FINAL
RECORD OF DECISION
INSTALLATION RESTORATION PROGRAM
SITES 2, 3, 5, AND 6

177TH FIGHTER WING
NEW JERSEY AIR NATIONAL GUARD
ATLANTIC CITY INTERNATIONAL AIRPORT
EGG HARBOR TOWNSHIP, NEW JERSEY

prepared for:

NGB/A7OR
Joint Base Andrews, Maryland

March 2019

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ATTACHMENTS

ACRONYMS

ACIA	Atlantic City International Airport
ACMUA	Atlantic City Municipal Utilities Authority
ANG	Air National Guard
AR	Administrative Record
ARARs	applicable or relevant and appropriate requirements
AST	aboveground storage tank
bgs	below ground surface
BaP	benzo(a)pyrene
BTEX	benzene, toluene, ethylbenzene, and xylenes
CB	catch basin
CDI	chronic daily intake
CEA/WRA	Classification Exception Area/Well Restriction Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CNS	central nervous system
COC	chemical of concern
COPC	chemical of potential concern
CSF	cancer slope factor
CY	cubic yard
DCE	dichloroethene
DD	Decision Document
DDT	dichlorodiphenyltrichloroethane
DERP	Defense Environmental Restoration Program
°F	degrees Fahrenheit
DGI	Data Gap Investigation
DoD	Department of Defense
DRO	diesel range organics
ERA	ecological risk assessment
ESD	Explanation of Significant Differences
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FS	Feasibility Study
ft	feet
GWQS	Groundwater Quality Standard
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IGW	Impact to Groundwater
IR	Information Repository

IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
ISCO	in-situ chemical oxidation
JP	jet propellant
LSRP	Licensed Site Remediation Professional
LUC	land use control
µg/kg	microgram per kilogram
µg/L	microgram per liter
$\mu g/m^3$	microgram per cubic meter
mg/kg	milligram per kilogram
mg/kg-day	milligram per kilogram per day
mg/L	milligram per liter
MNA	monitored natural attenuation
MOA	Memorandum of Understanding
msl	mean sea level
MTBE	methyl tertiary butyl ether
NAFEC	Naval Aviation Facilities Experimental Center
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NFA	No Further Action
NJ	New Jersey
NJAC	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
O&M	operation and maintenance
PA	Preliminary Assessment
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
PDI	pre-design investigation
PP	Proposed Plan
PPE	personal protective equipment
PPL	Priority Pollutant List
PRE	preliminary risk evaluation
PQL	practical quantitation limit
PZ	piezometer
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RfC	Reference concentration
RfD	reference dose
RI	Remedial Investigation
RSL	Regional Screening Level

ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SB	soil boring
SF	slope factor
SI	Site Investigation
SLERA	Screening Level Ecological Risk Assessment
SRP	Site Remediation Program
SRS	Soil Remediation Standard
SVOC	semi-volatile organic compound
SVS	soil vapor sampling
TAL	Target Analyte List
TCE	trichloroethene
TCL	Target Compound List
TFG	Tactical Fighter Group
TMV	toxicity, mobility, or volume
TPH	total petroleum hydrocarbon
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
UST	underground storage tank
UU/UE	Unrestricted Use/Unrestricted Exposure
VOC	volatile organic compound
VI	vapor intrusion
WOE	weight of evidence

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1.0 DECLARATION

1.1 Site Name and Location

Facility Name:	177th Fighter Wing
	New Jersey (NJ) Air National Guard (ANG)
Site Location:	Atlantic City International Airport (ACIA)
	Egg Harbor Township, New Jersey
Operable Unit/Site:	Installation Restoration Program (IRP) Sites 2, 3, 5, and 6

1.2 Statement of Basis and Purpose

This Record of Decision (ROD) presents the Selected Remedy for IRP Sites 2, 3, 5, and 6 located at the NJANG 177th Fighter Wing, ACIA, Egg Harbor Township, New Jersey, which constitutes Operable Unit 12 (OU12) of the Federal Aviation Administration (FAA) William J. Hughes Technical Center Superfund Site. The Selected Remedy for each site was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record (AR) for IRP Sites 2, 3, 5, and 6.

The ANG is managing remediation of contamination at the following IRP sites in accordance with CERCLA, as required by the Defense Environmental Restoration Program (DERP):

- IRP Site 2 – Aircraft Defueling Area;
- IRP Site 3 – Old Aircraft Washrack;
- IRP Site 5 – Liquid Waste Holding Area; and,
- IRP Site 6 – Drum Burial at Blast Pad near Alert Area.

A preferred alternative has been selected for IRP Site 3, and No Further Action (NFA) for IRP Sites 2, 5, and 6. The ANG coordinates IRP matters with the Federal Aviation Administration (FAA), who is the land owner, as well as the New Jersey Department of Environmental Protection (NJDEP) and United States Environmental Protection Agency (USEPA) who are the regulatory agencies in this matter.

1.3 Assessment of IRP Site 3

The response action selected for IRP Site 3 is necessary to protect the public health or welfare of the environment from actual or threatened releases of pollutants or contaminants from this site, which may present an imminent and substantial endangerment to public health or welfare.

IRP Site 3 was identified as a potential source area of contamination impacts during a 1988 Preliminary Assessment (PA). Since that time, it has been the subject of numerous environmental investigations, including:

- Site Investigation (SI) (ABB, 1995);
- Supplemental SI (Smith, 1996);
- Expanded Supplemental SI (TRC, 2003);
- Remedial Investigation (RI) (ANG, 2011); and,
- Data Gap Investigation (DGI) (ANG, 2015).

The results of these investigations have identified soil impacts near Former Building 53 (Former Parachute Shop) that contained a dry cleaning room. Tetrachloroethylene (PCE) exceeded the NJDEP Direct Contact Soil Remediation Standard (SRS) [43,000 micrograms per kilogram (µg/kg)] at one soil sample location with a concentration of 55,000 µg/kg. This area may be a potential source area contributing PCE concentrations to groundwater at the site.

Several groundwater investigations have been conducted to identify and delineate potential groundwater impacts at IRP Site 3. Groundwater investigation results have indicated that chloroform, cis-1,2-dichloroethene (DCE), naphthalene, PCE, and trichloroethylene (TCE) are present at concentrations exceeding NJDEP Groundwater Quality Standards (GWQSs)/ practical quantitation levels (PQLs) [1 microgram per liter (µg/L) for site chemicals of concern (COCs), with the exception of naphthalene which is 2 µg/L]. Concentrations exceeding GWQSs/PQLs were observed at multiple locations and spread across various groundwater sample interval depths ranging from 17 to 95 feet (ft) below ground surface (bgs). It should be noted that chloroform is a regional contaminant in this area of New Jersey and is not attributed to historic activities at IRP Site 3 (USGS, 2001).

As part of the 2011 RI, a Human Health Risk Assessment (HHRA) and a Screening Level Ecological Risk Assessment (SLERA) were conducted for IRP Site 3. As part of the HHRA, chemicals of potential concern (COPCs) in soil and groundwater were determined by screening the maximum detected concentrations against USEPA industrial soil and tap water Regional Screening Levels (RSLs). COPCs included chloroform, naphthalene, PCE, and chromium. It should be noted that chloroform is a regional contaminant in this area of New Jersey and while not attributable to IRP Site 3, it is discussed when presenting overall site risks. The HHRA concluded that the COPCs did not pose a human health risk in groundwater under current land use; however, if groundwater were to be used for potable water in the future, COPC concentrations did pose a threat for inhalation and ingestion of chloroform, naphthalene, and PCE. The RI concluded that while chromium was detected above the PQL, these concentrations appear to be within the range attributable to natural background, and are therefore unlikely to be related to the historic activities at IRP Site 3.

The SLERA found that residual concentrations in groundwater at IRP Site 3 did not pose an ecological risk since the groundwater discharge to surface water pathway is not complete. The fate and transport evaluation indicated that organic compounds either do not exceed surface water benchmarks or concentrations would attenuate to levels below the surface water benchmarks prior

to discharge to water bodies. No other ecological pathways were identified for ecological habitat because the entire site is developed. Therefore, the RI did not identify potential ecological risks at IRP Site 3.

Based upon investigation results, sediment within the catch basins at IRP Site 3 contained contaminant concentrations exceeding NJDEP Residential Direct Contact SRSs and needed to be removed from the site. On 9 September 2014, non-hazardous sediment was removed from catch basins 3CB-1 and 3CB-2 and containerized in two 55-gallon drums. On 9 December 2014, the drums were loaded and transported off-site for disposal. Sediment was not removed from catch basin 3CB-3 due to cadmium concentrations exceeding the Resource Conservation and Recovery Act (RCRA) Maximum Concentration of Contaminants for the Toxicity Characteristic. Thus, the sediment within the catch basin was classified as hazardous waste. This sediment was not removed as part of the DGI, but will be addressed during the future remedial action.

Areas within IRP Site 3 cannot support unrestricted use due to concentrations of cis-1,2-DCE, naphthalene, PCE, and/or TCE remaining above the NJDEP GWQSs after implementation of the selected remedy. Land use restrictions are required as part of this response action and will be achieved through imposition of land use controls (LUCs) that limit the use and/or exposure to those areas of the property, including water resources, that are contaminated. It is anticipated that a Classification Exception Area/Well Restriction Area (CEA/WRA) LUC will be implemented as part of the remedy, and will remain in-place until groundwater cleanup levels are attained through natural attenuation. The ANG and FAA are committed to implementing, monitoring, maintaining, and enforcing all components of the selected remedy to ensure that it remains protective of human health and the environment.

1.4 Description of Selected Remedy

1.4.1 IRP Site 3

Remedial alternatives for IRP Site 3 were developed and evaluated through a Feasibility Study (FS) (ANG, 2016). Based on the results of the FS, the Selected Remedies were chosen and included Soil Alternative 2 – *Excavation and Off-site Disposal*, for soils and Groundwater Alternative 4 – *In-Situ Chemical Oxidation (ISCO) Plus Monitored Natural Attenuation (MNA),* for groundwater at IRP Site 3. The major components of the selected response actions are presented below.

- Soil Alternative 2 – *Excavation and Off-site Disposal*, will include the physical removal of impacted soil from areas identified to contain PCE at concentrations greater than NJDEP SRSs. Since the complete horizontal and vertical extent of impacts were not delineated during the DGI, a pre-design soil investigation (PDI) will be implemented to refine the extent of impacted soil and develop a site-specific impact to groundwater (IGW) value. The IGW value will serve as the soil cleanup criteria and guide the extent of excavation. The vertical extent of soil impacted by PCE is assumed to be limited by a fine-grained silt

and clay lens (0.5 to 1 ft in thickness) that is present within the hotspot area at depths ranging from 1.5 to 4 ft bgs. Since the complete horizontal and vertical extent of impacts have not been delineated, the area of impact is approximate and will be confirmed as part of the remedial action. Excavated soil will be disposed at an appropriately permitted off-site facility. As part of the remedial action, sediment within Catch Base 3CB-3 previously classified as hazardous waste will be physically removed and disposed at a permitted off-site disposal facility.

- Groundwater Alternative 4 – *ISCO Plus MNA*, will include the injection of a chemical oxidant into injection wells drilled into the impacted zone of the groundwater aquifer to reduce constituent concentrations through the oxidation of volatile organic compounds (VOCs). Injection wells will be installed through the contaminant plume area where concentrations are ≥5 µg/L. Injections will be conducted during two full-scale injection events. Once COC concentrations have been reduced to below 5 µg/L, MNA will be implemented in accordance with USEPA and NJDEP requirements until COC concentrations are confirmed to be below 1 µg\L. Because this remedy will leave groundwater COCs at concentrations above the remedial action objectives (RAOs), a Classification Exception Area/Well Restriction Area (CEA/WRA) LUC will be implemented to restrict groundwater use at IRP Site 3. In addition, 5-year reviews will be required within 5 years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

1.4.2 IRP Sites 2, 5, and 6

The ANG and FAA, with concurrence from the NJDEP and USEPA, have determined that no further CERCLA remedial action is necessary at IRP Sites 2, 5, and 6. The NFA determination was accepted as there were no CERCLA risks identified at these sites and; therefore, the no action alternative was deemed acceptable.

1.5 Statutory Determinations

The ROD presents the selected remedy decision under CERCLA for IRP Sites 2, 3, 5, and 6. The selected remedy for IRP Site 3 and the NFA determination for IRP Sites 2, 5, and 6 are protective of human health and the environment, complies with promulgated requirements that are applicable or relevant and appropriate to the remedial action, and is cost effective.

The selected remedy represents the maximum extent to which permanent solutions can be used in a practicable manner at the IRP sites. It provides the best balance of trade-offs in terms of balancing criteria, while also considering the statutory preference for treatment as a principal element of a remedy and considering state and community acceptance.

1.5.1 IRP Site 3

The ROD presents the selected remedy for IRP Site 3. The NCP establishes the expectation that

treatment will be used to address the principal threats posed by a site whenever practicable (40 Code of Federal Regulations (CFR) 300.430(a) (1) (iii) (A)]. The selected groundwater remedy for IRP Site 3, *ISCO Plus MNA*, satisfies the statutory preference for treatment as a principal element of the remedy because ISCO injections will be used to treat groundwater COCs in-situ to concentrations below 5 µg/L. This treatment will reduce the toxicity, mobility, and volume of contaminants. During execution of the alternative, the community would be protected by limiting exposure through implementation of a CEA/WRA LUC to restrict groundwater use.

Due to the time required to execute this alternative (2 years of active treatment with approximately 24 years of MNA), 5-year reviews will be required. Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment. If necessary, as part of the 5-year review process, the FAA may conduct a remedial process optimization (RPO) assessment and make recommendations to enhance the remedy to achieve RAOs. The FAA and ANG may also conduct a RPO sooner than 5 years if it is deemed necessary.

The soil remedy for IRP Site 3, *Excavation and Off-site Disposal*, does not satisfy the statutory preference for treatment as a principal element of the remedy as the evaluation of treatment alternatives during the FS were determined to be either ineffective in reducing COC concentrations or not feasible due to costs associated with treating relatively low concentrations. Although *Excavation and Off-site Disposal* does not utilize treatment, this alternative was selected as it will protect human health and the environment by reducing the mobility, toxicity, and volume of contaminants through physical removal of impacts to achieve the RAOs.

1.5.2 IRP Sites 2, 5, and 6

The ROD presents the selected NFA decision under CERCLA for IRP Sites 2, 5, and 6. The NFA for IRP Sites 2, 5, and 6 is protective of human health and the environment, complies with promulgated requirements that are applicable or relevant and appropriate to the remedial action, and is cost effective.

The selected remedy represents the maximum extent to which permanent solutions can be used in a practicable manner at the IRP sites. It provides the best balance of trade-offs in terms of balancing criteria, while also considering the bias against off-site treatment and disposal and considering state and community acceptance.

Restoration activities for IRP Sites 2, 5, and 6 at the 177th Fighter Wing are complete. No other remedial action is necessary to ensure protection of human health and the environment. Restoration activities conducted at IRP Sites 2, 5, and 6 are provided in more detail in Section 2.0.

1.6 Data Certification Checklist

The following information is included in the Decision Summary section of this ROD (Section 2). Additional information can be found in the AR file for IRP Site 3, which can be found at the Environmental Management Office of the 177th Fighter Wing, NJANG, in Egg Harbor Township, New Jersey.

- List of chemicals of concern (COCs) and their respective concentrations (Section 2.8.2.1);
- Baseline risk represented by the COCs (Section 2.8);
- Cleanup levels established for COCs and the basis for these levels (Section 2.13.4);
- How source materials constituting principal threats will be addressed (Section 2.12);
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and ROD (Section 2.7);
- Potential land and ground water use that will be available at the site as a result of the selected remedy (Section 2.10.3);
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 2.11.7); and,
- Key factor(s) that led to selecting the remedy (i.e., describe how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (Section 2.13.1).

1.7 Authorizing Signatures

This signature sheet documents the FAA and ANG approval and concurrence by NJDEP and USEPA of the selected remedy for IRP Site 3 and NFA for IRP Sites 2, 5, and 6 in this ROD.

Kevin Mattoch — 31 May 19

Kevin L. Mattoch, P.E.
Chief, Operations Division
Installations and Mission Support Directorate
Air National Guard

Date

6/18/19

James Connett, PMP
Division Manager, Center Operations
Federal Aviation Administration

Date

Pat Evangelista
Acting Director, Superfund and Emergency Management Division
United States Environmental Protection Agency, Region 2

8/26/19
Date

2.0 DECISION SUMMARY

The Decision Summary identifies the selected remedy, explains how the selected remedy decision fulfills statutory and regulatory requirements, and provides a substantive summary of the AR file that supports the selected remedy decision. Following completion of the ROD, the ANG has determined IRP Site 3 requires a response action to address residual contamination and that IRP Sites 2, 5, and 6 have reached the Response Complete stage.

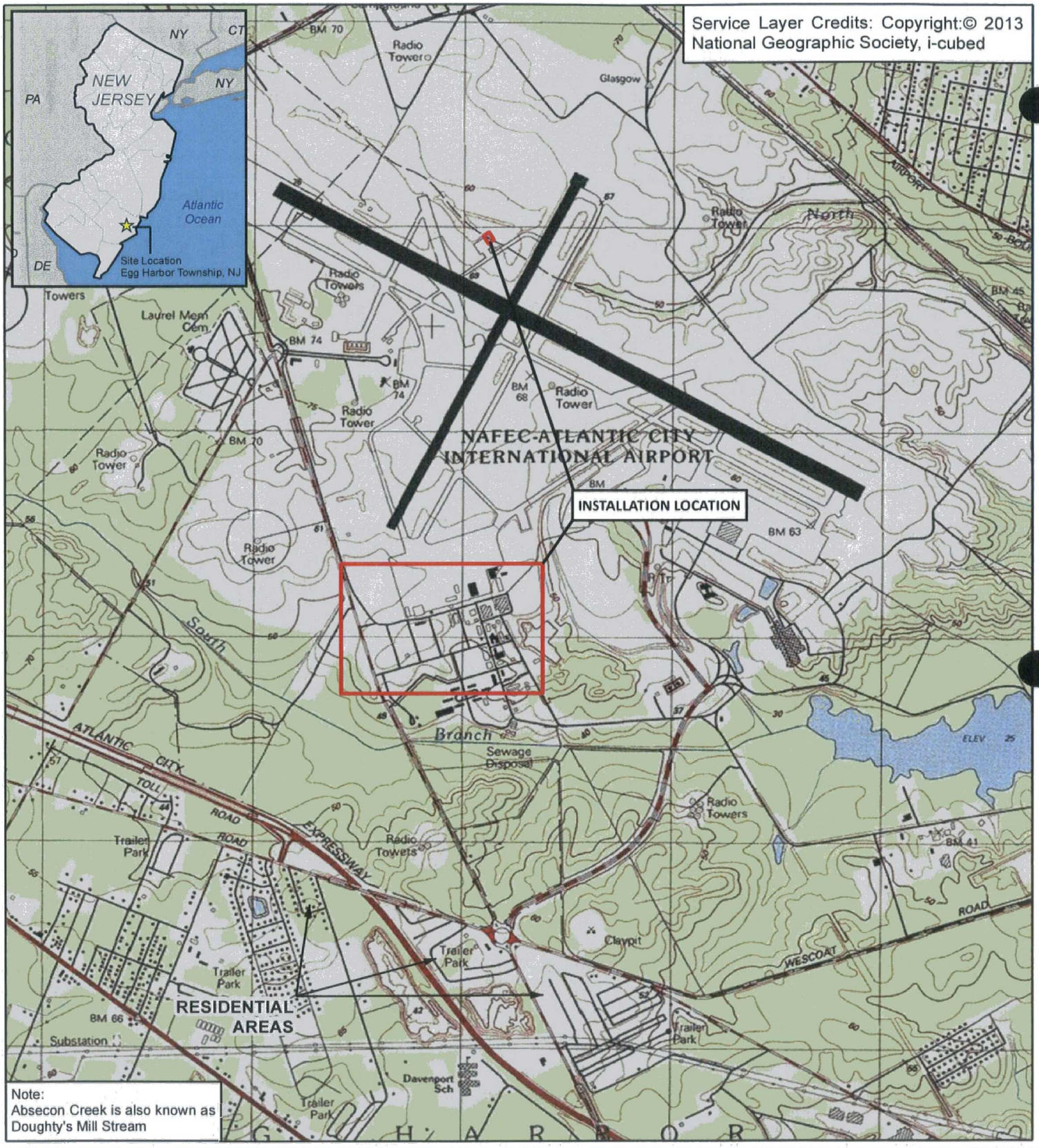
2.1 Site Name, Location, and Description

The NJANG, 177th Fighter Wing, is located in Egg Harbor Township, Atlantic County, New Jersey (**Figure 2-1**). The Base is located within the William J. Hughes Technical Center, which is administered by the FAA. The Technical Center, which occupies an area of over 5,000 acres, includes laboratories, test facilities, support facilities, the ACIA (operated by the South Jersey Transportation Authority), and a non-commercial aircraft hangar. In addition to the NJANG Base, the Technical Center is also host to the Department of Homeland Security Transportation Security Laboratory and the United States Coast Guard Group Air Station Atlantic City. The NJANG, occupies two tracts of land located to the northwest and west of the FAA terminal, with a total area of approximately 280 acres. Currently, the Base exists as primarily improved areas with buildings, roadways, aircraft parking aprons, and other structural improvements. The Base is surrounded by the ACIA to the northeast and west and green space and the Atlantic City Expressway to the south. The property is federally owned and permitted by the FAA to the United States Air Force (USAF), who in turn has licensed the property to the New Jersey ANG.

During its operational history, 177th Fighter Wing personnel have engaged in various activities, including aircraft and ground vehicle maintenance. These operations generate varying quantities of waste oils, recovered fuels, corrosion inhibitors, spent cleaners, and solvents. As part of the Department of Defense's (DoD's) IRP; the ANG initiated activities to identify, evaluate, and remediate former disposal or spill sites containing hazardous substances. The ANG is publishing this ROD to document public comment on selection of the remedial action under CERCLA, for IRP Site 3, and NFA, for IRP Sites 2, 5, and 6, at the Base, as required in Section 117(a) of CERCLA. These sites consist of the following:

- IRP Site 2 – Aircraft Defueling Area;
- IRP Site 3 – Old Aircraft Washrack;
- IRP Site 5 – Liquid Waste Holding Area; and,
- IRP Site 6 – Drum Burial at Blast Pad near Alert Area.

The locations of IRP Sites 2, 3, 5, and 6 are depicted in **Figure 2-2**.



New Jersey Air National Guard
177th Fighter Wing
Egg Harbor Township, NJ

N

FIGURE 2-1
Installation Location Map
Record of Decision
New Jersey Air National Guard - 177th Fighter Wing
Egg Harbor Township, New Jersey

0 250 500 1,000 1,500 2,000 2,500 Meters
0 2,000 4,000 6,000 8,000 Feet

4/16/2018	File: E_Harbor_NJ_ANG_Base_Location_FS_2015.mxd	
PROJ: 291330008	Drawn: JBO	

New Jersey Air National Guard
177th Fighter Wing
Egg Harbor Township, NJ

N

FIGURE 2-2
Site Location Map
Record of Decision
New Jersey Air National Guard - 177th Fighter Wing
Egg Harbor Township, New Jersey

0 100 200 400 600 800 1,000 1,200 Meters
0 500 1,000 2,000 3,000 4,000 Feet

03/23/2018	File: E_Harbor_NJ_ANG_IRP_Site_Locations_DGI_Rp2.mxd	
PROJ: 276220185	Drawn: JBO	

The ANG has conducted environmental investigations at IRP Sites 2, 3, 5, and 6, in accordance with CERCLA under DERP, which was established by Section 211 of SARA of 1986. As the regulatory review agency, the USEPA provides primary oversight of the environmental restoration actions. Funding is provided by the Defense Environmental Restoration Account, a funding source approved by Congress to clean up contaminated sites on DoD installations.

2.2 Site History and Enforcement Activities

Prior to ANG presence at the facility, the site was occupied by a Naval Air Station, which was operated until 1958 when the property was transferred to the Airways Modernization Board for use as its National Aviation Facilities Experimental Center (NAFEC). By November 1958, the FAA had assumed control of this NAFEC facility. In August 1958, the ANG 119th Fighter Squadron moved to the former Atlantic City Naval Air Station and was re-designated the 119th Tactical Fighter Squadron. This change of station also brought about a change in aircraft to the F-84F "Thunderstreak". In 1962, the unit was reorganized into the 177th Tactical Fighter Group (TFG), and transitioned into F-86H "Sabre" aircraft. Two years later, the unit transitioned into F-100 "Super Sabres." In 1972, Headquarters Air Force announced that the 177th TFG would be assigned to the Aerospace Defense Command and be responsible for protecting the United States from airborne attacks, and so was reorganized as the 177th Fighter Interceptor Group and 119th Fighter Interceptor Squadron. In 1973, the unit transitioned into the F-106 "Delta Dart" and assumed alert status the following year. The Aerospace Defense Command then came under Tactical Air Command as the Air Defense Tactical Air Command, and then again changed to a numbered Air Force, 1st Air Force. During 1988, the unit transitioned into the F-16A/B, "Fighting Falcon." In 1992, the unit became the 177th Fighter Group and finally became the 177th Fighter Wing in 1995.

The 177th Fighter Wing is a community-based force that flies the F-16C/D aircraft. This version of the "Fighting Falcon" features many new and upgraded aircraft Systems. Known as the Jersey Devils, the wing's federal mission is to provide combat ready personnel, aircraft, and equipment for worldwide deployment in support of USAF objectives. The 177th's state mission is to protect life and property, provide disaster relief, and ensure public safety when called upon by the New Jersey Governor. The wing's community role is to participate in events that add value to the community.

Description of previous investigation activities conducted at IRP Sites 2, 3, 5, and 6 can be found in Section 2.6. The ANG conducted corrective action activities at IRP Site 6, as described in greater detail in Section 2.6.5 of this ROD. Following completion of the investigation and evaluation of remedial alternatives, the 177th Fighter Wing received concurrence from FAA, USEPA, and NJDEP for the selected remedy for IRP Sites 2, 3, 5, and 6.

No regulatory enforcement actions have been reported at IRP Sites 2, 3, 5, and 6.

The ANG, FAA, USEPA, and NJDEP understand and agree that the contemplated permanence of the remedy reflected herein is dependent in part on ANG substantial good-faith compliance with the specific LUC maintenance commitments reflected therein. The ANG and FAA also understand that accomplishment of the remedy is dependent upon compliance with the Memorandum of Agreement (MOA) between the ANG and FAA that sets responsibilities for actions, costs, management, and administration of investigation and cleanup of CERCLA sites at the 177th Fighter Wing. Should such compliance not occur or should the MOA be terminated, it is understood that the protectiveness of the remedy may be reconsidered; consequently, additional measures may need to be taken to ensure adequate and necessary future protection of human health and the environment.

In accordance with ANG policy, to the extent practicable, National Environmental Policy Act (NEPA) values have been incorporated throughout the CERCLA process culminating in this ROD. Separate NEPA documentation will not be issued.

2.3 Community Participation

NCP Section 300.430(f)(3) establishes a number of public participation activities that the lead agency must conduct following preparation of the Proposed Plan (PP) and review by the support agency.

The ANG and NJANG have kept the community and other interested parties apprised of 177th Fighter Wing activities through fact sheets, press releases, and public meetings, as necessary. IRP documents relevant to the environmental studies performed at IRP Sites 2, 3, 5, and 6 can be found in the AR maintained at the Environmental Management Office of the 177th Fighter Wing, NJANG, in Egg Harbor Township, New Jersey. The AR file for the documents utilized in selecting a response action for IRP Site 2, 3, 5, and 6 is provided as **Attachment 1**. As part of the effort to inform the community about IRP Site 2, 3, 5, and 6, the Information Record (IR) for these sites, was placed at the Atlantic County Library System, Mays Landing Branch for public review. The IR was established to make accessible to the public documents and information, such as technical reports, data, and regulatory correspondence, pertaining to IRP Sites 2, 3, 5, and 6. The Atlantic County Library System, Mays Landing Branch is located at 40 Farragut Avenue, Mays Landing, New Jersey 08330.

The ANG published a public notice to announce the availability of the PP for IRP Sites 2, 3, 5, and 6 recommending remedial action under CERCLA, in the *The Press of Atlantic City* newspaper on 9 and 10 July 2017. The notice was also posted along with the PP at the The Atlantic County Library System, Mays Landing Branch. From 10 July to 9 August 2017, the ANG held a 30-day public comment period to accept comments on the PP, and information contained in the IR. Documentation of the Public Notice is included as **Attachment 2**. The ANG published a public notice to announce the public meeting in the *The Press of Atlantic City* newspaper on 28 January 2018. A public meeting on the PP was held on 30 January 2018 at the Residence Inn Atlantic City

Airport, 3022 Fire Road, Egg Harbor Township, New Jersey, 08234. The public meeting was not attended by anyone representing the public. Transcripts for the public meeting are included as **Attachment 3**. No comments were received by the public during the public comment period or the public meeting. A Responsiveness Summary is included as **Attachment 4**.

2.4 Scope and Role of Operable Unit or Response Action

2.4.1 IRP Site 3

The response action for IRP Site 3 presented in this ROD is intended to protect public health and welfare, and the environment from actual or threatened releases of pollutants or contaminants from this site which may present an imminent and substantial endangerment to public health or welfare. This will be accomplished by implementing the following:

- Soil Alternative 2 – *Excavation and Off-site Disposal*, will include the physical removal of impacted soil from areas identified to contain PCE at concentrations greater than NJDEP SRSs. A PDI will be implemented to refine the extent of impacted soil and develop a site-specific impact to groundwater (IGW) value. The IGW value will serve as the soil cleanup criteria and guide the extent of excavation. The vertical extent of soil impacted by PCE is assumed to be limited by a fine-grained silt and clay lens (0.5 to 1 ft in thickness) that is present within the hotspot area at depths ranging from 1.5 to 4 ft bgs. Since the complete horizontal and vertical extent of impacts have not been delineated during the DGI, the area of impact is approximate and will be confirmed as part of the remedial action. Excavated soil will be disposed at an appropriately permitted off-site facility. As part of the remedial action, sediment within Catch Base 3CB-3 previously classified as hazardous waste will be physically removed and disposed at a permitted off-site disposal facility.
- Groundwater Alternative 4, *ISCO Plus MNA*, will include the injection of a chemical oxidant into injection wells drilled into the impacted zone of the groundwater aquifer to reduce constituent concentrations through the oxidation of VOCs. Injection wells will be installed through the contaminant plume area where concentrations are $\geq$5 µg/L. Injections will be conducted during two full-scale injection events. Once COC concentrations have been reduced to below 5 µg/L, MNA will be implemented in accordance with USEPA and NJDEP requirements until COC concentrations are confirmed to be below NJDEP GWQSs.

2.4.2 IRP Sites 2, 5, and 6

The NFA decision for IRP Sites 2, 5, and 6 presented in this ROD is intended to protect public health and welfare, and the environment. No additional response actions will be necessary under the NFA for IRP Sites 2, 5, and 6.

2.5 Site Characteristics

2.5.1 Physiography and Climate

The NJANG Base lies within the New Jersey Coastal Plain Physiographic province, within Atlantic County, which is characterized by a relatively flat topography with minimal relief. Atlantic County includes parts of the inner upland (Miocene-Pliocene) and outer lowland (Pleistocene) sub-provinces. The maximum ground elevations at the Base range from approximately 70 ft mean sea level (msl) (in the Alert Area) to approximately 20 ft msl toward the southeast.

The Atlantic City region experiences a temperate climate that is influenced by a moderating effect of the Atlantic Ocean. Mild weather tends to persist late into the fall while warming tends to start late in the spring. The mean annual temperature in the Atlantic City region is 53.0 degrees Fahrenheit (°F). Temperatures of 90°F or higher are normally recorded on an average of 16 days per year, whereas temperatures of 32°F or less are recorded on an average of 18 days per year. The mean annual precipitation in the region is 41.23 inches (ABB, 1995).

2.5.2 Geology

The geology of the Atlantic Coastal Plain consists of an eastward thickening apron of unconsolidated and partly consolidated sediments (Cretaceous-Tertiary) which extends along the east coast. These sediments overlap the Precambrian to Paleozoic crystalline basement complex and gently dip towards the southeast (ABB, 1995). Near the NJANG Base, the sedimentary wedge is estimated to be approximately 4,000 ft thick, but thickens towards the east in the direction of the regional dip (Richards, et al., 1962). The geology of Atlantic County includes the Precambrian and Paleozoic basement rocks, which, in this area are assumed to be very flat in relief, sloping southeastward toward the ocean. Overlying this are the Cenozoic and Mesozoic deposits. The three geologic units identified for the site are the Quaternary Bridgeton formation, Miocene Cohansey sand, and Miocene Kirkwood formation. A brief description of each is included in the following paragraphs.

At the NJANG Base, the Bridgeton formation may overlay the Cohansey sand. The Bridgton formation is a non-marine quaternary deposit of fluvial sand and gravels and is characterized by a highly weathered mixture of unconsolidated materials that are typically cross-stratified, showing rapid vertical and horizontal changes in texture. Lag gravels, suggestive of the Bridgeton formation, have been observed at topographically high areas in the northwest and southeast parts of FAA property. Distinction between the Bridgeton formation and gravels within the Cohansey sand is difficult since the Bridgeton is derived from re-worked sediments of the Cohansey (ABB, 1995).

The Cohansey sand crops out over the majority of the NJANG and FAA property. The formation consists of predominately yellow to orange-brown sand, with lesser amounts of pebbly sand, fine-

to coarse-grained sand, silty and clayey sand and interbedded clays. Gravel beds, up to several ft thick, may also be present within this unit but are generally less than 1-ft thick. Clay beds within the Cohansey in the Mullica River Basin, north of the NJANG, can range in thickness from less than an inch to as much as 24 ft. Clayey sand zones within the unit often form thick sections covering several square mile areas. These clayey sands have been found to be as thick as 30 ft at the FAA property and are nearly indistinguishable from silty sand zones without the use of geophysical logging and/or grain size analysis. The Cohansey sand attains a maximum known thickness of 265 ft at Atlantic City. In the vicinity of the NJANG, the thickness of the unit is likely closer to the average thickness of 156 ft (ABB, 1995).

The Kirkwood formation is not exposed near NJANG but may be encountered at a depth ranging from 150 ft bgs to more than 250 ft bgs in the lower parts of the nine Atlantic City Municipal Utilities Authority (ACMUA) production wells, which are on FAA property. The Kirkwood formation consists of light to dark gray sand, silt, clay, and gravel and is uniformly overlain by the Cohansey sand (ABB, 1995).

2.5.3 Hydrogeology

The hydrogeologic framework within the Atlantic Coastal Plain consists of a series of aquifers and semi-confining to confining units. In this Atlantic City Region, three of these aquifers are of interest, including the shallow or water table aquifer within the Cohansey formation, the Kirkwood-Cohansey Aquifer System, and the Atlantic City 800-ft Sand Aquifer (Kirkwood formation). The deeper aquifers (Eocene-, Paleocene-, and Cretaceous-age) are typically not accessed in the Atlantic City area due to high salinity and generally poor water quality (SCITEK, 1989).

2.5.3.1 Cohansey Sand (Water Table Aquifer)

The shallow or water table aquifer is situated in the upper part of the Cohansey sand or similar sand equivalents. In the area of the NJANG, depths to water range from 2 to 31 ft bgs and may vary as much as 5 to 7 ft. Regionally, the water table aquifer is hydraulically connected to deeper underlying aquifers, but is seldom used as a water resource due to its relatively thin occurrence. Locally, units within the Cohansey may serve as confining layers yielding artesian or semi-artesian conditions (ABB, 1995). Impacts are present within the shallow water table aquifer at IRP Site 3.

2.5.3.2 Kirkwood-Cohansey Aquifer

The Kirkwood-Cohansey Aquifer is a major aquifer system in the Atlantic City region. According to the New Jersey Geologic Survey, the aquifer supplies water for potable water supply, agriculture, commercial/industrial, non-agricultural irrigation, and mining.

The Kirkwood-Cohansey Aquifer encompasses two separate formations that are hydraulically connected (i.e., the Cohansey and the Kirkwood formations). The Cohansey formation is subdivided as the Shallow Cohansey Aquifer (shallow aquifer generally present between 3 to

23 ft bgs), the Intermediate Cohansey Aquifer (intermediate aquifer generally present between 24 to 120 ft bgs), and the Deep Cohansey Aquifer (deep aquifer generally present between 150 to 200 ft bgs), with two significant clay units, the Upper Cohansey clay and the Middle Cohansey clay, separating the shallow and intermediate aquifers and the intermediate and deep aquifers, respectively. These two clay units can create semi-confining to confining conditions.

The Upper Cohansey clay locally separates the shallow aquifer from the intermediate aquifer and reportedly occurs between approximately 40 ft and 65 ft bgs, but is believed to be discontinuous. Based upon drill logs recorded during the DGI, clay lenses/pockets were observed between 30 and 40 ft bgs and appeared to be thin and discontinuous. Therefore, it appears that the Upper Cohansey clay is absent beneath IRP Site 3, and the shallow and intermediate aquifers are considered to be one continuous hydrogeologic unit, the shallow/intermediate aquifer. The combined saturated thickness of this shallow/intermediate aquifer varies from approximately 80 to 100 ft. Based on the DGI results, the combined aquifer ranges from approximately 20 to 120 ft bgs Impacts at IRP Site 3 are present within this combined shallow/intermediate aquifer at depths ranging from 20 to 98 ft bgs.

The lower, more extensive clay (Middle Cohansey clay) underlies the shallow/intermediate aquifer at IRP Site 3 at greater than 100 ft bgs and ranges from 20 to 55 ft in thickness (ANG, 2015). However, this clay unit has not been observed within borings advanced to this depth at IRP Site 3 (ABB, 1995).

The nine production wells (ACMUA wells) on the FAA property, north of the Upper Atlantic City Reservoir penetrate the lower part of the Cohansey formation (Deep Cohansey Aquifer) (encountered at depths ranging from 100 to 155 ft bgs) and possibly the upper part of the Kirkwood formation (encountered at depths ranging from 150 to greater than 250 ft bgs).

2.5.3.3 Atlantic City Aquifer

The Atlantic City Aquifer is a major aquifer situated within an 800-ft thick sand section in the lower part of the Kirkwood formation. This formation lies beneath the Cohansey formation. The aquifer is a major water-bearing unit that supplies water along the coast and as far west as Egg Harbor Township (NJGS, 2001). The sand is confined by a thick diatomaceous clay bed present in the middle of the formation. The thick clay bed, and consequently the aquifer itself is restricted to the coastal area and short distances inland (ABB, 1995). The Atlantic City Aquifer is recharged by lateral flow from the Kirkwood-Cohansey Aquifer system in areas up from the extent of the confining unit and by vertical leakage from the Kirkwood-Cohansey Aquifer system through the confining unit (NJGS, 2001). This aquifer may be present within the Base or FAA vicinity (ABB, 1995).

2.5.3.4 Public Supply Wells

Atlantic City obtains its municipal water supply from the ACMUA via 13 production wells, which

are located north of the Upper Atlantic City Reservoir. Eleven of these wells obtain their water from the Lower Cohansey Aquifer (150 to 200 ft bgs) and two obtain their water from the Kirkwood Aquifer. Nine of these wells are located on FAA property. This water supply is supplemented by water withdrawn from two surface water reservoirs (Kuehnle Pond Dam and Doughty Pond Dam). The upper reservoir lies entirely within FAA property, whereas the lower reservoir is situated just outside of the FAA property, to the east. The reservoirs are fed by the North and South Branches of Absecon Creek (also known as the North and South Branches of Doughty's Mill Stream), which traverse portions of the FAA property. The South Branch of Absecon Creek also flows through the FAA property within a short distance of the southern perimeter of the NJANG Base.

Potable water near the Base is obtained in part from the Cohansey sand (ABB, 1995; TRC, 2003). The Middle Cohansey sand is approximately 80 to 90 ft bgs and is utilized primarily for domestic water supply. The Kirkwood formation, located at 150 to 200 ft bgs, is tapped for municipal and commercial use.

The FAA currently extracts potable water from three production wells, FAA-1R, FAA-5, and FAA-2R, located near IRP Site 3. These three wells are screened in the Deep Cohansey Aquifer. Well FAA-2 was used from approximately 1943 to 2013 when it was properly closed and abandoned and replaced by well FAA-2R.

2.5.4 Storm Water Management

Storm water from the NJANG Base is discharged to South Branch of Doughty's Mill Stream through an outfall point just south of the NJANG's storage and tanker loading terminal for jet fuel. Prior to August 1992, wastewater generated at the facility was treated at the Base Sewage Treatment Plant. Thereafter, all generated wastewater has been sent off-site to the ACMUA Wastewater Treatment Plant via Regional Interceptor.

2.5.5 Ecology

The NJANG Base is included within the New Jersey State Designated Pinelands Area, created by the New Jersey Pinelands Protection Act of 1979. This area encompasses 938,000 acres of protected land and includes portions of seven counties and all or part of 53 municipalities. It should be noted that although the site is located within the New Jersey State Designated Pinelands Area, it is not located within Pinelands National Reserve boundary.

2.5.6 Areas of Archeological and Historical Importance

There are no areas of archeological or historical importance at the 177th Fighter Wing.

2.6 Previous Site Characterization Activities

Four IRP sites are the subject of this ROD, including IRP Site 2 (Aircraft Defueling Area), IRP Site 3 (Former Aircraft Washrack), IRP Site 5 (Liquid Waste Holding Area), and IRP Site 6 (Drum

Burial at Blast Pad). Investigation activities were conducted at each IRP site, as detailed below.

2.6.1 IRP Site 2 – Aircraft Defueling Area

IRP Site 2, the Aircraft Defueling Area, is located in the south-central portion of the Base, north of an existing concrete flight apron (**Figure 2-2**). The site is delineated by the FAA property line to the north, by Taxiway H to the east, by the apron edge to the south, and by the apron's edge to the west. The area is an approximately 1,450 ft by 180 ft rectangular area, and consists of two subareas (Subareas A and B) (**Figure 2-3**). Subarea A is a grass-covered area that is approximately 1,080 ft by 180 ft and is located between Taxiways C and H. Subarea A contains the beginning of a concrete flume that extends to the north into FAA property. Although historically Subarea B was a grass-covered area; currently, Subarea B is an asphalt-paved area that is approximately 250 ft by 180 ft and is located west of Taxiway C.

Between 1965 and 1975, IRP Site 2 was used as an aircraft defueling area. During this time, aircraft were routinely defueled into tank trucks or bowsers. When a tank truck or browser became full, any residual fuel still in the aircraft was discharged to the grassy areas adjacent to the flight apron. Discharges of fuel potentially occurred at various points along the entire length of both grassy areas, which were identified as Subparts A and B during the 1989 PA. According to historical documents, various spills and dumping of fuel were reported at IRP Site 2, including a specific event involving the discharge of more than 400 gallons of Jet Propellant (JP)-4 to the grassy area near Subarea B (TRC, 2003).

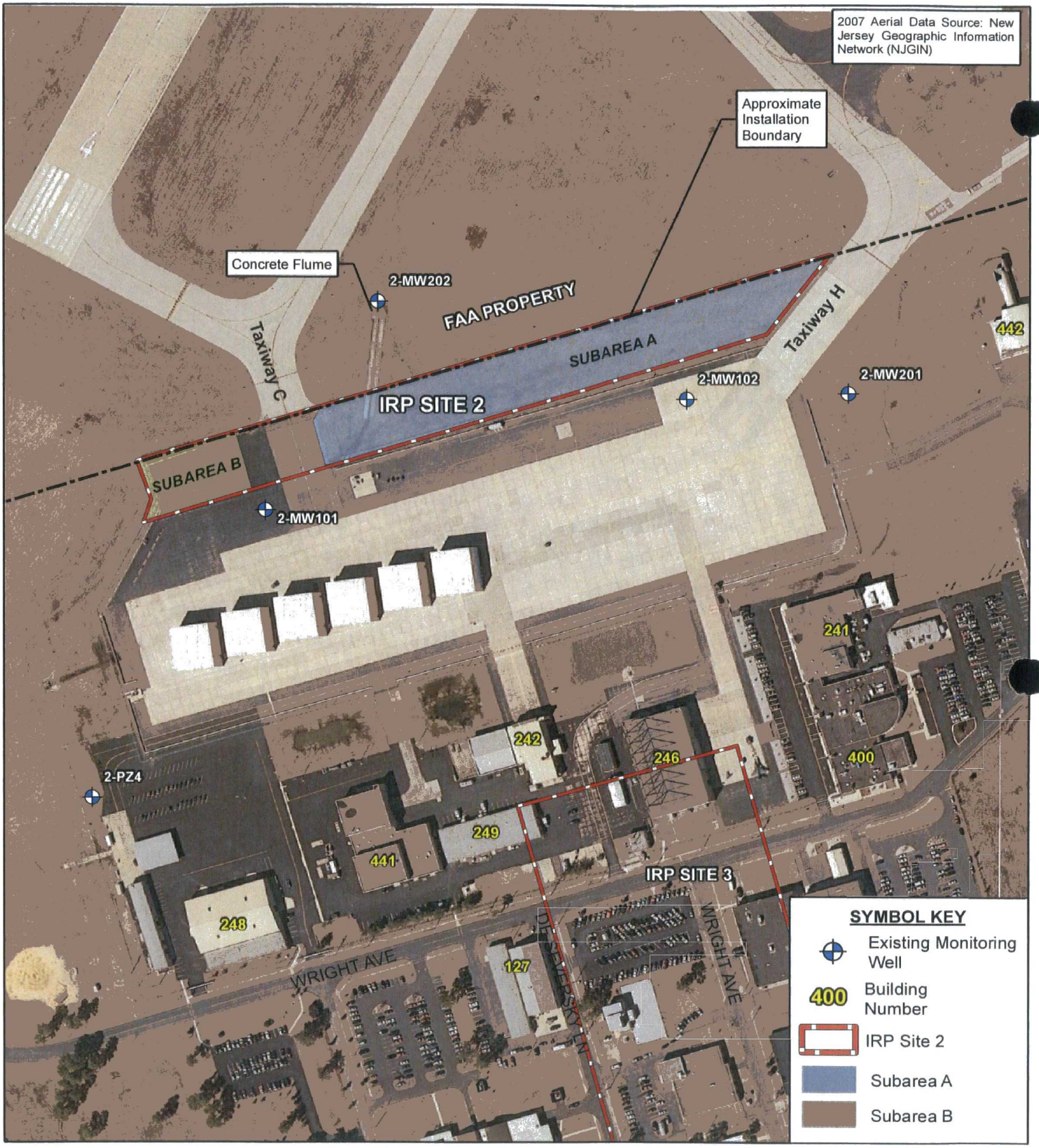
Previous investigations conducted at IRP Site 2 include:

- PA (SCITEK, 1989);
- Site Investigation (SI) (ABB, 1995);
- Supplemental SI (Smith, 1996);
- Quarterly Groundwater Sampling (TRC, 2002a, 2002b, 2002c, and 2002d);
- RI (ANG, 2011);
- DGI (ANG, 2015); and,
- FS (ANG, 2016).

A summary of these investigations is presented in the following paragraphs.

Preliminary Assessment (1989)

Based on interviews conducted during the PA with NJANG personnel and site inspections, six spill sites were identified as potential sources of impacts, including IRP Site 2. The assessment identified the two subareas within IRP Site 2 (Subareas A and B) as the specific points of aircraft defueling (ABB, 1995).



New Jersey Air National Guard
177th Fighter Wing
Egg Harbor Township, NJ

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FIGURE 2-3
IRP Site 2 Layout
Record of Decision
New Jersey Air National Guard 177th Fighter Wing
Egg Harbor Township, New Jersey

0 50 100 200 300 Meters
0 125 250 500 750 1,000 Feet

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Site Investigation (1995)

In March 1995, a SI Report was submitted that documented the field investigative activities conducted between October 1991 and January 1992. This investigation was conducted to confirm the presence or absence of impacts at various sites and to evaluate potential threats to public health and/or the environment. Investigative activities included the installation of piezometers, advancement of soil borings; collection of surface and subsurface soil samples, soil vapor sampling (SVS), and installation of groundwater monitoring wells. Results of the investigation indicated that concentrations of VOCs and semivolatile organic compounds (SVOCs) above the screening criteria were present in subsurface soil at two distinct subareas (A and B). These detections were attributed to the former aircraft defueling activities at the site. Groundwater samples collected at monitoring wells within Subareas A and B did not contain detections of VOCs, SVOCs, or total petroleum hydrocarbons (TPH). However, ethylbenzene, total xylenes, and TPH were detected at piezometer 2-PZ4 (**Figure 2-3**), located southwest of Subareas A and B and reportedly near a former aircraft taxiway. An oily sheen was also observed in the groundwater during water level measurements at piezometer 2-PZ4.

As part of the SI, preliminary human health and ecological risk evaluations were performed for IRP Site 2. The HHRA evaluated surface soil, subsurface soil, and groundwater. The exposure assessment indicated that potential pathways for human exposure to surface soil included dermal contact, incidental ingestion of soil, and inhalation of fugitive dust. However, surface soil analytical results did not exceed applicable or relevant and appropriate requirements (ARARs); therefore, risks were not quantified. Analytical detections within subsurface soil did not exceed the NJDEP proposed cleanup standards for subsurface soil; therefore, risks were not quantified. Due to the lack of an exposure pathway for groundwater, a quantitative risk evaluation was not performed (ABB, 1995).

The ecological risk evaluation identified several lower trophic level avian and mammalian ecological receptors foraging at IRP Site 2. The evaluation determined that these receptors are potentially at risk due to chronic and acute exposure to surface soil contaminants. Lead was determined to be the most significant risk contributor for all modeled ecological receptor species (ABB, 1995).

Based upon the results of the SI, it was recommended that additional soil and groundwater data be collected at the site and at the location of piezometer 2-PZ4. Additionally, the report recommended a focused FS be conducted.

Supplemental Site Investigation (1996)

In September 1996, a Supplemental SI Report was prepared to document field activities performed between May and June 1996. The purpose of the investigation was to expand and build upon results from the SI and to provide additional required information not obtained during the SI.

Investigative activities included vapor intrusion sample points; advancement of soil borings; the installation of groundwater monitoring wells; and the collection of surface soil, subsurface soil, and groundwater samples (Smith, 1996). An oily sheen was observed at piezometer 2-PZ4 during groundwater sampling activities. Soil and groundwater sample results were below the NJDEP screening criteria. Based upon the results of the SI and Supplemental SI, NFA was recommended at IRP Site 2.

Quarterly Groundwater Monitoring (2002)

No significant impacts were identified during field investigations conducted during the SI and Supplemental SI. However, an oily sheen was observed in groundwater at piezometer 2-PZ4 with elevated concentrations of several VOCs, TPH, and metals. Therefore, the USEPA recommended that quarterly groundwater samples be collected at piezometer 2-PZ4 for a 5-year period.

Between 7 February and 1 November 2002, three rounds of quarterly groundwater sampling were conducted at piezometer 2-PZ4 (**Figure 2-3**). Groundwater samples were analyzed for VOCs, TPH, and total and dissolved Target Analyte List (TAL) metals. Analytical results indicated that several VOCs and TPH were present at piezometer 2-PZ4 at concentrations that exceeded NJDEP GWQSs. VOC concentrations were variable throughout the sampling period. TPH concentrations decreased during the sampling period [1,645 milligrams per liter (mg/L) to 160 mg/L], but were still higher than the level detected during a June 1996 sampling event (43 mg/L). The majority of the total metals did not exhibit a consistent trend during the sampling period. Three total metals (cadmium, lead, and zinc) and one dissolved metal (iron) were consistently detected above their GWQS or background level since June 1996.

Remedial Investigation (2011)

An RI Report documenting field activities conducted in 2006 was prepared to evaluate four IRP sites. IRP Site 2 was investigated to confirm the presence of non-aqueous phase liquid that had been previously identified at piezometer 2-PZ4. The investigation included a laboratory "fingerprint" analysis of groundwater collected from piezometer 2-PZ4, subsurface soil sampling to confirm the absence of additional petroleum source material in soil borings 2PZ4-SB1 through 2PZ4-SB4, and the collection of groundwater samples from piezometer 2-PZ4 and 2PZ4-GGW4 (grab sample from soil boring 2PZ4-SB4). Soil samples were analyzed for VOCs and TPH, and groundwater samples were analyzed for VOCs, polynuclear aromatic hydrocarbons (PAHs), dissolved iron (Hach field test kits were used), and natural attenuation parameters.

Piezometer 2-PZ4 (5 to 20 ft) is the established monitoring point at IRP Site 2 to evaluate groundwater concentration in the area. During the RI, no groundwater contaminants were detected in Piezometer 2-PZ4 above their respective GWQS. However, one groundwater grab sample (2-PZ4-SB4-GGW4 - Water) was collected on 14 June 2006 from temporary geoprobe boring 2-PZ4-SB4 (13.5 ft) that contained concentrations of 1,2,4-trimethylbenzene (686 µg/L) and Extractable Petroleum Hydrocarbons-Diesel (32,700 µg/L), neither of which have a developed

GWQS. Geoprobe location 2-PZ4-SB4 (abandoned) was located approximately 5 ft west of piezometer 2-PZ4, and is no longer available for sampling. Two subsequent groundwater samples from piezometer 2-PZ4 were collected and found non-detect for contaminants of concern.

No soil contaminants were detected above the NJDEP Non-Residential SRSs. The soil analytical results met the USEPA RSLs for residential soil and the NJDEP Residential Direct Contact SRS when evaluated using compliance averaging. Although traces of ethylbenzene and methylene chloride were detected in one soil sample above the NJDEP IGW Screening Criteria, no corresponding IGW has been observed in piezometer 2-PZ4. The traces of TPH-diesel range organics (DRO) compounds that were detected were below the NJDEP Interim Generic Ground Water Quality Criterion [New Jersey Administrative Code (NJAC) 7:9C-Appendix Table 2] of 500 µg/L for non-carcinogenic synthetic organic compounds. Therefore, NFA was recommended for soils at IRP Site 2. In addition, the RI proposed that a confirmatory groundwater sample be collected from piezometer 2-PZ4 for laboratory analysis of TPH-DRO, in order to confirm that the concentration is decreasing.

The risk assessment for Site 2 concluded that it appears that the petroleum impacts to Site 2 have naturally attenuated; and that any remaining residual impacts will continue to attenuate.

Residual concentrations in soil or groundwater at IRP Site 2 do not pose a human health risk because most chemical residuals in groundwater were either not detected or below NJDEP GWQSs. Residual levels of chemicals in groundwater exceeding NJDEP GWQSs would attenuate to concentrations below criteria prior to leaving the site.

Residual concentrations in groundwater at IRP Site 2 do not pose an ecological risk because the groundwater discharge to surface water pathway is not complete. The fate and transport evaluation indicates that organic compounds either do not exceed surface water benchmarks or concentrations would attenuate to levels below the surface water benchmarks prior to discharge to water bodies.

In addition, there is no potential for ecological risk at IRP Site 2 as is does not constitute ecological habitat because the areas are paved.

Data Gap Investigation (2015)

Based upon the request of the USEPA to confirm that concentrations of TPH-DRO in groundwater are continuing to decrease, a DGI was conducted and included the collection of groundwater samples from piezometer 2-PZ4 during four sampling events (February 2013, May 2013, July 2013, and April 2014). Samples were analyzed for TPH-DRO; methylene chloride; and benzene, toluene, ethylbenzene, and xylenes (BTEX). Analytical results indicated that methylene chloride and BTEX are not present at detectable concentrations. TPH-DRO was detected during the February and July 2013 sampling events at concentrations of 40 and 3,100 µg/L, respectively, but was not detected in the most recent sampling event (April 2014). The spike in TPH-DRO concentration during the July 2013 sampling event (3,100 µg/L) is most likely attributable to a

relatively minor amount of contamination that remains in the soil or groundwater. However, groundwater concentrations have declined from 1,645,000 µg/L in 1992 to ≤40 µg/L in three of the four samples collected in 2013/2014. Currently, TPH-DRO does not have a GWQS. No other constituents were detected during the four groundwater sampling events. Based upon the results of previous investigations and the DGI, NFA was requested for soil and groundwater at IRP Site 2.

Feasibility Study (2016)

An FS was completed in 2016 to evaluate the appropriateness of NFA for IRP Site 2. Based on the results of previous investigations, NFA was recommended for soil and groundwater at IRP Site 2. Results of the FS were submitted in an FS Report to USEPA and NJDEP.

The investigation activities at IRP Site 2 are summarized in **Table 2-1**.

Table 2-1. IRP Site 2 Investigation Summaries

Study/Investigation	Date	Study/Investigation Summary
Preliminary Assessment	1989	• Installation Restoration Program (IRP) Site 2 was concluded to be one of the six spill sites that may possibly be sources of contamination. • Assessment identified IRP Site 2 to contain two subareas (Subareas A and B) that are specific aircraft defueling points.
Site Investigation	1995	• Ethylbenzene, total xylenes, and total petroleum hydrocarbons (TPH) were detected at Piezometer 2-PZ4 and an oily sheen was found in groundwater during measurements. • Human health risks not quantified due to lack of concentrations exceeding New Jersey Department of Environmental Protection (NJDEP) criteria. • Ecological risk assessment indicated possible chronic and acute exposure to surface soil contaminants with lead being the most significant risk contributor. • Results suggest supplementary soil and groundwater data be obtained from Piezometer 2-PZ4. FS also recommended.
Supplemental Site Investigation	1996	• Soil and groundwater sample results were below the NJDEP screening criteria. • An oily sheen was observed at piezometer 2-PZ4 during groundwater sampling activities. • No Further Action (NFA) recommended.
Quarterly Groundwater Monitoring	2002	• Several volatile organic compounds (VOCs) and TPH were present at piezometer 2-PZ4 at concentrations that exceeded NJDEP Groundwater Quality Standards (GWQSs). • Cadmium, iron, lead, and zinc were detected above their GWQS or background levels.
Remedial Investigation	2011	• No soil contaminants were detected above the NJDEP Non-Residential Soil Remediation Standards (SRSs). • Traces of ethylbenzene and methylene chloride were detected in one soil sample above the NJDEP Impact to Groundwater Soil Screening Levels; however, no corresponding impact to groundwater was observed in piezometer 2-PZ4. • The oily sheen observed during previous investigations was not observed during the two sampling events. • No groundwater contaminants were detected above the GWQSs.

Table 2-1. IRP Site 2 Investigation Summaries (continued)

Study/Investigation	Date	Study/Investigation Summary
Data Gap Investigation	2016	• Methylene chloride and benzene, toluene, ethylbenzene, and xylenes were not present at detectable concentrations. • TPH-diesel range organics (DRO) groundwater concentrations declined from 1,645,000 micrograms per liter (µg/L) in 1992 to ≤40 µg/L in three of the four samples collected in 2013/2014. Currently, TPH-DRO does not have a GWQS. • No other constituents were detected during the four groundwater sampling events. • NFA recommended.
Feasibility Study	2016	• Based on the results of previous investigations, NFA was recommended for soil and groundwater at IRP Site 2.

2.6.2 IRP Site 3 – Former Aircraft Washrack

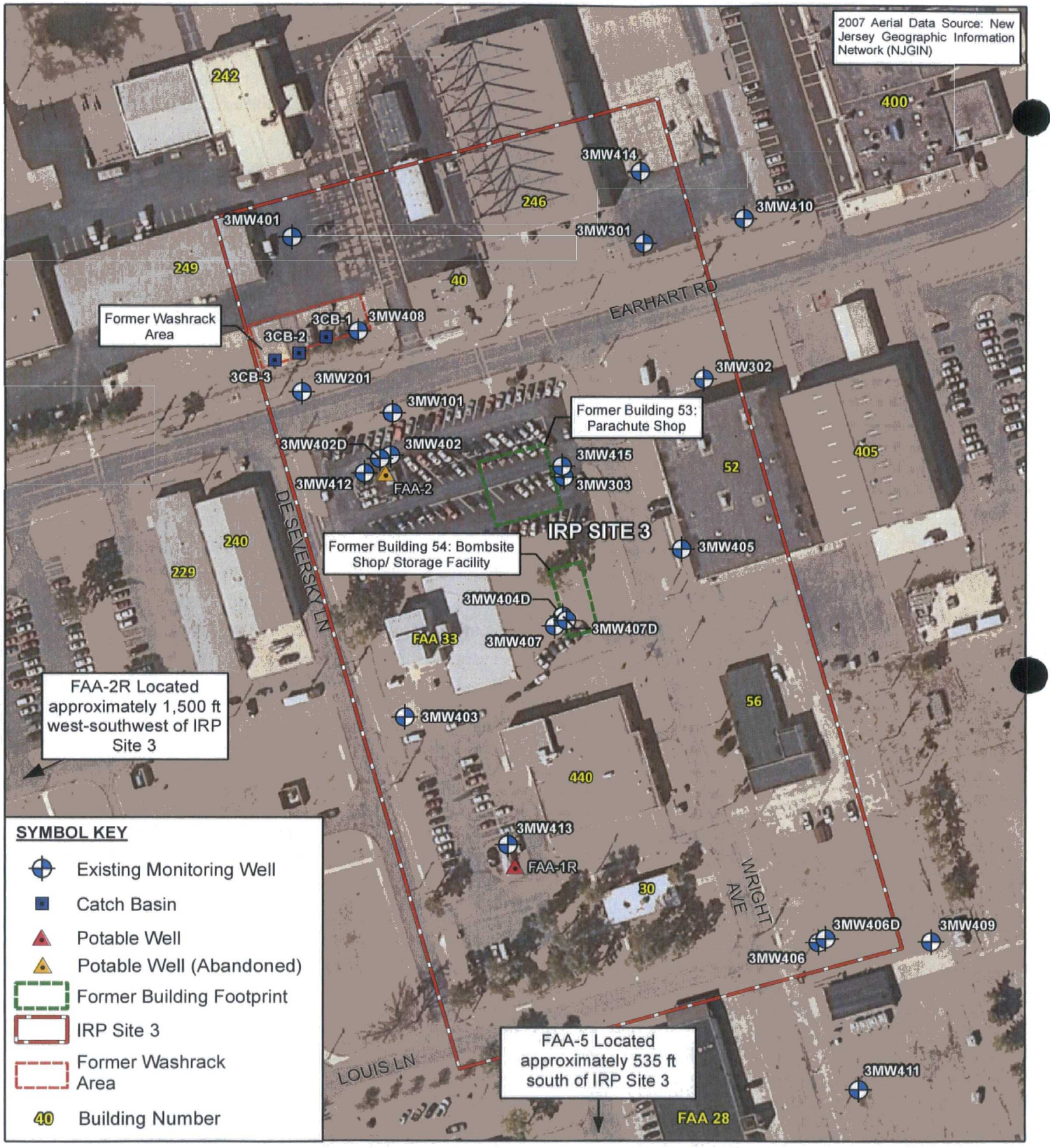
IRP Site 3 is located in the central portion of the Base and consists of a former washrack and adjacent area (**Figure 2-2**). The former washrack was located along the northern portion of Earhart Drive west of Building 40 and southeast of Building 249 (**Figure 2-4**). The area of the former washrack is covered with concrete pavement, which slopes toward Earhart Drive. A concrete retaining wall and two catch basins are positioned on the downgradient end of this paved area. A second retaining wall, perpendicular to the first, separates a third catch basin or drain to the east from the other two drains. This third drain is positioned at a slightly higher elevation than the two western drains. The majority of the adjacent paved parking area also slopes towards these drains and Earhart Drive. A concrete vault and manholes associated with the drains are located south of the paved area adjacent to Earhart Drive.

The former washrack associated with IRP Site 3 was reportedly used from approximately 1942 until 1974 as the primary location of aircraft cleaning for the Naval Air Station (1942 to 1958) and the NJANG (1958 to 1974) (ABB, 1995). Historic washrack operations included the storage of waste oils and the potential use of chlorinated compound-based cleaners/solvents.

Two former buildings, 53 and 54, existed within the boundaries of IRP Site 3. Building 53 was designated as the Parachute Shop and reportedly contained a dry cleaning room and a laundry room. Building 54 was located directly south of Building 53 and was designated as the Bombsite Shop/Storage Facility and Building. Building 54 reportedly contained areas labeled as Laundry Racks and Slop Sinks.

Previous investigations conducted at IRP Site 3 include:

- PA (SCITEK, 1989);
- SI (ABB, 1995);
- Supplemental SI (Smith, 1996);
- Expanded Supplemental SI (TRC, 2003);
- RI (ANG, 2011);
- DGI (ANG, 2015); and,
- FS (ANG, 2016).



New Jersey Air National Guard
177th Fighter Wing
Egg Harbor Township, NJ

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FIGURE 2-4
IRP Site 3 Layout
Record of Decision
New Jersey Air National Guard 177th Fighter Wing
Egg Harbor Township, New Jersey

0 25 50 75 100 125 Meters
0 100 200 300 400 Feet

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Preliminary Assessment (1989)

A PA was conducted in 1989 to identify potential sources of impacts at the NJANG. The PA provided the initial historical background and descriptions for each site warranting further investigation. The PA report identified six spill sites, including IRP Site 3 (Old Aircraft Washrack), as potential sources of impacts based upon interviews with NJANG personnel and site inspections conducted during PA activities (ANG, 2015).

Site Investigation (1995)

A SI was conducted in 1995 to determine the presence or absence of environmental impacts at sites identified during the PA (including IRP Site 3). This SI was also used to evaluate potential threats to public health or the environment.

Five soil borings were advanced and one groundwater monitoring well (03MW101) was installed at IRP Site 3 to assess the extent of potential subsurface impacts associated with former washrack activities (**Figure 2-4**). Four soil borings were located adjacent to existing drains or catch basins that may have received storm or wash waters from the former aircraft washrack area while a fifth soil boring was located on the opposite side of Earhart Drive from the former washrack for the installation of 3MW101. Soil and groundwater samples collected during the SI were analyzed for VOCs, SVOCs, TPH, pesticides, polychlorinated biphenyls (PCBs), and Priority Pollutant List (PPL) metals.

Acetone and ten SVOCs were detected in soil samples but were not identified as COPCs. TPH was also detected in one soil boring. Antimony, arsenic, barium, chromium, copper, nickel, and zinc were detected within the four soil borings adjacent to the former washrack at concentrations within the range of background published for soils of the eastern United States.

Three VOCs, one SVOC, TPH, and eight metals were detected in one groundwater sample collected during the first sampling round. The detected concentrations of bis(2-ethylhexyl)phthalate, antimony, barium, cadmium, and chromium in groundwater exceeded several regulatory criteria, including Maximum Contaminant Levels and the New Jersey Proposed GWQSs.

A preliminary risk evaluation (PRE) was performed for human health using the analytical data collected during the SI. The PRE considered subsurface soil and groundwater impacts and concluded the following:

- Chromium was the only COPC detected in IRP Site 3 subsurface soil and was used to evaluate the non-cancer risk to human health at this site. The calculated risk was not significant based on USEPA risk management criteria. No carcinogenic COPCs were detected in subsurface soils at this site, and future risks associated with subsurface soil excavation were estimated to be not significant; and,

- Although bis(2-ethylhexyl)phthalate, antimony, barium, cadmium, and chromium exceeded their respective GWQSs, a complete exposure pathway to groundwater under the current land use was not identified.

An ecological PRE was not performed for IRP Site 3 due to the lack of significant ecological habitat.

Based upon the human health PRE, the SI recommended NFA for IRP Site 3, and that a Decision Document be prepared to formalize this decision point.

Supplemental Site Investigation (1996)

Following completion of SI activities, the FAA, NJDEP, and USEPA requested that a Supplemental SI field effort be conducted. The Supplemental SI was conducted in 1996 and included the collection and analysis of three subsurface and four surface soil samples for Target Compound List (TCL) VOCs, TCL SVOCs, PPL metals plus aluminum and barium, TCL pesticides/PCBs, and TPH. Supplemental SI activities also included the installation of one monitoring well (3MW201) and one piezometer (3-PZ1), and collection and analysis of groundwater samples for TCL VOCs, TCL SVOCs, TAL metals (filtered and unfiltered), TCL pesticides/PCBs, and TPH.

No organic compounds or metals were detected in surface or subsurface soil samples collected at IRP Site 3 at concentrations above appropriate NJDEP SRSs.

Analytical results of groundwater samples indicated that TCE was present at 2 µg/L, which exceeds the NJDEP GWQS of 1 µg/L. No other organic compounds were identified in groundwater at concentrations above GWQSs.

The Supplemental SI concluded that monitoring wells installed at IRP Site 3 did not adequately monitor groundwater passing beneath the areas of environmental concern and recommended additional studies to delineate the extent of TCE-impacted groundwater.

Expanded Supplemental Site Investigation (2003)

Based upon the results of the SI and Supplemental SI, the USEPA recommended further field investigations at IRP Site 3 to:

- Better delineate groundwater flow conditions and obtain a confirmatory groundwater sample from a new well downgradient of the environmental areas of concern; and,
- Pursue the collection of soil samples at the storm drainage outfall approximately 700 ft downgradient of IRP Site 3 (at FAA Area 41).

A GeoProbe™ investigation conducted at IRP Site 3 as part of the Expanded Supplemental SI indicated the presence of dissolved chlorinated VOCs in groundwater downgradient of the former washrack area. The Expanded Supplemental SI conclusions recommended an additional round of groundwater sampling at IRP Site 3.

The Expanded Supplemental SI documented that soil samples, collected during an unexploded ordnance investigation near the storm water discharge (approximately 700 ft east of the former washrack), did not indicate the presence of constituents in excess of action levels. The Expanded Supplemental SI concluded that no further studies were necessary for the soils near the storm drainage outfall located downgradient of IRP Site 3.

Remedial Investigation (2011)

An RI was conducted at IRP Site 3 to delineate the horizontal and vertical extent of groundwater impacts. The groundwater investigation was conducted using GeoProbe™/ Hydropunch™ in conjunction with on-site mobile laboratory analysis to collect groundwater grab samples and to install eight new monitoring wells [five shallow wells (3MW401, 3MW402, 3MW403, 3MW405, 3MW406) and three deep wells (3MW402D, 3MW404D, 3MW406D)] (**Figure 2-4**). Results from two groundwater sampling events (conducted during different seasons) indicated the presence of PCE and TCE in several shallow wells; however, only PCE was detected at concentrations exceeding the GWQS (1 µg/L) with concentrations ranging from 1.28 to 7.96 µg/L. No other dechlorination breakdown products were detected in the fixed-base laboratory analysis.

As part of the RI, a HHRA and a SLERA were conducted for IRP Site 3. As part of the HHRA, COPCs in soil and groundwater were determined by screening the maximum detected concentrations against USEPA industrial soil and tap water RSLs. COPCs included chloroform, naphthalene, PCE, and chromium. The RI concluded that while chromium was detected above the GWQS, these concentrations appear to be within the range attributable to natural background and are therefore unlikely to be related to the historic activities at IRP Site 3. The RI did not identify potential ecological risks at IRP Site 3.

The RI concluded that remediation of PCE in groundwater would be necessary at IRP Site 3 to meet NJDEP GWQSs and recommended that a FS be prepared.

Data Gap Investigation (2015)

Between December 2012 and September 2014, a DGI was conducted at IRP Site 3 to close identified data gaps and fulfill agreements made during a 6 June 2012 Stakeholder Meeting between ANG, FAA, USEPA Region 2, and NJDEP, which were subsequently approved by all stakeholders prior to implementation.

The approach to characterizing environmental media and expanding the monitoring well network at IRP Site 3 involved a three-phased approach, in which the results from one phase of data collection was used to determine the nature and scope of subsequent phases.

The sampling program at IRP Site 3 began with an initial round (Baseline) of groundwater data collection to obtain current groundwater data and determine the number and location of wells to be installed during Phase I. Phase I involved the collection of soil samples, the installation of multi-level groundwater monitoring wells, and a second round of groundwater data. Phase II

included the installation of additional monitoring wells, a third round of groundwater sampling, hydraulic investigation, catch basin sediment removal, and a vapor intrusion (VI) investigation.

Soil

Based upon a document prepared by the FAA (FAA, 2012), one source of PCE/TCE groundwater impacts at IRP Site 3 was suggested to have been the operations at former Building 53 (FAA, 2012). Since soil sampling had not previously been conducted within this area, 18 soil borings (IRP3-01 through IRP3-18) were installed east of Building FAA 33 with samples analyzed for six VOCs including chloroform, cis-1,2-DCE, naphthalene, PCE, TCE, and vinyl chloride. PCE exceeded NJDEP Residential Direct Contact SRSs (43,000 µg/kg) at one soil sample location (IRP3-02) with a concentration of 55,000 µg/kg. Elevated PCE concentrations in this area were attributed to former Building 53, which contained a dry cleaning room (FAA, 2012). PCE impacted soil is limited to shallow soils (less than 4 ft bgs).

The DGI Report (ANG, 2015) recommended that a FS be developed to evaluate options for implementing a remedial action to address soil impacts at IRP Site 3. In addition, the report recommended that the FS include additional delineation of soil impacts as part of the remedial action.

Groundwater

Groundwater data for IRP Site 3 was determined to be insufficient to define the extent of groundwater impacts. To address this data gap, the following activities were conducted:

- Eleven monitoring wells were installed to establish a more comprehensive groundwater monitoring network and better define the extent of groundwater impacts; and,
- Groundwater samples were collected from existing and newly installed monitoring wells during three sampling events.

Groundwater analytical results indicate that chloroform, cis-1,2-DCE, naphthalene, PCE, and TCE are present at concentrations exceeding GWQSs (1 µg/L for each constituent, with the exception of naphthalene which is 2 µg/L). Concentrations exceeding GWQSs were observed at multiple locations and spread across various groundwater sample interval depths ranging from 17 to 95 ft bgs. It should be noted that chloroform is a regional contaminant in this area of New Jersey and is not attributed to historic activities at IRP Site 3.

The DGI Report recommended that a FS be conducted to evaluate options for implementing a remedial action to address groundwater impacts present at IRP Site 3.

Catch Basin Sediments

On 18 July 2013, sediments samples from three concrete catch basins (3CB-1 through 3CB-3) were collected and analyzed for Toxicity Characteristic Leaching Procedure VOCs, SVOCs, pesticides, herbicides, and metals. Analytical results indicated that cadmium exceeded the Resource Conservation and Recovery Act (RCRA) Maximum Concentration of Contaminants for

the Toxicity Characteristic (40 CFR §261.24) in sediment sample (3CB-3/IDW06). Constituent results from the remaining two sediment samples (3CB-1/IDW04, 3CB-2/IDW05) did not exceed RCRA-hazardous criteria. Non-hazardous sediment was removed from catch basins 3CB-1 and 3CB-2 on 9 September 2014 and containerized in two 55-gallon drums for transport and disposal. Due to the elevated levels of cadmium within catch basin 3CB-3, the sediment from this location remained in place and will be addressed during the remedial action. It is anticipated that remaining sediment will be containerized in a 55-gallon drum for transport to an offsite disposal facility.

Vapor Intrusion Investigation

Between 9 and 13 June 2014, sub-slab VI sampling was conducted to determine if groundwater COCs presented a VI risk in the overlying buildings. The VI investigation focused on the buildings located within 100 ft of the currently known extent of groundwater impacted by PCE and TCE above their respective GWQSs. A total of 29 sub-slab soil gas samples, including three field duplicate samples were collected from six buildings (ANG 52, ANG 440, ANG/AAFPS G30, FAA 28, FAA 33, and FAA 56) during the VI investigation. Analytical results indicated that PCE and TCE were below their respective NJDEP Non-Residential Soil Gas Screening Level. Chloroform was detected at concentrations exceeding the NJDEP Non-Residential SGSL; however, chloroform is a common by-product of the drinking water disinfection that occurs at Building FAA 33 and is a regional contaminant in groundwater in this area of New Jersey. Ethylbenzene was detected at a concentration exceeding its NJDEP Non-Residential Soil Gas Screening Level in one sample collected beneath Building ANG 52. However, the ethylbenzene concentration observed within groundwater in this area during the RI (0.61 µg/L) does not explain the presence of ethylbenzene in soil vapor at the 510 parts per billion by volume [2,213 micrograms per cubic meter (µg/m^3)] concentration. If groundwater and soil vapor were at equilibrium at the water table, the soil vapor concentration associated with 0.61 µg/L in groundwater would be approximately 197 µg/m^3. Based upon the information above, the data does not indicate that ethylbenzene concentrations in groundwater could be the source of the measured soil vapor concentration. Based upon the information above and the fact that the Building ANG 52 is currently used to store gasoline, kerosene, paint, and solvent, no further VI investigation is recommended or warranted at Buildings ANG 52, ANG 440, ANG/AAFPS G30, FAA 28, FAA 33, and FAA 56. However, the NJANG will create a new site for additional investigation of ethylbenzene at Building ANG 52, which is not included in this ROD.

Feasibility Study (2016)

An FS was completed in 2016 to evaluate appropriate remedies to address soil and groundwater impacts at IRP Site3. The FS evaluated the following alternatives for soil and groundwater:

- Soil
  - Alternative 1: No Action
  - Alternative 2: Excavation and Offsite Disposal

- Groundwater
  - Alternative 1: No Action
  - Alternative 2: Monitored Natural Attenuation (MNA)
  - Alternative 3: Groundwater Extraction and Treatment Plus MNA
  - Alternative 4: In-Situ Chemical Oxidation (ISCO) Plus MNA

Based on the evaluation of alternatives, Soil Alternative 2 – *Excavation and Offsite Disposal*, and Groundwater Alternative 4 – *ISCO Plus MNA*, were recommended as the preferred alternatives at IRP Site 3 for soil and groundwater, respectively. Results of the FS were submitted in an FS Report to USEPA and NJDEP.

The investigation activities at IRP Site 3 are summarized in **Table 2-2**.

Table 2-2. IRP Site 3 Investigation Summaries

Study/Investigation	Date	Study/Investigation Summary
Preliminary Assessment	1989	• Installation Restoration Program (IRP) Site 3 deemed potential source of contamination along with the other six spill sites.
Site Investigation (SI)	1995	• No soil contaminants present at concentrations above New Jersey Department of Environmental Protection (NJDEP) regulatory criteria. • Semivolatile organic compounds (SVOCs) and metals were detected in groundwater above NJDEP regulatory criteria. • Risk to human health from exposure to surface and subsurface soil was determined to be insignificant (i.e., non-cancer risk of less than 1). The total Hazard Quotient for this scenario was 7×10^{-3} (0.007). Since carcinogenic chemicals of potential concern (COPCs) were not detected in soil, cancer risks were not estimated. • An ecological risk assessment was not warranted for IRP Site 3 due to the lack of significant ecological habitat. • SI recommended No Further Action (NFA) and a Decision Document for this site.
Supplemental SI	1996	• No organic compounds or metals were detected in surface or subsurface soil samples collected at IRP Site 3 at concentrations above appropriate NJDEP Soil Remediation Standards (SRSs). • Trichloroethylene (TCE) was present at 2 micrograms per liter (µg/L), which exceeds the NJDEP Groundwater Quality Standard (GWQS) of 1 µg/L. No other organic compounds were identified in groundwater at concentrations above GWQSs. Additional studies were recommended to further explain the extent that TCE impacts the groundwater. • Recommended additional studies to delineate the extent of TCE-impacted groundwater.
Expanded Supplemental SI	2003	• Presence of dissolved chlorinated volatile organic compounds (VOCs) in groundwater downgradient of the former washrack area. • Soil samples collected near the storm water outfall did not indicate the presence of constituents in excess of action levels. • The Supplemental SI concluded that no further investigations were necessary for the soils located downgradient of former washrack.

Table 2-2. IRP Site 3 Investigation Summaries (continued)

Study/Investigation	Date	Study/Investigation Summary
Remedial Investigation (RI)	2011	• Tetrachloroethylene (PCE) exceeded NJDEP GWQSs (1 µg/L) with concentrations ranging from 1.28 to 7.96 µg/L. • The RI concluded that remediation of PCE in groundwater would be necessary at IRP Site 3 to meet NJDEP GWQSs and recommended that a Feasibility Study (FS) be prepared.
Data Gap Investigation	2015	• Soil Sampling - PCE exceeded NJDEP Residential SRSs [2 milligrams per kilogram (mg/kg)] at seven soil sample locations with concentrations ranging from 2,400 to 55,000 µg/kg. • Groundwater Sampling - chloroform, cis-1,2-DCE, naphthalene, PCE, and TCE were present at concentrations exceeding NJDEP GWQSs (1 µg/L for each constituent, with the exception of naphthalene which is 2 µg/L). • VI Sampling - PCE and TCE are below their respective NJDEP Non-Residential Soil Gas Screening Level. Ethylbenzene was detected at a concentration exceeding its NJDEP Non-Residential Soil Gas Screening Level in one sample collected beneath Building ANG 52. The ANG determined that it would create a new site at IRP Site 3 for additional investigation of ethylbenzene at Building ANG 52.
Feasibility Study	2016	• The FS recommended remedial action be taken to address impacted soil and groundwater.

2.6.3 IRP Site 5 – Liquid Waste Holding Area

IRP Site 5, the Liquid Waste Holding Area, is located in the south-central portion of the Base (**Figure 2-2**). Specifically, IRP Site 5 is located in the south-central of the Vehicle Maintenance Compound, behind the Buildings 65 and 116 and consists of a rectangular area, approximately 75 ft by 165 ft (**Figure 2-5**). Within IRP Site 5 and northeast of Building 116 was the location of a former 3,000-gallon underground storage tank (UST) and associated piping that was used to store unleaded gasoline. The area immediately north of the site is an asphalt-paved parking lot and the area south of the site was a graveled equipment staging area. A 45 square ft divided concrete containment pad is present immediately north of the site. The northern half of the pad was used to store drums containing waste oils, solvents, and engine coolants. The southern half of the pad contained two steel aboveground storage tanks (ASTs) that were used to store waste fuel and waste fuel products. The containment pad has concrete sumps that were used to contain spills.

Previous environmental investigations and remedial actions conducted at IRP Site 5 include the following reports, which are summarized in the following subsections:

- PA (SCITEK, 1989);
- SI (ABB, 1995);
- Supplemental SI (Smith, 1996);
- UST Closure Report (ANG, 2005);
- Expanded Supplemental SI (TRC, 2003);
- RI (ANG, 2011);
- DGI (ANG, 2015); and,
- FS (ANG, 2016).

New Jersey Air National Guard **177th Fighter Wing** **Egg Harbor Township, NJ**		N	**FIGURE 2-5** **IRP Site 5 Layout** Record of Decision New Jersey Air National Guard 177th Fighter Wing Egg Harbor Township, New Jersey
0 10 20 40 60 Meters 0 50 100 150 200 Feet	03/23/2018	File: E_Harbor_NJ_ANG_Site_5_Layout_.mxd	
	PROJ: 291330008	Drawn: KPS	

Preliminary Assessment (1989)

Based upon interviews with NJANG personnel and site inspections conducted during the PA, six spill sites were identified as potential sources of contamination, including IRP Site 5. According to the PA, disabled vehicles, including fuel tankers, had parked on the unpaved surfaces at IRP Site 5. This practice resulted in oil staining of shallow soils (at least 10-inches in depth) in several areas. Additional PA documentation suggests that JP-4 may have been discharged to IRP Site 5 soils in small quantities.

In addition to performing vehicle maintenance tasks in the area for many years, liquid wastes have also been stored at IRP Site 5. The PA indicated that prior to 1988, as many as 100 drums of waste fluids may have been stored at IRP Site 5 at any given time (ABB, 1995).

Site Investigation (1995)

Between October 1991 and January 1992, a SI was conducted at Site 5. This investigation was conducted to confirm the presence or absence of contamination at various sites and to evaluate potential threats to public health and/or the environment. The investigation included SVS, installation of piezometers, advancement of soil borings, installation of groundwater monitoring wells, and collection of surface soil, subsurface soil, and groundwater samples (ABB, 1995). Surface soil samples were analyzed for VOCs, SVOCs, pesticides, PCBs, TPH, and PPL metals from one location. Subsurface soil samples were analyzed for VOCs, SVOCs, TPH, and PPL metals from two locations. Groundwater samples were analyzed for VOCs, SVOCs, TPH, and filtered PPL metals.

The results of SVS indicated that IRP Site 5 contains two subareas of VOC contamination. Detected compounds included BTEX. Surface soil sample analytical results indicated the presence of methylene chloride, acetone, 4-methyl-2-pentanone, 2-butanone, 2-hexanone, ethylbenzene, total xylenes, aldrin, endrin, 4,4-dichlorodiphenyltrichloroethane (DDT), aroclor-1254, and six metals (arsenic, barium, cadmium, chromium, copper, and lead). Each of these constituents, with the exception of 2-butanone, cadmium, and lead, were also detected in subsurface soil samples. Samples collected at the monitoring well installed during the SI detected concentrations of 2-butanone and bis(2-ethylhexyl)phthalate (ABB, 1995).

The two subareas identified by SVS are located north of the drum storage area and southeast of the ASTs. According to the SI Report, VOCs north of the Drum Storage Area were localized between ground surface and approximately 10 ft bgs. At the subarea southeast of the ASTs, VOCs were detected in surface and shallow subsurface soil (ABB, 1995).

As part of the SI, a Preliminary Human Health and Ecological Risk Assessment were performed for IRP Site 5. The HHRA considered surface soil, subsurface soil, and groundwater. The assessment indicated that human exposure to surface soil contaminants could occur via dermal contact, incidental ingestion, and inhalation. However, detected contaminant levels in surface soil

did not exceed ARARs; therefore, risks were not quantified. The assessment concluded that there was not a significant health risk associated with future exposure to subsurface soil. The assessment did not recognize an exposure pathway to groundwater under the land-use in place at the time of the SI Report; therefore, a quantitative evaluation was not performed (ABB, 1995).

The preliminary ecological evaluation indicated that several lower trophic level avian and mammalian ecological receptors foraging at IRP Site 5 are potentially at risk to chronic and acute exposure to surface soils. Lead and copper in surface soil were determined to be the most significant risk contributor for the majority of ecological receptors (ABB, 1995).

The SI Report recommended that additional investigation be conducted to define the extent of soil and groundwater contamination at IRP Site 5. Additionally, the report recommended that a focused FS be performed to address site contamination (ABB, 1995).

Supplemental Site Investigation (1996)

Between May and June 1996, a Supplemental SI was conducted to expand and build upon results from the SI and to provide additional required information not obtained during the SI. The investigation included the advancement of soil borings, the installation of groundwater monitoring wells, and the collection of surface soil, subsurface soil, and groundwater samples. Soil and groundwater samples were analyzed for VOCs, SVOCs, TAL metals (filtered and unfiltered), pesticides/PCBs, and TPH (Smith, 1996).

Soil analytical results indicated that all detected organic compounds and metals concentrations were below NJDEP soil cleanup criteria, with the exception of total xylenes. Total xylenes were detected at a concentration exceeding the NJDEP IGW level at one subsurface soil sample location (2 to 5 ft bgs interval). However, the concentration at the 5 to 7 ft bgs interval was well below the impact to groundwater criteria (10 mg/kg) with a concentration of 0.180 milligrams per kilogram (mg/kg) (Smith, 1996).

Groundwater analytical results indicated that elevated levels of total xylenes and benzene were present at IRP Site 5. Total xylenes were detected at an elevated concentration at monitoring well 5MW203 and benzene was detected at elevated concentrations at monitoring wells 5MW201 and 5MW203. According to the Supplemental SI Report, metals are likely adsorbed to sediments within the aquifer and are therefore, relatively immobile and not of substantial concern (Smith, 1996).

The Supplemental SI Report concluded that the likely source of xylenes and benzene in groundwater at monitoring well 5MW203 is the former gasoline UST removed from the area immediately north of the well. Additionally, the report indicated that impacted soil was suspected to be present near the former UST. The Supplemental SI Report recommended that an additional groundwater sample be collected from monitoring well 5MW201 and analyzed for VOCs. If benzene is detected at a concentration of concern, the report recommended additional investigation

to delineate benzene-impacted groundwater (Smith, 1996).

UST Closure Report (2005)

In 1996, a 3,000-gallon gasoline UST (UST #2) was removed from the site. Following removal of visually contaminated soils, samples were collected from the UST excavation. Analysis of the soil samples detected contaminants (BTEX) above NJDEP Cleanup guidelines at UST #2. To delineate the vertical and horizontal extent of residual soil contamination, seven soil samples were collected from eight borings in 2001 and analyzed for BTEX with no constituents detected. The UST Closure Report (ANG, 2005) indicated that the soil delineation was complete and NFA was recommended for soils in this area.

Based upon the results of the excavation-screening and soil sampling analyses, monitoring well MW-T2 was installed and groundwater samples collected from the well detected benzene, xylenes, toluene and methyl tertiary butyl ether (MTBE) at concentrations in excess of NJDEP SRSs. Subsequent groundwater sampling events conducted in 1999 and 2001 indicated that BTEX concentrations remained above the NJDEP GWQSs but were steadily decreasing. MTBE was not detected in MW-T2 during subsequent sampling events.

The UST Closure Report recommended further groundwater monitoring of monitoring well MW-T2 and NFA for soils at IRP Site 5 (ANG, 2005).

Expanded Supplemental Site Investigation (2003)

In 2002, an Expanded Supplemental SI was conducted to fill data gaps from previous investigations. The investigation included collecting surface soil samples at four locations originally investigated during the SI, groundwater samples at existing monitoring wells, groundwater grab samples from soil boring locations, and the installation and sampling of three new monitoring wells. Soil samples were analyzed for VOCs, while groundwater samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals (filtered and unfiltered) (TRC, 2003).

Several VOCs were detected in surface soil samples; however, none of the concentrations exceeded NJDEP SRSs. Groundwater analytical results indicated the presence of chloroform at a concentration exceeding the NJDEP GWQS at monitoring well 5MW202, and detections of BTEX at concentrations exceeding the NJDEP GWQS at 5MW203. Sixteen total metals (aluminum, arsenic, barium, cadmium, chromium, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, thallium, vanadium, and zinc) and seven dissolved metals (aluminum, cobalt, iron, magnesium, manganese, potassium, and sodium) were detected in several groundwater samples at concentrations exceeding the NJDEP GWQSs (TRC, 2003).

The Expanded Supplemental SI Report concluded that no further investigation was necessary for surface soil at IRP Site 5. The report indicated that groundwater sampling results show that groundwater had been impacted by aromatic hydrocarbons at 5MW203, which is consistent with the location of the former gasoline pump island. It was recommended that corrective action

activities be completed, which would include source removal. Following source removal, additional groundwater sampling at monitoring well 5MW203 was recommended to confirm that contamination concentrations decrease in groundwater (TRC, 2003).

Remedial Investigation (2011)

Between February 27 and March 1, 2006, the NJANG conducted a RI for IRP Site 5. Investigation activities included the advancement of soil borings, collection of surface soil samples, two rounds of groundwater monitoring, a HHRA, and an Ecological Risk Assessment (ERA) (ANG, 2011).

Soil analytical results indicated that concentrations of VOCs and metals at IRP Site 5 were below the NJDEP Direct Contact SRSs. The concentrations of aluminum, arsenic, and lead detected in soils, while above the PQLs, were generally within the background ranges reported during a previous background study (TRC, 1986), and all of the results were below the 95th percentiles reported by the NJDEP (1998 and 2002) for rural and urban soils in the New Jersey Coastal Plain. Therefore, the metal concentrations detected within soils can reasonably be attributed to background conditions, and thus do not warrant remediation (ANG, 2011).

Methylene chloride was detected above the IGW Soil Screening Level (0.007 µg/kg). According to the RI Report, due to the relatively low concentrations that were detected (maximum of 0.231 µg/kg) and the fact that methylene chloride was not detected in groundwater samples collected during the RI, the reported concentrations can reasonably be considered to be *de minimis,* and thus do not warrant further remedial action (ANG, 2011).

Traces of ethylbenzene, isopropylbenzene, n-propylbenzene, xylenes, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene were detected in groundwater at IRP Site 5. Only ethylbenzene, isopropylbenzene, and xylene were detected above the NJDEP GWQSs. The RI Report indicated that a comparison of the VOC concentrations with historical data suggests decreasing trends with time (ANG, 2011).

According to the HHRA performed during the RI, COPCs do not currently pose a human health risk in shallow groundwater, as on-site and off-site wells have not been impacted. Under a hypothetical, future residential exposure scenario where groundwater is used as a potable water source, risk estimates for adults and children exceeded the USEPA threshold of 1×10^{-6} for inhalation of PCE (ANG, 2011).

Based on the ERA, since the groundwater discharge to surface water pathway is not complete, groundwater at IRP Site 5 does not pose an ecological risk. The fate and transport evaluation indicates that organic compounds either do not exceed surface water benchmarks or concentrations would likely attenuate to levels below the surface water benchmarks prior to discharge to water bodies. Site 5 has limited ecological habitat as the area is mown lawn. However, based on the lead concentrations in soil, a conservative hazard index (HI) of 2.9 was calculated for American robins indicating a potential for ecological risk. (ANG, 2011).

Based upon the results of soil sampling, the RI Report recommended NFA for soil at IRP Site 5. Due to VOC contamination in groundwater associated with the former UST, it was recommended that IRP Site 5 either be transferred to the NJDEP UST Program or administered directly by the current NJDEP Case Manager. Subsequently, the primary regulatory oversight of IRP Site 5 was transferred to the NJDEP to be managed under the Licensed Site Remediation Professional (LSRP) program.

Data Gap Investigation (2016)

During the DGI, two rounds of quarterly groundwater sampling (February and May 2013) was conducted at monitoring wells MW-T2, 5MW101, 5MW202, and 5MW203 to verify that contaminant concentrations are below NJDEP GWQSs. During each sampling event, 5 groundwater samples (4 regular and 1 field duplicate samples) were collected and analyzed for VOCs, tertiary butyl alcohol, and a library search of the 15 TICs with the highest concentrations. Analytical results indicated that chloroform and p-isopropyltoluene were present in groundwater at IRP Site 5. Only chloroform exceeded its NJDEP GWQS (1 µg/L) as monitoring wells 5MW-202, and 5MW-203. However, chloroform is not a COC as it is a regional contaminant in groundwater in this area of New Jersey and not attributable to historic activities at IRP Site 5.

Feasibility Study (2016)

An FS was completed in 2016 to evaluate the appropriateness of NFA for IRP Site 5. Based on the results of previous investigations, NFA was recommended for soil and groundwater at IRP Site 5. Results of the FS were submitted in an FS Report to USEPA and NJDEP.

The investigation activities at IRP Site 5 are summarized in **Table 2-3**.

Table 2-3. IRP Site 5 Investigation Summaries

Study/Investigation	Date	Study/Investigation Summary
Preliminary Assessment	1989	• Soil staining of shallow soils at Installation Restoration Program (IRP) Site 5 in several areas. Small amounts of JP-4 may have also been discharged into the soils. Liquid wastes have also been stored at this site over the past years.
Site Investigation (SI)	1995	• Benzene, toluene, ethylbenzene, and xylenes (BTEX) present in soil vapor samples. • Volatile organic compounds (VOCs), pesticides, aroclor-1254, and six metals were present in surface and subsurface soil samples. • Groundwater samples collected at the monitoring well installed during the SI detected concentrations of 2-butanone and bis(2-ethylhexyl)phthalate. • The human health risk assessment concluded that there was not a significant health risk associated with future exposure to subsurface soil. The assessment did not recognize an exposure pathway to groundwater under the land-use in place at the time of the SI Report; therefore, a quantitative evaluation was not performed. • Lead and copper in surface soil were determined to be the most significant risk contributor for the majority of ecological receptors. • Recommended that additional investigation be conducted to define the extent of soil and groundwater contamination at IRP Site 5. Additionally, the report recommended that a focused Feasibility Study (FS) be performed to address site contamination.

Table 2-3. IRP Site 5 Investigation Summaries (continued)

Study/Investigation	Date	Study/Investigation Summary
Supplemental Site Investigation	1996	• All detected organic compounds and metals concentrations in soil samples were below New Jersey Department of Environmental Protection (NJDEP) Impact to Groundwater (IGW) Soil Remediation Standard (SRS), with the exception of total xylenes. Total xylenes were detected at a concentration exceeding the IGW SRS [10 milligrams per kilogram (mg/kg)] at one subsurface soil sample location [2 to 5 feet below ground surface (bgs)]. However, the concentration decreased to 0.180 mg/kg, which was well below the IGW SRS at the 5 to 7 ft bgs interval. • Elevated levels of total xylenes and benzene were present in groundwater samples. • The Supplemental SI Report recommended that an additional groundwater sample be collected from monitoring well 5MW201 and analyzed for VOCs. If benzene is detected at a concentration of concern, the report recommended additional investigation to delineate benzene-impacted groundwater.
UST Closure Report	2005	• Analysis of the soil samples detected BTEX above NJDEP Residential SRSs, but delineation sampling did not detect any BTEX constituents. • The UST Closure indicated that the soil delineation was complete and No Further Action (NFA) was recommended for soils in this area. • Groundwater samples detected benzene, xylenes, toluene, and methyl tertiary butyl ether (MTBE) at concentrations exceeding NJDEP Groundwater Quality Standards (GWQSs). • Subsequent groundwater sampling events conducted in 1999 and 2001 indicated that BTEX concentrations remained above GWQSs but were steadily decreasing. MTBE was not detected in MW-T2 during subsequent sampling events. • The UST Closure Report recommended further groundwater monitoring of monitoring well MW-T2 and NFA for soils at IRP Site 5.
Expanded Supplemental Site Investigation	2003	• Several VOCs present in surface soil samples; however, none of the concentrations exceeded NJDEP Residential SRSs. • Chloroform present within groundwater at a concentration exceeding GWQSs at monitoring well 5MW202. • BTEX present at concentrations exceeding the GWQSs at 5MW203. • Metals present in several groundwater samples at concentrations exceeding the GWQSs. • Report concluded that no further investigation was necessary for surface soil at IRP Site 5. Recommended that corrective action activities be completed, which would include source removal. Following source removal, additional groundwater sampling at monitoring well 5MW203 was recommended to confirm that contamination concentrations decrease in groundwater.

Table 2-3. IRP Site 5 Investigation Summaries (continued)

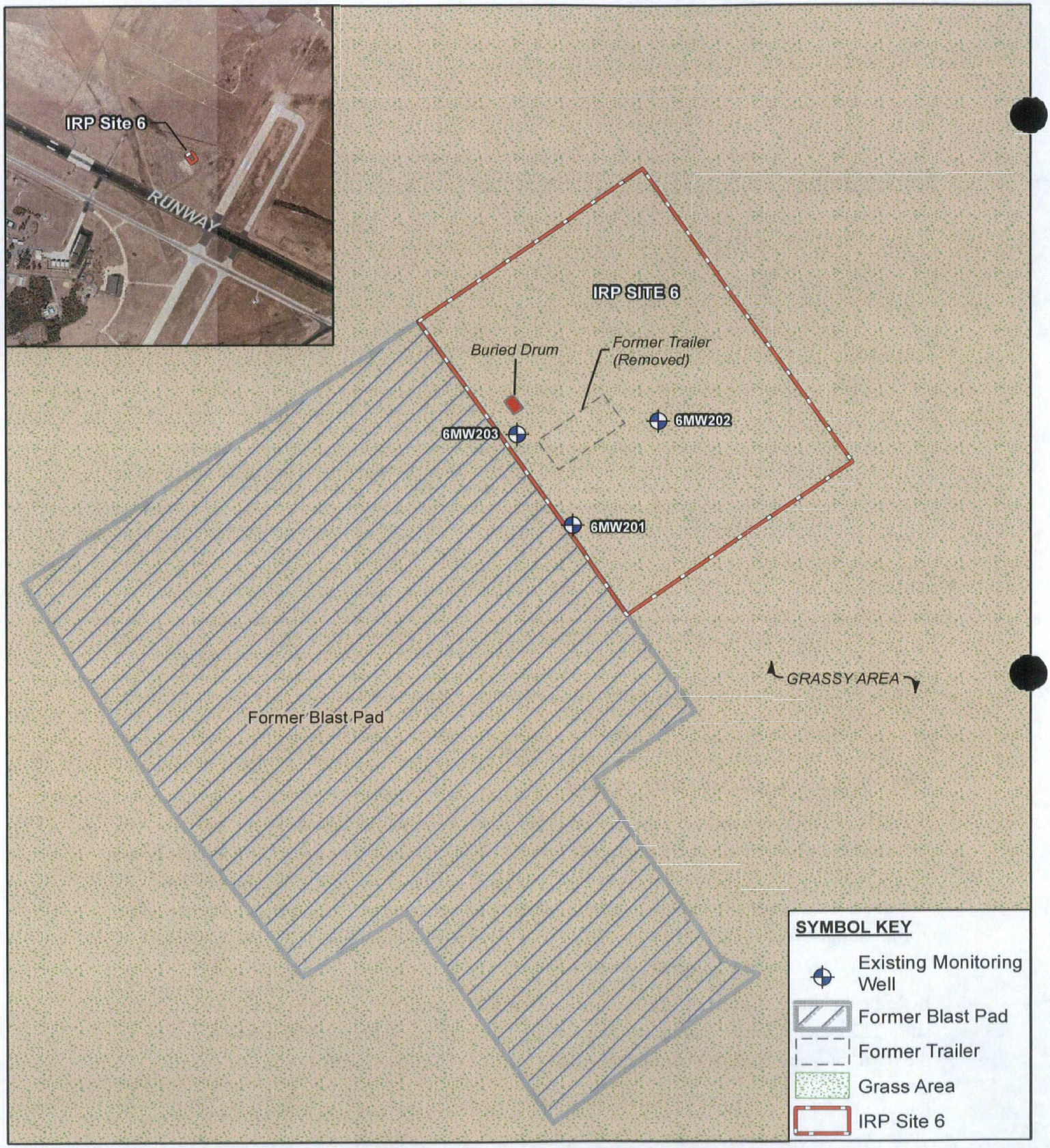
Study/Investigation	Date	Study/Investigation Summary
Remedial Investigation	2011	• Concentrations of aluminum, arsenic, and lead detected in soils, while above the NJDEP Residential SRSs, were generally within background ranges. • Methylene chloride was detected above the IGW SRS [0.007 micrograms per kilogram (µg/kg)]; however, the reported concentration was considered to be *de minimis,* and thus did not warrant further remedial action. • Ethylbenzene, isopropylbenzene, and xylene were present in groundwater at concentrations above the GWQSs. • Based on the human health risk assessment, constituents did not pose a human health risk in shallow groundwater, as on-site and offsite wells were not impacted. • Since the groundwater discharge to surface water pathway was not complete, groundwater at IRP Site 5 did not pose an ecological risk. However, based upon the lead concentrations in soil, there was a potential for ecological risk. • Recommended that IRP Site 5 either be transferred to the NJDEP UST Program or administered directly by the current NJDEP Case Manager. • The primary regulatory oversight of IRP Site 5 was transferred to the NJDEP to be managed under the Licensed Site Remediation Professional (LSRP) program.
Data Gap Investigation	2015	• Chloroform and p-isopropyltoluene were present in groundwater at IRP Site 5 • Chloroform exceeded its NJDEP GWQS (1 µg/L); however, it is a regional contaminant in groundwater and not attributable to historic activities at IRP Site 5.
Feasibility Study (FS)	2016	• IRP Site 5 was transferred into and subsequently addressed under the NJDEP LSRP Program. Therefore, the FS did not discuss proposed remedial actions for IRP Site 5. A Response Action Outcome document was issued by the LSRP on 22 August 2016. The Response Action Outcome document stated that remedial activities were complete and that NFA was warranted. The NJDEP concurred with the Response Action Outcome document in its March 27, 2017 correspondence to the ANG.

2.6.4 IRP Site 6 – Drum Burial at Blast Pad

IRP Site 6, Drum Burial at Blast Pad near Alert Area, is located northeast of the NJANG Alert Area and northwest of the intersection of Runways 13-31 and 4-22 (**Figure 2-2**). The site consists of a 130 ft by 90 ft rectangular area that is located to the east side of the former blast pad (**Figure 2-6**). A partially buried drum was located approximately 47 ft south and 8 ft east of the northeast blast pad corner. The drum was vertically oriented, approximately 3 to 4 inches above ground surface, and contained an unknown fluid.

IRP Site 6 is located adjacent to the removed former blast pad, which was used as a jet engine test site. The exact dates of operation at the former blast pad are unknown. However, according to the SI, testing at the site ended sometime during the early 1980's (ABB, 1995).

During the PA, a partially buried drum containing an unknown fluid was identified at Site 6. The drum was located approximately 47 ft south and 8 ft east of the northeast blast pad corner. According to the SI, the drum may have been used as a receptacle for discarding spent fuel filters and/or minor amounts of jet fuel. During the SI, the drum and surrounding soil were removed and



New Jersey Air National Guard
177th Fighter Wing
Egg Harbor Township, NJ

N

FIGURE 2-6
IRP Site 6 Layout
Record of Decision
New Jersey Air National Guard 177th Fighter Wing
Egg Harbor Township, New Jersey

0 5 10 20 30 40 50 Meters
0 50 100 150 200 Feet

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disposed. Additionally, an insulated metal trailer was historically present at the site, but has since been removed. According to the SI, this trailer may have served as a control module during engine testing activities. Historically, the trailer contained waste materials; including, empty paint cans and cans of unidentified substances (ABB, 1995).

Investigations conducted at IRP Site 6 include:

- PA (SCITEK, 1989);
- SI (ABB, 1995);
- Supplemental SI (Smith, 1996);
- Expanded Supplemental SI (TRC, 2003);
- RI (ANG, 2011);
- DGI (ANG, 2015); and,
- FS (ANG, 2016).

Preliminary Assessment (1989)

In 1988, a PA was conducted, during which a partially buried drum containing an unknown fluid and a metal trailer were identified. Based on the results of the PA, Site 6 was identified as a potential source of impacts. The PA identified JP-4 as the COC (ABB, 1995).

Site Investigation (1995)

Between October 1991 and January 1992, a SI was conducted at IRP Site 6 to confirm the presence or absence of impacts at various sites and to evaluate potential threats to public health and/or the environment. During the investigation, the following activities were conducted:

- Observed the removal of a partially buried drum containing an unknown liquid and collected a soil sample from the bottom of the drum excavation for analysis of VOCs, SVOCs, PPL metals, and TPH;
- Directed the excavation of five test pits to investigate the presence of additional drums;
- Advanced soil borings for the collection of subsurface soil samples for analysis of VOCs, SVOCs, PPL metals (one sample), and TPH;
- Collected surface soil samples for analysis of VOCs, SVOCs, pesticides, PCBs, and TPH; and,
- Installed an upgradient monitoring well (06MW101) for the collection of groundwater samples (ABB, 1995).

Field activities conducted during the SI confirmed the presence of a 55-gallon drum. Although photoionization detector screening indicated the presence of VOCs, laboratory analysis of soil samples did not indicate the presence of chlorinated solvents or significant detections of other VOCs or SVOCs. Additionally, TPH and PCBs were not detected in any soil samples at IRP Site 6. Two pesticides [4,4-1,1-Dichloro-2,2-bis(p-chlorophenyl) ethylene and 4,4-DDT] and several metals were detected in soil samples at concentrations below applicable screening levels.

In groundwater, bis(2-ethylhexyl)phthalate was the only SVOC detected and was below applicable screening levels (ABB, 1995).

According to the PRE preformed during the SI, risk to human health from exposure to surface and subsurface soil was determined to be insignificant. Although groundwater contained a COPC, an on-site exposure pathway was not identified. The ecological PRE indicated that ecological receptors are not at risk due to acute exposure to surface soil, and that risks due to chronic exposure are minimal. Based on the PRE, NFA was recommended for Site 6 (ABB, 1995).

Supplemental Site Investigation (1996)

Between May and June 1996, a Supplemental SI was conducted to expand and build upon results from the SI and to provide additional required information not obtained during the SI. The investigation included the advancement of soil borings, installation of monitoring wells, and collection of surface soil, subsurface soil, and groundwater samples. Samples were analyzed for VOCs, SVOCs, PPL metals (soil), TAL metals (filtered and unfiltered groundwater), pesticides/PCBs, and TPH (Smith, 1996).

Surface soil analytical results for VOCs, pesticides/PCBs, and TPH analyses were below NJDEP SRSs. Benzo(a)anthracene, benzo(a)pyrene (BaP), and lead were detected in one surface soil sample at concentrations exceeding the NJDEP Non-Residential SRSs. Benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, and cadmium were detected at concentrations exceeding NJDEP Residential Direct Contact SRSs but below the non-residential criteria. In subsurface soil, analytical results indicate that all analytes were below NJDEP SRSs (Smith, 1996).

Groundwater analytical results for VOCs, SVOCs, pesticides/PCBs, and TPH analyses were below GWQSs. Total aluminum and iron (all monitoring wells) as well as total cadmium and lead (6MW203) were detected in unfiltered groundwater samples in all monitoring wells at concentrations exceeding GWQSs. According to the Supplemental SI, metals concentrations in groundwater samples are consistent with concentrations that are seen under natural conditions (Smith, 1996).

Based upon surface soil detections of benzo(a)anthracene and BaP at concentrations exceeding NJDEP Non-Residential SRSs, additional soil sampling was recommended in the Supplemental SI Report to identify the extent of impacts. NFA was recommended for groundwater at IRP Site 6 (Smith, 1996).

Expanded Supplemental Site Investigation (2003)

In 2002, an Expanded Supplemental SI was conducted to fill data gaps from previous investigations. As recommended in the Supplemental SI, surface soil samples were collected to delineate the extent of SVOCs. Soils samples were collected to the north, south, and east of monitoring well 6MW203 and analyzed for TCL SVOCs and lead. Six SVOCs were detected at concentrations exceeding NJDEP Non-Residential Direct Contact SRSs; including,

benzo(a)anthracene, benzo(b)fluoranthracene, benzo(k)fluoranthracene, BaP, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene. Each of these SVOCs plus chrysene also exceeded the NJDEP Residential Direct Contact SRS. Detected lead concentrations were below NJDEP SRSs (TRC, 2003).

Based upon detections of SVOCs exceeding NJDEP SRSs, it was recommended that additional soil sampling be conducted near monitoring well 06MW203, including beneath the blast pad, to delineate the extent of SVOC impacts. The Expanded Supplemental SI Report stated that no further delineation of lead is necessary (TRC, 2003).

Remedial Investigation (2011)

On 7 March 2006, the NJANG conducted RI activities at IRP Site 6 that included the collection of surface soil samples, a HHRA, and a SLERA. Surface soil sample results indicated that BaP, benzo(a)anthracene, benzo(b)fluoranthene, and dibenz(a,h)anthracene were detected at concentrations exceeding the NJDEP Non-Residential Direct Contact SRSs. Lead was detected at concentrations below the NJDEP Non-Residential and Residential Direct Contract SRS but exceeded the NJDEP Impact to Groundwater criteria of 59 mg/kg (ANG, 2011).

The HHRA performed for IRP Site 6 concluded that residual concentrations in soil do not pose a human health risk because most chemical residuals were either not detected or below NJDEP SRSs. Site 6 is grassland habitat for NJ threatened birds; eastern meadowlark and possibly, vesper sparrow were observed in these areas. The conservative HI of 1.5 is based on the 95th upper confidence level (UCL) concentration of lead and indicates a slight potential for ecological risk (ANG, 2011).

Data Gap Investigation (2015)

Based upon the results of the RI, an interim removal action including a targeted excavation was conducted to remove PAH and lead impacted soils to eliminate the need for LUCs. On 21 through 22 March 2013, excavation activities were conducted within the two areas identified to contain lead and PAHs at concentrations exceeding NJDEP IGW SRS and NJDEP Residential Direct Contact SRSs, respectively. During excavation, a total of 149.66 tons of impacted soil was removed and transported off-site for disposal. Based upon post-excavation confirmatory soil sample results, lead concentrations within remaining soils are below the NJDEP Residential Direct Contact SRS. BaP was detected at a concentration exceeding its NJDEP Residential Direct Contact SRS and IGW SRS of 200 µg/kg at sample IRP608 (260 µg/kg).

Utilizing the 75 percent/10X Compliance Averaging Procedure in accordance with the NJDEP Site Remediation Program (SRP) Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria, dated 24 September 2012, compliance with the NJDEP Residential Direct Contact SRS and IGW SRS for BaP has been achieved based on the following:

- Minimum of 8 samples required for 125 cubic yards (CY) of excavated soil (10 samples for 115 CY at IRS Site 6);
- 9 of the 10 samples (>75 percent of all samples) exhibited BaP concentrations below the NJDEP Residential Direct Contact SRS and IGW SRS (200 µg/kg); and,
- The remaining sample (IRP608) did not exceed the NJDEP Residential Direct Contact SRS and IGW SRS for by an order of magnitude (or 10X).

Based upon the analytical results from confirmatory soil sampling, the interim soil removal action at IRP Site 6 met the Remedial Action Objectives (RAOs).

Soil data indicated that lead exceeded NJDEP IGW SRS within soils at IRP Site 6. Therefore, groundwater samples were collected from three groundwater monitoring wells (6MW201, 6MW202, and 6MW203) and analyzed for lead. Analytical results indicate that lead did not exceed its NJDEP GWQS. Based upon the analytical results, groundwater at IRP Site 6 is not impacted.

Based upon confirmatory soil sample results as well as groundwater sample results, the DGI Report recommended NFA for soil and groundwater.

Feasibility Study (2016)

An FS was completed in 2016 to evaluate the appropriateness of NFA for IRP Site 6. Based on the results of previous investigations, NFA was recommended for soil and groundwater at IRP Site 6. Results of the FS were submitted in an FS Report to USEPA and NJDEP.

The investigation activities at IRP Site 6 are summarized in **Table 2-4**.

Table 2-4. IRP Site 6 Investigation Summaries

Study/Investigation	Date	Study/Investigation Summary
Preliminary Assessment (PA)	1989	• Based on the results of the PA, Installation Restoration Program (IRP) Site 6 was identified as a potential source of impacts.
Site Investigation	1995	• Presence of two pesticides [4,4-1,1-Dichloro-2,2-bis(p-chlorophenyl) ethylene and 4,4-DDT] identified and several metals in soils. • Bis(2-ethylhexyl)phthalate detected in groundwater. • Risk to human health from exposure to surface and subsurface soil was determined to be insignificant (i.e., noncancer risk of less than 1). • Ecological receptors were not at risk due to acute exposure to surface soil, and that risks due to chronic exposure were minimal.
Supplemental Site Investigation	1996	• Benzo(a)anthracene, benzo(a)pyrene (BaP), and lead were present in one surface soil sample at concentrations exceeding the New Jersey Department of Environmental Protection (NJDEP) Residential Soil Remediation Standards (SRSs). • Three semivolatile organic compounds (SVOCs) and cadmium were detected in surface soil at concentrations exceeding NJDEP Residential SRSs. • All analytes were below NJDEP Residential SRSs in subsurface soil. • Total aluminum, iron, cadmium, and lead were present in groundwater at concentrations exceeding Groundwater Quality Standards (GWQSs). However, metals concentrations in groundwater samples were consistent with natural background conditions.

Table 2-4. IRP Site 6 Investigation Summaries (continued)

Study/Investigation	Date	Study/Investigation Summary
Expanded Supplemental Site Investigation	2003	• Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, BaP, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected at concentrations exceeding NJDEP Residential SRSs. • Detected lead concentrations were below NJDEP Residential SRSs.
Remedial Investigation	2011	• Four SVOCs were present in surface soil at concentrations exceeding the NJDEP Residential SRSs. • Lead was present in surface soil at concentrations below the NJDEP Non-Residential and Residential Direct Contract SRS but exceeded the NJDEP Impact to Groundwater (IGW) SRS of 59 mg/kg. • Residual concentrations in soil did not pose a human health risk because most chemical residuals were either not detected or below NJDEP SRSs. • Constituent concentrations at IRP Site 6 posed a slight risk potential for ecological receptors. • Recommended that a targeted excavation and removal of polynuclear aromatic hydrocarbon (PAH) and lead-impacted soil be conducted to eliminate the need for land use controls.
Data Gap Investigation (DGI)	2015	• On 21 through 22 March 2013, excavation activities were conducted within the two areas. • During excavation, a total of 149.66 tons of impacted soil was removed and transported off-site for disposal. • Post-excavation confirmatory soil sample results indicated lead concentrations are below the NJDEP Residential Direct Contact SRS. BaP met the Remedial Action Objective (RAO) through compliance averaging. • Lead not present within groundwater samples. • The soil removal at IRP Site 6 met the RAOs.
Feasibility Study	2016	• Based on the results of the DGI excavation and groundwater sampling, No Further Action was recommended.

2.7 Current and Potential Future Land Uses

The mission of the 177th Fighter Wing is to provide combat ready personnel, aircraft and equipment for worldwide deployment in support of USAF objectives as well as to protect life and property, provide disaster relief, and ensure public safety when called upon by the New Jersey Governor. The 177th Fighter Wing conducts its activities in an environmentally sound manner, efficiently and effectively complying with the letter, spirit, and intent of applicable environmental statues, regulation, and standards.

In support of its primary mission, the facility has historically stored and used various types of hazardous materials. Current waste management practices at the facility are performed in compliance with applicable laws and regulations to protect human health and the environment.

The base is used for activities associated with airport/aviation support operations, including open space, airfield pavement, aircraft maintenance, wastewater treatment, equipment storage, and administrative offices. In addition, the base has used the property for petroleum-oil-lubricants operations, jet fuel storage, munitions maintenance and storage areas, and hazardous waste storage areas. No changes to land-use are anticipated in the future.

The Base is located within the William J. Hughes Technical Center, which is administered by the

FAA. The Technical Center, which occupies an area of over 5,000 acres, includes laboratories, test facilities, support facilities, the ACIA (operated by the South Jersey Transportation Authority), and a non-commercial aircraft hangar. The NJANG, occupies two tracts of land located to the northwest and west of the FAA terminal, with a total area of approximately 280 acres. The property is federally owned and permitted by the FAA to the USAF, who in turn has licensed the property to the New Jersey ANG. The areas surrounding the FAA facility are characterized by a variety of different land uses including vacant land (forest), commercial sites, and residential areas. Commercial properties are located along the White Horse Pike (Route 30) and Pomona Oaks north of the FAA property along with densely developed residential areas. The nearest residential area to the south is a trailer park located at the intersection of Tilton and Delilah Roads. The Garden State Parkway, the Lower Atlantic City Reservoir, and adjacent areas of forested land are located to the east of the property and a large tract of forested land is present directly west of the FAA property.

Currently, the Base exists as primarily improved areas with buildings, roadways, aircraft parking aprons, and other structural improvements. The Base is surrounded by the ACIA to the northeast and west and green space and the Atlantic City Expressway to the south. Atlantic City obtains its municipal water supply from the ACMUA via nine production wells, which are located north of the Upper Atlantic City Reservoir, on the FAA property. These wells obtain their water from the Lower Cohansey aquifer (150 to 200 ft bgs). This water supply is supplemented by water withdrawn directly from the Upper and Lower Atlantic City Reservoirs. The upper reservoir lies entirely within FAA property, whereas the lower reservoir is situated just outside of the FAA property, to the east. The reservoirs are fed by the North and South Branches of Absecon Creek (also known as the North and South Branches of Doughty's Mill Stream), which traverse portions of the FAA property. The South Branch of Absecon Creek also flows through the FAA property within a short distance of the southern perimeter of the NJANG Base.

The FAA currently extracts potable water from three production wells, FAA-1R, FAA-5, and FAA-2R, located near IRP Site 3. These three wells are screened in the Deep Cohansey Aquifer. Well FAA-2 was used from approximately 1943 to 2013 when it was properly closed and abandoned and replaced by well FAA-2R.

2.8 Summary of Site Risks

This section includes brief summaries of the completed investigations at IRP Sites 2, 5, and 6, including any human health or ecological risks that remain, which are the basis for the selection of corrective action or the selected remedy of NFA at each site. Based on the results of previous investigation and risk assessments, the ANG has determined that unacceptable risks are not present at IRP Sites 2, 5, and 6 and; therefore, are at the Response Complete stage. Alternatively, COCs associated with IRP Site 3 are present at concentrations presenting an unacceptable risk to human health and the environment. These COCs are identified below as well as the potentially exposed

populations and exposure pathways of primary concern. A summary of the findings of the ecological risk assessment is also presented. Based on the presence of unacceptable risks to human health and the environment, remedial action is being recommended to at IRP Site 3 to reduce the risks.

2.8.1 No Further Action Sites (IRP Site 2, 5, and 6)

2.8.1.1 IRP Site 2

IRP Site 2 consists of two subareas (A and B) that were used as aircraft defueling areas. Aircraft were routinely defueled into tank trucks or bowsers. When a tank truck or browser became full, any residual fuel still in the aircraft was discharged to the grassy areas adjacent to the flight apron. According to historical documents, various spills and dumping of fuel were reported at IRP Site 2, including a specific event involving the discharge of more than 400 gallons of JP-4 to the grassy area near Subarea B.

IRP Site 2 was identified as a potential source of impacts in the PA and recommended an SI. The SI was completed in 1995 and results indicated that VOCs and SVOCs were present at concentrations above NJDEP screening criteria in subsurface soil; however, petroleum constituents were not identified in groundwater. During the Supplemental SI, an oily sheen was observed at piezometer 2-PZ4 during groundwater sampling activities; however, soil and groundwater sample results were below the NJDEP screening criteria. During subsequent quarterly groundwater sampling, VOCs, TPH, three total metals (cadmium, lead, and zinc), and one dissolved metal (iron) were detected at concentrations exceeding NJDEP GWQSs. The RI Report indicated that no soil constituent concentrations were above NJDEP Non-Residential SRSs. The soil analytical results met the USEPA RSLs for residential soil and the NJDEP Residential Direct Contact SRS when evaluated using compliance averaging. Although traces of ethylbenzene and methylene chloride were detected in one soil sample above the NJDEP IGW SRS, no corresponding impact to groundwater has been observed in piezometer 2-PZ4. No groundwater contaminants were detected in Piezometer 2-PZ4 above their respective GWQS. No COPCs were identified for inclusion in the HHRA for soil. Risks from incidental ingestion, inhalation, or dermal contact with soil at IRP Site 2 were considered *de minimus* due to concentrations below USEPA RSLs and the derived RSL for p-isopropyltoluene. A DGI was conducted to confirm groundwater concentrations. Results of the DGI indicated that none of the constituents analyzed exceeded NJDEP GWQSs.

Based on the results of previous investigations, soil and groundwater at IRP Site 2 are not sources of contaminant impacts. COPCs were not identified for inclusion in a HHRA and ecological risk assessment indicates that risks are *de minimus* due to concentrations being below USEPA RSLs and derived RSLs. Therefore, NFA was recommended in the 2018 PP.

2.8.1.2 IRP Site 5

IRP Site 5 (also known as UST No. 2 Site, TU007) has been in operation since 1958 and has been used for a variety of activities. According to the 1989 PA, the unpaved portion of IRP Site 5 was used to park disabled vehicles, including fuel tank trucks (ABB, 1995). Based on interviews conducted during the Supplemental SI, as many as 100 drums containing waste fluids may have been simultaneously stored at IRP Site 5 (Smith, 1996). Some of these drums may have contained JP-4, as the PA documented that small quantities of JP-4 may have been discharged to the soil at the site (ABB, 1995). In addition, a 3,000 gallon gasoline UST was formerly located at IRP Site 5 and was removed in 1996 (ANG, 2005).

IRP Site 5 was identified as a potential source of impacts in the PA and recommended an SI. The SI indicated the presence of VOCs in soils and SVOCs in groundwater. The 1996 Supplement SI indicated that all detected constituents were below NJDEPs IGW SRS. The investigation indicated that VOC concentrations in groundwater were attributable to the former gasoline UST. In 1996, a 3,000-gallon gasoline UST was removed from the site. Analysis of confirmatory soil samples detected BTEX above NJDEP Cleanup guidelines. Groundwater samples indicated BTEX and MTBE at concentrations above NJDEP GWQSs. The 2002 Expanded Supplemental SI indicated constituent concentrations in soil below NJDEP SRSs, while groundwater results indicated BTEX at concentrations exceeding GWQSs. The 2011 RI indicated soil constituent concentrations below NJDEP SRSs, with the exception of methylene chloride that exceeded the NJDEP IGW. However, since methylene chloride was not detected in groundwater, the reported concentrations were considered to be *de minimis*. Groundwater results indicated that only ethylbenzene, isopropylbenzene, and xylene were detected at concentrations exceeding NJDEP GWQSs. According to the HHRA performed during the RI, COPCs do not currently pose a human health risk in shallow groundwater, as on-site and off-site wells have not been impacted. Under a hypothetical, future residential exposure scenario where groundwater is used as a potable water source, risk estimates for adults and children exceeded the USEPA threshold of 1×10^{-6} for inhalation of PCE (ANG, 2011). Based on the ERA, since the groundwater discharge to surface water pathway is not complete, groundwater at IRP Site 5 does not pose an ecological risk. However, based upon the lead concentrations in soil, there is a potential for ecological risk (ANG, 2011). Results of the 2015 DGI indicate that only chloroform exceeded the NJDEP GWQSs; however, chloroform is not a COC as it is a regional contaminant in groundwater in this area of New Jersey and not attributable to historic activities at IRP Site 5.

IRP Site 5, which included the former gasoline UST, was transferred into and subsequently addressed under the NJDEP Licensed Site Remediation Professional (LSRP) Program. Therefore, the FS did not discuss proposed remedial actions for IRP Site 5. Remedial activities were completed and discussed in the Corrective/Remedial Action Report (Watermark, 2016). A Response Action Outcome document was issued by the LSRP on 22 August 2016. The Response Action Outcome document stated that remedial activities were complete and that NFA was

warranted. The NJDEP concurred with the Response Action Outcome document in its March 27, 2017 correspondence to the ANG.

2.8.1.3 IRP Site 6

IRP Site 6, Drum Burial at Blast Pad near Alert Area, is located northeast of the NJANG Alert Area and northwest of the intersection of Runways 13-31 and 4-22. The site consists of a 130 ft by 90 ft rectangular area that is located to the east side of the former blast pad. A partially buried drum was located approximately 47 ft south and 8 ft east of the northeast blast pad corner. The drum was vertically oriented, approximately 3 to 4 inches above ground surface, and contained an unknown fluid.

Site 6 is located adjacent to the removed former blast pad, which was used as a jet engine test site. The exact dates of operation at the former blast pad are unknown. However, according to the SI, testing at the site ended sometime during the early 1980's (ABB, 1995).

During the PA, a partially buried drum containing an unknown fluid was identified at Site 6. The drum was located approximately 47 ft south and 8 ft east of the northeast blast pad corner. According to the SI, the drum may have been used as a receptacle for discarding spent fuel filters and/or minor amounts of jet fuel. During the SI, the drum and surrounding soil were removed and disposed. Additionally, an insulated metal trailer was historically present at the site, but has since been removed. According to the SI, this trailer may have served as a control module during engine testing activities. Historically, the trailer contained waste materials; including, empty paint cans and cans of unidentified substances (ABB, 1995).

IRP Site 6 was identified as a potential source of impacts in the PA and recommended an SI. SI results indicated that two pesticides [4,4-1,1-Dichloro-2,2-bis(p-chlorophenyl) ethylene and 4,4-DDT] and several metals were detected in soil samples at concentrations below applicable screening levels. In groundwater, bis(2-ethylhexyl)phthalate was the only SVOC detected and was below applicable screening levels (ABB, 1995). The Supplemental SI soil analytical results indicated benzo(a)anthracene, BaP, and lead were detected in one surface soil sample at concentrations exceeding the NJDEP Non-Residential SRSs. Benzo(b)fluoranthene, benzo(k)fluoranthene, ideno(1,2,3-cd)pyrene, and cadmium were detected at concentrations exceeding NJDEP Residential Direct Contact SRSs but below the non-residential criteria. No constituents were detected in groundwater above the NJDEP GWQSs. The Expanded Supplemental SI indicated SVOC concentrations in soil exceeded the NJDEP Residential Direct Contact SRS. Surface soil sample results indicated that BaP, benzo(a)anthracene, benzo(b)fluoranthene, and dibenz(a,h)anthracene were detected at concentrations exceeding the NJDEP Non-Residential Direct Contact SRSs. Lead was detected at concentrations below the NJDEP Non-Residential and Residential Direct Contract SRS but exceeded the NJDEP Impact to Groundwater criteria of 59 mg/kg (ANG, 2011). The risk assessment at Site 6 concluded that residual concentrations in soil at Site 6 do not pose a human health risk because most chemical

residuals were either not detected or below NJDEP soil standards. Site 6 is grassland habitat for NJ threatened birds; eastern meadowlark and possibly, vesper sparrow were observed in these areas. The conservative Hazard Index of 1.5 is based on the 95th UCL concentration of lead and indicates a slight potential for ecological risk.

Based upon the results of the RI, a targeted excavation was recommended to remove PAH and lead impacted soils to eliminate the need for land use controls. On 21 through 22 March 2013, excavation activities were conducted within the two areas identified to contain lead and PAHs at concentrations exceeding NJDEP IGW SRS and NJDEP Residential Direct Contact SRSs, respectively. During excavation, a total of 149.66 tons of impacted soil was removed and transported off-site for disposal. Based upon post-excavation confirmatory soil sample results, lead concentrations within remaining soils are below the NJDEP Residential Direct Contact SRS. BaP was detected at a concentration exceeding its NJDEP Residential Direct Contact SRS and IGW SRS of 200 µg/kg at sample IRP608 (260 µg/kg).

Utilizing the 75 percent/10X Compliance Averaging Procedure in accordance with the NJDEP SRP Technical Guidance for the Attainment of Remediation Standards and Site Specific Criteria, dated September 24, 2012, compliance with the NJDEP Residential Direct Contact SRS and IGW SRS for BaP has been achieved based on the following:

- Minimum of 8 samples required for 125 CY of excavated soil (10 samples for 115 CY at IRS Site 6);
- 9 of the 10 samples (>75 percent of all samples) exhibited BaP concentrations below the NJDEP Residential Direct Contact SRS and IGW SSL (200 µg/kg); and,
- The remaining sample (IRP608) did not exceed the NJDEP Residential Direct Contact SRS and IGW SRS for BaP by an order of magnitude (or 10X).

Based upon the analytical results from confirmatory soil sampling, the soil removal action at IRP Site 6 met the RAOs.

Based upon post-excavation soil confirmation samples, IRP Site 6 is not a source of soil impacts. It is recommended that NFA be granted for soil at IRP Site 6.

Analytical results indicate that lead did not exceeded NJDEP GWQSs. Based upon the analytical results, groundwater at IRP Site 6 is not impacted.

The 2016 FS indicated that the remaining soil concentrations were in compliance with NJDEP regulatory criteria and that the RAOs had been met. In addition, groundwater samples indicated that lead was below the NJDEP GWQS. Based upon these results, NFA was recommended.

2.8.2 Further Action Sites (IRP Site 3)

This section summarizes the human health and ecological risk assessments that have been performed at IRP Site 3. The COCs associated with unacceptable site risk are identified, as well as the potentially exposed populations and exposure pathways of primary concern. A

summary of the findings of the ecological risk assessment is also presented. Based on the presence of unacceptable risks to the hypothetical future residential child and adult populations based on exposure through potable use of untreated groundwater, remedial action is being recommended to reduce the risks.

At the time the HHRA was completed in 2011, no constituents were detected in soils above USEPA RSLs; therefore, no constituents for soil were carried forward to the HHRA.

2.8.2.1 Summary of Human Health Risk

The baseline risk assessment estimates what risks the site poses if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the approaches used and the results of the baseline risk assessment for this site. The HHRA is divided into the following sections: identification of COCs (hazard assessment), exposure assessment, toxicity assessment, and risk characterization. Potential risks for both current and future site occupants are discussed. Key assumptions and uncertainties associated with the HHRA are also identified. The chemicals, exposure pathways, and populations associated with unacceptable risk are highlighted, as they serve as the primary basis for remedial action.

Identification of Chemicals of Concern

This section identifies those chemicals associated with unacceptable risk at IRP Site 3 and that are the basis for the proposed remedial action. Although other chemicals were detected at IRP Site 3, these COCs are the primary risk- driving chemicals. The data used in this risk assessment was deemed to be of sufficient quality and quantity for its intended use. The detection frequency, range of detected concentrations, and the exposure point concentrations for chemicals and media of concern are presented in **Table 2-5**.

In accordance with the USEPA protocols, the primary screening criteria for the HHRA (which was presented in the 2011 Final RI Report), were the December 2009 USEPA RSLs. Groundwater analytical results were screened against the RSLs for tap water and the NJDEP GWQSs for Class I-PL groundwater which are the practical quantitation limits PQLs. Detected VOC concentrations were also compared to the USEPA values for evaluating the vapor intrusion to indoor air pathway from groundwater.

Table 2-5. Summary of Chemicals of Concern

Media	Chemical of Concern	Concentration Detected		Units	Exposure Point Concentration	Screening Concentration RSL / GWQS
		Min	Max			
Groundwater – Direct Contact	Chloroform	0.16 J	5.10	µg/L	5.10	0.22 / 1.0
	1,2-DCE	0.26 J	2.70	µg/L	2.70	3.6 / 1.0
	Naphthalene	0.76 J	6.40	µg/L	6.40	0.17 / 2.0
	PCE	0.30 J	69.0	µg/L	69.0	4.1 / 1.0
	TCE	0.22 J	26.0	µg/L	26.0	0.28 / 1.0

Notes:
Dashes (--) - information is not relevant for the referenced medium
µg/L - micrograms per liter
J-qualifier - estimated concentration
RSL - USEPA Regional Screening Levels for Tapwater (November 2017)
GWQS - NJDEP Groundwater Quality Standards for Class I-PL groundwater
PCE - tetrachloroethene
TCE - trichloroethene

The data used in the HHRA were reviewed and validated in accordance with the requirements of the Quality Assurance Project Plan. The validation results of the July 2006 and October-November 2006 groundwater data indicated that no data were rejected. All data were deemed usable as qualified based on the data validation review.

A DGI was conducted between December 2012 and September 2014 at IRP Sites 2, 3, 5 and 6. As a result of the DGI at IRP Site 3, PCE was identified in soil at concentrations above the NJDEP SRS. Although not addressed through the risk assessment process, a PDI will be implemented to refine the extent of impacted soil and develop a site-specific soil IGW SRS pursuant to NJDEP guidance. The IGW SRS represents the constituent concentration, above which, presents an unacceptable risk via leaching of constituents from soil into groundwater. The more stringent of the NJDEP Residential SRS and IGW SRS will serve as the soil cleanup criteria and guide the extent of remedial action. PCE in soil; therefore, is not evaluated further herein.

Groundwater data for IRP Site 3 had been determined to be insufficient to define the extent of groundwater impacts; therefore, 11 monitoring wells were installed during the DGI to establish a more comprehensive groundwater monitoring network and better define the extent of groundwater impacts. Groundwater samples were collected from existing and newly installed monitoring wells during three sampling events: Baseline (2012), Phase I (2013), and Phase II (2014). Groundwater analytical results indicate that chloroform, cis-1,2- DCE, naphthalene, PCE, and TCE are present at concentrations exceeding NJDEP GWQSs. The HHRA evaluations have been updated as appropriate to reflect this new data.

The HHRA (2011) identified three COCs in IRP Site 3 groundwater that contributed to unacceptable risk including chloroform, naphthalene, and PCE. Based on the DGI, cis-1,2-DCE and TCE were also detected above screening criteria and these COPCs are also summarized in **Table 2-5**. The screening criteria have been updated to reflect the current USEPA RSLs for tap water (November 2017) and the NJDEP GWQSs for Class I-PL groundwater.

Evaluation of the data presented in **Table 2-5** indicates the maximum concentration of cis-1,2-DCE of 2.7 µg/L is less than the corresponding risk-based screening level for tapwater established by USEPA (November 2017) of 3.6 µg/L. Cis-1,2-DCE will; therefore, not contribute to unacceptable risk and is not evaluated further herein.

Exposure Assessment

This section documents the populations and exposure pathways that were quantitatively evaluated in the risk assessment. A conceptual exposure model was developed to aid in determining reasonable exposure scenarios and pathways of concern. As described in this section, both current and future populations have been evaluated based on current and reasonably anticipated future land use. The contaminated media to which people may be exposed is also discussed.

The ingestion of groundwater was considered a complete exposure pathway for the NJANG because water supply wells are located on-site and within 0.5 miles of the Base perimeter. The HHRA indicated there was no immediate threat to drinking water supplies as public supply wells are tested on a quarterly basis. Based on the fate and transport evaluations provided in the Final RI (Section 7 and Section 8.2.2.4), COPCs in groundwater were considered to be unlikely to impact on-site or off-site public supply wells due to the reduction of COPC concentrations by natural attenuation (ANG, 2011 and ANG, 2016). Given that USEPA assumes that the sole source aquifer may be restored within a reasonable timeframe, a hypothetical future residential exposure scenario using untreated contaminated groundwater as a potable water source was included in the HHRA. A future residential child and a future residential adult receptor were evaluated with the potential for exposure through ingestion, and dermal contact and inhalation of volatiles while showering.

Major assumptions about exposure frequency, duration, and other exposure factors that were included in the exposure assessment are included in Section 8.2.2.7, Intake Assumptions, as presented in the Final RI. The risk estimates presented below have been updated as appropriate to reflect the new data obtained during the DGI and to incorporate current default exposure factors as presented in the USEPA's on-line RSL calculator (2018).

Toxicity Assessment

This section describes the carcinogenic and non-carcinogenic toxicity criteria used to calculate the potential risk for each COC. When available, these toxicity criteria are separated into ingestion, inhalation, and dermal routes of exposure. Also included is the source of the toxicity criteria and the primary health endpoint and organ of concern for each COC. Toxicity data for carcinogens are presented in **Table 2-6** and for non-carcinogens in **Table 2-7**.

Table 2-6. IRP Site 3 Cancer Toxicity Data Summary

Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Weight of Evidence/Cancer Guideline Description	Source	Date
Pathway: Ingestion, Dermal					
Chloroform	3.1E-02[a]	3.1E-02[a]	B2	Cal-EPA/ IRIS	2017 02/28/2018
Naphthalene	--	--	C	IRIS	02/28/2018
PCE	2.1E-03[a]	2.1E-03[a]	likely to be carcinogenic in humans by all routes of exposure	IRIS	02/28/2018
TCE	4.6E-02[a]	4.6E-02[a]	Carcinogenic to humans by all routes	IRIS	02/28/2018
Pathway: Inhalation					
Chloroform	2.3E-05[b]	8.0E-02[a]	B2	IRIS	02/28/2018
Naphthalene	3.4E-05[b]	1.2E-01[a]	C	Cal-EPA IRIS	2017 02/28/2018
PCE	2.6E-07[b]	9.1E-04[a]	likely to be carcinogenic in humans by all routes of exposure	IRIS	02/28/2018
TCE	4.1E-06[b]	1.4E-02[a]	Carcinogenic to humans by all routes	IRIS	02/28/2018

Notes:
[a] values reported in $(mg/kg\text{-}day)^{-1}$
[b] values reported in $(\mu g/m^3)^{-1}$
B2 - probably human carcinogen
C - possible human carcinogen
PCE - tetrachloroethene
TCE - trichloroethene
Cal-EPA - California EPA value as presented in EPA RSL Summary Table, November 2017. Weight of evidence, if presented, was obtained from IRIS.
IRIS - USEPA Integrated Risk Information System. Date noted is date IRIS was searched.
Dermal Cancer Slope Factor - Oral Cancer Slope Factor * dermal absorption factor. DAF of 1.0 assumed for all COCs.
Inhalation Cancer Slope Factor = Unit risk $(\mu g/m^3)^{-1} * 1000\ \mu g/mg * 70\ kg * 1\ day/20\ m^3$

Table 2-7. IRP Site 3 Non-Cancer Toxicity Data Summary

Chemical of Concern	Chronic/ Subchronic	Oral RfD	Dermal RfD	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Pathway: Ingestion, Dermal							
Chloroform	Chronic	1.0E-02[a]	1.0E-02[a]	Liver	100	IRIS	02/28/2018
Naphthalene	Chronic	2.0E-02[a]	2.0E-02[a]	Decreased body weight	3000	IRIS	02/28/2018
PCE	Chronic	6.0E-03[a]	6.0E-03[a]	CNS; ocular	1000	IRIS	02/28/2018
TCE	Chronic	5.0E-04[a]	5.0E-04[a]	Developmental; immune	100	IRIS	02/28/2018
Pathway: Inhalation							
Chloroform	Chronic	9.8E-02[b]	2.8E-02[a]	Kidney	30	ASTDR	2017
Naphthalene	Chronic	3.0E-03[b]	8.6E-04[a]	Nervous system, respiratory	3000	IRIS	02/28/2018
PCE	Chronic	4.0E-02[b]	1.1E-02[a]	CNS, ocular	1000	IRIS	02/28/2018
TCE	Chronic	2.0E-03[b]	5.7E-04[a]	Developmental; immune	100	IRIS	02/28/2018

Notes:
[a] values reported in mg/kg-day
[b] values reported in mg/m^3
Dashes (--) - information was not available
Rfc - Reference concentration
Rfd - Reference dose
PCE - tetrachloroethene
TCE - trichloroethene
CNS - central nervous system
ATSDR - Agency for Toxic Substances and Disease Registry as presented in EPA RSL Summary Table, November 2017.
IRIS - USEPA Integrated Risk Information System. Date noted is date IRIS was searched.
Dermal RfD = Oral RfD * dermal absorption factor. DAF of 1.0 assumed for all COCs.
Inhalation Rfd = Inhalation RfC $(mg/m^3) * 20\ m^3/day * 1/70\ kg$

Toxicity factors are derived separately for potential carcinogens and non-carcinogens and verified values are currently available only for the inhalation and ingestion routes, typically for chronic exposure (USEPA, 1989). The toxicity values used in the HHRA were obtained in accordance with USEPA's hierarchy described in the Office of Solid Waste and Emergency Response Directive 9285.7-53 (USEPA, 2003), with the primary source being USEPA's Integrated Risk Information System (Tier 1), followed by USEPA's Provisional Peer Reviewed Toxicity Values (Tier 2). If a value was not found in either of those sources, additional USEPA and non-USEPA sources [for example, Agency for Toxic Substance and Disease Registry and California Environmental Protection Agency (EPA)] were consulted, with preference given to those sources that are current, transparent, publicly available, and peer reviewed (Tier 3 sources). These values were updated where appropriate as described below.

Non-carcinogenic effects, carcinogenic effects, or both types of effects may be associated with an individual constituent. The toxicity factors for potential carcinogens are referred to as cancer slope factors (CSFs) for the oral exposure route and are expressed in terms of the inverse of a milligram of agent per kilogram body weight per day $[(mg/kg\text{-}day)^{-1}]$. Toxicity factors for potential carcinogens for the inhalation exposure route are referred to as inhalation unit risk values and are expressed in terms of the inverse of microgram of agent per cubic meter of air $[(\mu g/m^3)^{-1}]$. Carcinogens are assumed to have no threshold or dose below which no adverse or toxic effect will occur. The higher the value of the slope factor, the more potent the carcinogen, and the more likely the probability that a given concentration of the chemical may result in the incidence of cancer.

Under the USEPA's 1986 risk assessment guidelines, the weight of evidence (WOE) classifications for potential carcinogens ranged from Class A (Human Carcinogen) to Class E (Evidence of Non-carcinogenicity). New cancer guidelines were issued in 2005 with the WOE using a narrative approach to characterize carcinogenicity ranging from Carcinogenic to Humans to Not Likely to be Carcinogenic to Humans. Both types of WOE classifications may be found in Integrated Risk Information System (IRIS).

As noted in **Table 2-6**, the COCs that contributed to unacceptable groundwater risk in the HHRA, chloroform, naphthalene, and PCE, are considered potential carcinogens. Chloroform is identified as a Class B2 Probable Human Carcinogen, which means there is sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans. Naphthalene is identified as a Class C Possible Human Carcinogen which means there is limited evidence of carcinogenicity in animals and inadequate or lack of human data. Naphthalene is a Possible Human Carcinogen for the inhalation exposure route only. Although PCE was not classified with regard to the WOE of its carcinogenic potential in 2011, carcinogenic toxicity factors were assigned to this compound by the California EPA (a Tier 3 source of toxicity information) which were used in the HHRA. The toxicological profile for PCE as published in IRIS was updated in 2012 and now incorporates USEPA-approved toxicity information. The updated carcinogenic information for PCE is presented in **Table 2-6**. The change in toxicity factors does not impact the

cleanup level for PCE of 1 µg/L as established by the NJDEP GWQS for Class I-PL groundwater. The updated information indicates that PCE is considered likely to be carcinogenic in humans by all routes of exposure. TCE, detected during the DGI groundwater sampling events at concentrations above screening criteria, is considered carcinogenic to humans by all routes of exposure. TCE is also considered a mutagen.

Dermal CSFs have not been established and according to USEPA guidelines (1989) the oral slope factors were adjusted using a dermal absorption value of 1 to estimate an absorbed dose. Therefore, the dermal CSFs are equivalent to the oral CSFs.

The toxicity factors for potential non-carcinogens are chronic reference doses (RfDs) for the oral exposure route (in units of mg/kg-day), and reference concentrations for the inhalation exposure route (in units of milligrams per cubic meter). The greater the value of the RfD, the less toxic the chemical. Non-carcinogens are usually assumed to have a "threshold" or a dose below which no adverse or toxic effect will occur, and doses that are less than the RfD are not likely to be associated with adverse health effects.

The three COCs contributing to unacceptable groundwater risk in the 2011 HHRA, chloroform, naphthalene, and PCE, also exhibit non-carcinogenic potential as does TCE. Based on the updated toxicological profile for PCE, this COC is identified to target the central nervous system (CNS), kidney, liver, immune and hematologic system, and development and reproduction. Neurological effects were found to be associated with lower PCE inhalation exposures and the nervous system is also the expected target for oral exposures. The IRIS toxicological profile for PCE identifies the CNS and the ocular system as the two primary critical effect systems. Chloroform also targets the liver through the oral exposure route and the kidney through the inhalation exposure route. Oral exposure to naphthalene has the potential to cause decreased body weight, and inhalation exposure to naphthalene effects the respiratory system. TCE is identified to target the developmental and immune systems through both the oral and inhalation exposure routes.

Dermal RfDs have not been established and according to USEPA guidelines, the oral RfDs were adjusted using a dermal absorption value of 1 to estimate an absorbed dose. Therefore, the dermal RfDs are equivalent to the oral RfDs.

Risk Characterization

This section of the risk assessment combines the results of the exposure assessment with the toxicity criteria identified for the COCs. Carcinogenic risks and non-carcinogenic impacts for each COC are presented for all populations and media of interest, including both current and future land use settings. Cumulative risks for all relevant pathways and populations are also described. These risk estimates are summarized in **Tables 2-8 and 2-9**. The results of the HHRA are interpreted within the context of the CERCLA acceptable risk range (or state requirements, whichever is appropriate).

Table 2-8. IRP Site 3 Risk Characterization Summary – Carcinogens

Scenario Timeframe: Hypothetical Future Receptor Population: Resident Receptor Age: child/adult (child 0-6 years) and adult (>18 years)						
			Carcinogenic Risk			
Medium	Exposure Point	Chemical of Concern	Ingestion	Inhalation	Dermal	Cumulative Risk
Residential Child/Adult						
Groundwater	Potable Water	Chloroform	2×10^{-6}	2×10^{-5}	2×10^{-7}	2×10^{-5}
		Naphthalene	--	4×10^{-5}	--	4×10^{-5}
		PCE	2×10^{-6}	3×10^{-6}	1×10^{-6}	6×10^{-6}
		TCE	2×10^{-5}	3×10^{-5}	3×10^{-6}	5×10^{-5}
Groundwater Risk Total						1×10^{-4}
Total Risk Residential Child/Adult						1×10^{-4}

Notes:
PCE - Tetrachloroethene
TCE - Trichloroethene
Dashes (--) - toxicity factors not available for naphthalene via oral or dermal routes.

Non-cancer risk estimates are calculated separately for the future residential child (0 to 6 years) and adult (>18 years) receptors. The non-cancer risk estimates [i.e., Hazard Quotients (HQs) and HIs] are summarized in **Table 2-9**.

Table 2-9. IRP Site 3 Risk Characterization Summary – Non-carcinogens

Scenario Timeframe: Hypothetical Future Receptor Population: Resident Receptor Age: child (0-6 years) and adult (>18 years)							
				Non-Carcinogenic Hazard Quotient			
Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Ingestion	Inhalation	Dermal	Cumulative Hazard Index
Residential Child (0-6 years)							
Groundwater	Potable Water	Chloroform	Liver; kidney	0.025	0.025	0.0020	0.052
		Naphthalene	Decreased body	0.016	1.0	0.0091	1.0
		PCE	CNS; ocular	0.57	0.83	0.30	1.7
		TCE	Developmental;	2.6	6.2	0.38	9.2
Groundwater Hazard Index Total							12
Residential Child Hazard Index							12

Table 2-9. IRP Site 3 Risk Characterization Summary – Non-carcinogens (continued)

Scenario Timeframe: Hypothetical Future Receptor Population: Resident Receptor Age: child (0-6 years) and adult (>18 years)							
				Non-Carcinogenic Hazard Quotient			
Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Ingestion	Inhalation	Dermal	Cumulative Hazard Index
Residential Adult (>18 years)							
Groundwater	Potable Water	Chloroform	Liver; kidney	0.015	0.025	0.0013	0.041
		Naphthalene	Decreased body weight; nervous system; respiratory	0.0096	1.0	0.0061	1.0
		PCE	CNS; ocular	0.35	0.83	0.20	1.4
		TCE	Developmental; immune	1.6	6.2	0.25	8.1
						Groundwater Hazard Index Total	11
						Residential Adult Hazard Index	11

Notes:
PCE - Tetrachloroethene
TCE - Trichloroethene
CNS - central nervous system

The major uncertainties affecting the risk assessment are also presented in this section, including uncertainties related to sampling and analysis, environmental fate and transport modeling, the use of default exposure assumptions, and those associated with the toxicity criteria.

For carcinogens, risks are generally expressed as the incremental probability of an individual's likelihood of developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF

Where:

Risk = a unitless probability (e.g., 2×10^{-5}) of an individual's likelihood of developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$.

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. US EPA's generally acceptable risk range for site-related exposure is 10^{-4} to 10^{-6}.

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with an RfD derived for a similar exposure period. An RfD represents a daily individual intake that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of site-related daily intake to the RfD is called a HQ. The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI/RfD}$$

Where:

CDI = chronic daily intake
RfD = reference dose

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

An HQ < 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic non-carcinogenic effects from that chemical are unlikely.

The HI is generated by adding the HQs for all COCs at a site that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which an individual may reasonably be exposed. An HI < 1 indicates that adverse effects are unlikely from additive exposure to site chemicals. An HI > 1 indicates that site-related exposures may present a risk to human health.

The ingestion of groundwater was considered a complete exposure pathway for the NJANG; however, the HHRA indicated there was no immediate threat to drinking water supplies. COPCs in groundwater were considered to be unlikely to impact on-site or off-site public supply wells due to the reduction of COPC concentrations by natural attenuation. A hypothetical future residential exposure scenario using untreated contaminated groundwater as a potable water source was included in the HHRA. This scenario evaluated a future residential child and a future residential adult receptor for potential exposure to COPCs in untreated groundwater through ingestion, and dermal contact and inhalation of volatiles while showering. Three COCs: chloroform, naphthalene and PCE were identified in association with unacceptable risk for these combined exposure pathways. The DGI conducted between December 2012 and September 2014 identified an additional COC, TCE, in groundwater as well as changes to the maximum detections used as the exposure point concentrations. Risk was re-evaluated using USEPA's on-line calculator (2018) to address the potential for exposure to chloroform, naphthalene, PCE and TCE in groundwater.

Current cancer risk estimates for the future residential child and adult receptor (evaluated as a time-weighted average exposure over a 70 year lifetime) are presented in **Table 2-8**. The results indicate the combined cancer risk estimate of 1×10^{-4} for residential exposure to untreated groundwater if used as a source of potable water is equal to the upper limit of the acceptable cancer risk range. The combined cancer risk estimate is driven by the presence of TCE and naphthalene in groundwater. The primary pathway of concern is the potential for exposure to COCs through the inhalation of vapors while showering. Chloroform, which is a regional contaminant in

groundwater has a cumulative cancer risk at the midpoint of the acceptable cancer risk range.

The results indicate the total non-cancer HI for the future residential child (12) and the future residential adult (11) exceed the acceptable level of 1 indicating that site-related exposures may present a risk to human health. Potential exposure to TCE in groundwater represents approximately 75 percent of the total HI for each receptor. The chemical-specific HIs summed across exposure pathways for TCE, PCE, and naphthalene equal or exceed the acceptable non-cancer risk level of 1 and inhalation represents the primary exposure route for each of the three COCs. Chloroform, which is a regional contaminant in groundwater does not contribute to unacceptable non-cancer risk.

Risk estimates were limited to the environmental media, exposure scenarios, and receptors described in the HHRA. Estimated potential health effects for exposure to groundwater are likely to be overestimated as the maximum concentrations were used as the exposure point concentrations. Based on the quantitative fate and transport evaluation presented in the Final RI (2011), chemical residual concentrations will likely attenuate to concentrations less than the NJDEP GWQS within a few hundred ft of the sampled monitoring wells. Based on quarterly monitoring reports, the COPCs in the shallow aquifer have not affected off-site public supply wells nor the on-site supply wells. In addition, the chemical residual concentrations were collected from groundwater in the Cohansey Sand Aquifer; the nine ACMUA wells on FAA property penetrate the lower part of the Cohansey sand and possibly the upper part of the Kirkwood formation (Final RI, 2011). Therefore, the risk estimates and hazard indices presented may not be representative of the actual VOC concentrations in drinking water.

2.8.3 Basis for Action

The response action selected in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of pollutants or contaminants from this site. The response action is warranted based on cancer risk, non-cancer risk, and concentrations of cis-1,2-DCE, naphthalene, PCE, and TCE exceeding NJDEP GWQSs at IRP Site 3.

At IRP Sites 2, 5, and 6, an NFA determination was accepted as there were no CERCLA risks identified at these sites and; therefore, the no action alternative was deemed acceptable.

2.9 Remedial Action Objectives

RAOs provide a general description of what the cleanup will accomplish. These goals typically serve as the design basis for the remedial alternatives which will be presented in the next section. The RAOs for IRP Site 3 are presented in **Table 2-10**. Soil and groundwater COCs and their respective GWQS are listed in **Tables 2-11 and 2-12**, respectively.

Table 2-10. Remedial Action Objectives

IRP Site 3 - Groundwater	IRP Site 3 - Soils
Remedial Action Objectives (RAOs)	
• Reduce the contaminant levels in groundwater to below NJDEP GWQS; • Prevent exposure to contaminated groundwater that could be harmful to human health and the environment; and, • Minimize further migration of contaminated groundwater *	• Reduce the contaminant levels in soil to the most stringent NJDEP soil remediation standards by removing impacted soil from the site; • Prevent exposure to contaminated soil that could be harmful to human health and the environment; and, • Eliminate future risk to human health by mitigating potential migration of COCs at concentrations above human health risk standards to surrounding environmental media.

Notes:
* The RAO to "minimize further migration of contaminated groundwater" at IRP Site 3 refers to the potential horizontal downgradient movement of the plume as well as the potential vertical downward migration of the plume through the leaky clayey layer identified here as separating the Shallow/Intermediate Cohansey Aquifer from the Deep Cohansey Aquifer.

IRP - Installation Restoration Program
GWQS - Groundwater Quality Standards
NJDEP - New Jersey Department of Environmental Protection
µg/L - micrograms per liter
MNA - monitored natural attenuation
COC - Chemical of Interest

Table 2-11. IRP Site 3 – Soil Constituents of Concern and Clean-Up Criteria

Constituent	Media	Clean-Up Criteria*
Tetrachloroethene	Soil	43,000 µg/kg

Notes:
* New Jersey Residential Direct-Contact Soil Remediation Standards (2017). A site-specific impact to groundwater cleanup criteria will be developed during pre-design activities that will represent the soil cleanup criteria during the remedial action.
µg/kg - micrograms per kilogram
IRP - Installation Restoration Program

Table 2-12. IRP Site 3 – Groundwater Constituents of Concern and Clean-Up Criteria

Constituent	Media	Clean-Up Criteria*
Chloroform	Groundwater	1 µg/L
cis-1,2-dichloroethene	Groundwater	1 µg/L
Naphthalene	Groundwater	2 µg/L
Tetrachloroethene	Groundwater	1 µg/L
Trichloroethylene	Groundwater	1 µg/L

Notes:
* New Jersey Department of Environmental Protection Groundwater Quality Criteria
µg/L - micrograms per liter
IRP - Installation Restoration Program

2.10 Description of Alternatives

The remedial alternatives considered for IRP Site 3 were presented in the FS Report (ANG, 2016) and are summarized in **Table 2-13** below.

Table 2-13. Summary of Remedial Alternatives Evaluated for IRP Site 3

Alternative Designation	Alternative Description
Groundwater	
1	No Action
2	Monitored Natural Attenuation (MNA)
3	Groundwater Extraction and Treatment Plus MNA
4	In-situ Chemical Oxidation Plus MNA
Soil	
1	No Action
2	Excavation and Off-site Disposal

Each alternative evaluated is described in more detail including: remedy components, common elements and distinguishing features, and expected outcomes in the following sections.

2.10.1 Description of Remedy Components

A total of four alternatives were developed to address groundwater and two alternatives were developed to address soil remediation at IRP Site 3. This section provides a summary overview of the components of those alternatives.

- Groundwater Alternative 1 – No Action
  - Under this alternative, no remedial action would be taken, and any identified contaminants are left "as is" without the implementation of any containment, removal, treatment, or other protective measures.
  - This alternative does not provide for site monitoring and does not provide for any active or passive ICs to reduce the potential for exposure.
- Groundwater Alternative 2 – MNA (Only)
  - Installation of additional groundwater monitoring wells.
  - IC establishment restrict groundwater from this area.
  - MNA until site closure, which is anticipated to be greater than 30 years under this alternative.
- Groundwater Alternative 3 – Groundwater Extraction and Treatment Plus MNA
  - Conduct pumping test and additional modeling to determine optimal flow rates and well spacing.
  - Installation of groundwater extraction wells to capture impacted groundwater.
  - Active remediation via an ex-situ treatment system which has the capability to manage the entire plume.
  - Reinjection of treated groundwater and securing re-injection permit through the CERCLA process.
  - IC establishment restrict groundwater from this area.
  - Long-term MNA.
  - Site closure, it is estimated that IRP Site 3 could reach site closure after approximately 29 years (4 years of active remediation and 25 years of monitoring).

- Groundwater Alternative 4 – ISCO Plus MNA
  - Pilot study to determine all necessary parameters needed for final design.
  - Installation of 78 injection points at 37 nested well locations.
  - Installation of an additional monitoring well.
  - Performance of two full-scale in-situ injections using sodium permanganate and activated persulfate.
  - Performance groundwater monitoring (two rounds).
  - Quarterly groundwater monitoring to verify that COC concentrations remain below 5 µg/L.
  - IC establishment restrict groundwater from this area.
  - Long-term MNA.
  - Site closure, it is estimated that IRP Site 3 could reach site closure after approximately 26 years (2 years of active remediation and 24 years of monitoring).
- Soil Alternative 1 – No Action
  - Under this alternative, no remedial action would be taken, and any identified contaminants are left "as is" without the implementation of any containment, removal, treatment, or other protective measures.
  - This alternative does not provide for site monitoring and does not provide for any active or passive ICs to reduce the potential for exposure.
- Soil Alternative 2 – Excavation and Off-Site Disposal
  - Soil investigation to calculate site-specific soil impact to groundwater criteria and determine extent of excavation.
  - Monitoring well abandonment.
  - Physical removal and off-site disposal of impacted soils.
  - Confirmatory soil sampling.
  - Excavation backfill and compaction.
  - Reinstallation of monitoring wells.

2.10.2 Common Elements and Distinguishing Features of Each Alternative

Tables 2-14 and 2-15 provide a summary of the elements common to each alternative and features that distinguish one alternative from another.

Table 2-14. Common Elements and Distinguishing Features of Groundwater Alternatives

Remedy Elements	Alternative 1: No Action	Alternative 2: MNA	Alternative 3: Groundwater Extraction and Treatment Plus MNA	Alternative 4: ISCO Plus MNA
Key ARARs associated with alternative	New Jersey Department of Environmental Protection Groundwater Quality Criteria			

Table 2-14. Common Elements and Distinguishing Features of Groundwater Alternatives (continued)

Remedy Elements	Alternative 1: No Action	Alternative 2: MNA	Alternative 3: Groundwater Extraction and Treatment Plus MNA	Alternative 4: ISCO Plus MNA
Long-term reliability of remedy	Will not be able to verify effectiveness or permanence over the long-term.	Permanent remedy; however, is anticipated to take greater than 30 years to reach RAO.	Permanent remedy and reliable in the long-term.	Permanent remedy and reliable in the long-term.
Quantity of untreated waste and treatment residuals to be disposed off-site or managed on-site in a containment system and the degree of hazard remaining in such material	NA	NA	All groundwater extracted would be treated ex-situ at a treatment facility that would require large amounts of infrastructure and energy consumption. This treatment would require handling of treated water.	COCs would be treated in-situ via ISCO to concentrations below 5 µg/L. This alternative would not require large amounts of infrastructure or energy.
Estimated time for design and construction	NA	NA	6 months	3 months
Estimated time to reach remediation goals	This alternative would not allow for remediation goals to be achieved.	Greater than 30 years and up to 70 years.	29 years (4 years of operation and 25 years of MNA.	26 years (2 years to below 5 µg/L and 24 years to reach cleanup criteria).
Estimated capital cost	$0	$3,850	$750,250	$781,750
Estimated annual O&M cost	$0	$4,214	$19,037	$13,436
Estimated total present worth	$0	$611,573	$2,040,874	$1,886,426
Discount rate	NA	7%	7%	7%
Number of years over which cost is projected	NA	70	29	27
Use of presumptive remedies and/or innovative technologies	NA	No	No	No

Notes:
ARARs - applicable or relevant and appropriate Federal standards
MNA - monitored natural attenuation
ISCO - in-situ chemical oxidation
RAO - remedial action objective
NA - not applicable
µg/L - microgram per liter

Table 2-15. Common Elements and Distinguishing Features of Soil Alternatives

Remedy Elements	Alternative 1: No Action	Alternative 2: Excavation and Off-site Disposal
Key ARARs associated with alternative	New Jersey Residential Direct-Contact Soil Remediation Standards (2015). A site-specific impact to groundwater cleanup criteria will be developed during pre-design activities that will represent the soil cleanup criteria during the remedial action.	
Long-term reliability of remedy	Will not be able to verify effectiveness or permanence over the long-term.	Permanent remedy that physically removes soil impacts.
Quantity of untreated waste and treatment residuals to be disposed off-site or managed on-site in a containment system and the degree of hazard remaining in such material	NA	Approximately 894 CY
Estimated time for design and construction	NA	1 year
Estimated time to reach remediation goals	This alternative would not allow for remediation goals to be achieved.	1 year
Estimated capital cost	$0	$394,039
Estimated annual O&M cost	$0	$0
Estimated total present worth	$0	$611,959
Discount rate	NA	7%
Number of years over which cost is projected	NA	1 year
Use of presumptive remedies and/or Innovative technologies	NA	Presumptive remedy.

Notes:
ARARs - applicable or relevant and appropriate Federal standards
NA - not applicable
CY - cubic yards

2.10.3 Expected Outcome of Each Alternative

Tables 2-16 and 2-17 provide a summary of the outcomes of each alternative for groundwater and soil, respectively.

Table 2-16. Expected Outcomes of Each Groundwater Alternative

	Alternative 1: No Action	Alternative 2: MNA	Alternative 3: Groundwater Extraction and Treatment Plus MNA	Alternative 4: ISCO Plus MNA
Available uses of land upon achieving cleanup levels	Cleanup levels will not be achieved under this alternative.	UU/UE	UU/UE	UU/UE
Time frame to achieve available land use	NA	~70 years	~29 years	~26 years
Available uses of groundwater upon achieving cleanup levels	NA	UU/UE	UU/UE	UU/UE

Table 2-16. Expected Outcomes of Each Groundwater Alternative (continued)

	Alternative 1: No Action	Alternative 2: MNA	Alternative 3: Groundwater Extraction and Treatment Plus MNA	Alternative 4: ISCO Plus MNA
Time frame to achieve available groundwater use	NA	~70 years	~29 years	~26 years
Other impacts or benefits associated with alternative	Would not be protective of human health or the environment.	Would not be protective within a reasonable timeframe (30 years) and would not minimize plume migration.	Would be protective and minimize plume migration, but would require extensive infrastructure and large amount of energy.	Would be protective and minimize plume migration, and is anticipated to reach cleanup levels within the shortest timeframe.

Notes:
UU/UE - unrestricted use/unrestricted exposure
NA - not applicable
MNA - monitored natural attenuation
ISCO - in-situ chemical oxidation

Table 2-17. Expected Outcomes of Each Soil Alternative

	Alternative 1: No Action	Alternative 2: Excavation and Off-site Disposal
Available uses of land upon achieving cleanup levels.	Cleanup levels will not be achieved under this alternative.	UU/UE for soil
Time frame to achieve available land use.	NA	~1 year
Other impacts or benefits associated with alternative.	Would not be protective of human health or the environment.	Permanent remedy that achieves cleanup levels within a relatively short timeframe.

Notes:
UU/UE - unrestricted use/unrestricted exposure
NA - not applicable

2.11 Summary of Comparative Analysis of Alternatives

In accordance with the NCP, the alternatives for IRP Site 3 were evaluated using the nine criteria described in Section 121(b) of CERCLA and the NCP §300.430(f)(5)(i). These criteria are classified as threshold criteria, balancing criteria, and modifying criteria.

Threshold criteria are standards that an alternative must meet to be eligible for selection as a remedial action. There is little flexibility in meeting the threshold criteria—the alternative must meet them or it is unacceptable. The following are classified as threshold criteria:

- Overall protection of human health and the environment; and,
- Compliance with ARARs.

Balancing criteria weigh the tradeoffs between alternatives. These criteria represent the standards upon which the detailed evaluation and comparative analysis of alternatives are based. The rating

on one balancing criterion can offset the rating on another balancing criteria

Five of the nine criteria are considered balancing criteria:

- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, and volume through treatment;
- Short-term effectiveness;
- Implementability; and,
- Cost.

Modifying criteria are additional criteria that are considered in remedy selection and are typically evaluated following the public comment periods. These criteria include:

- Community acceptance; and,
- State/support agency acceptance.

This section summarizes how well each alternative satisfies each evaluation criterion and indicates how it compares to the other alternatives under consideration.

2.11.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

2.11.1.1 Groundwater

Groundwater Alternative 1 – No Action: The No Action alternative provides no control of exposure to the contaminated groundwater and no reduction in risk to human health or the environment. It also allows for the concentrations of COCs to remain in the groundwater at unacceptable concentrations.

Groundwater Alternative 2 – MNA (Only): Over the long-term, as advection and dispersion processes occur within the plume, concentrations of PCE will ultimately decline to levels below clean-up criteria (1 µg/L), which is protective of both human health and the environment. However, this alternative will not be fully protective of human health and the environment until clean-up criteria have been reached.

Groundwater Alternative 3 – Groundwater Extraction and Treatment Plus MNA: Alternative 3 would be protective of human health and the environment since the contaminant mass would be reduced. The concentrations of COCs within the plume are expected to be reduced to a maximum concentration of 1 µg/L. The groundwater extraction and treatment system is expected to reduce concentrations to 5 µg/L or less within 4 years, and the GWQSs for COCs throughout the aquifer would be met with the follow on MNA processes in approximately 29 years after implementation of the groundwater extraction and treatment system. Until the RAOs are achieved, risks to human

health will be mitigated through the use of a CEA/WRA LUC and risks to remediation workers will be mitigated through use of proper personal protective equipment (PPE) and a Health and Safety Plan.

Groundwater Alternative 4 – ISCO Plus MNA: Alternative 4 would be protective of human health and the environment in that the contaminant mass would be reduced. The target active treatment goal of 5 µg\L or less throughout the aquifer would be met within approximately 2 years (assuming two injections). The ultimate RAOs of COC concentrations reaching the GWQSs would be met following MNA, which is anticipated to require up to 25 additional years. This approach completes treatment to GWQSs with in the 30-year objective. Until the RAOs are achieved, risks to human health will be mitigated through the use of a CEA/WRA LUC and risks to remediation workers will be mitigated through use of proper PPE and a Health and Safety Plan.

2.11.1.2 Soil

Only two soil alternatives were evaluated for soil since Alternative 2, *Excavation and Off-site Disposal*, is the presumed remedy. Alternative 1, *No Action*, is not protective of human health and the environment. Alternative 2, *Excavation and Off-site Disposal*, is protective of human health and the environment by permanently reducing soil COCs to below cleanup levels through physical removal.

Alternative 1: No Action: The No Action alternative provides no control of exposure to the impacted soil and no reduction in risk to human health or the environment. It also allows for the COCs to remain in surface soils at unacceptable concentrations at IRP Site 3.

Alternative 2: Excavation and Off-Site Disposal: This alternative would protect human health and the environment in both the short-term and the long-term as it would remove the risks associated with the elevated COC concentrations in soils.

2.11.2 Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State

environmental or facility citing laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site (relevant) that their use is well-suited (appropriate) to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

2.11.2.1 Groundwater

All of the alternatives, except Alternative 1, *No Action*, and Alternative 2, *MNA*, would achieve the RAOs within a reasonable timeframe, which includes reducing COC concentrations to below ARARs. The ARARs applicable to these alternatives is the NJDEP Groundwater Quality Standards (NJAC 7:9C).

Groundwater Alternative 1 – No Action: Because no action is being taken under this alternative, it will not meet the ARARs for groundwater.

Groundwater Alternative 2 – MNA (Only): This alternative would ultimately be compliant with chemical-, action-, and location-specific ARARs. The concentrations of PCE will naturally decline over time to acceptable concentrations. However, these concentrations will not be achieved within 30 years.

Groundwater Alternative 3 – Groundwater Extraction and Treatment Plus MNA: The implementation of the groundwater extraction and treatment system would comply with chemical-specific ARARs in the long-term after treatment. It is anticipated that MNA would be an effective final polishing step in this process to bring concentrations of COCs from 5 µg/L to the final GWQS of 1 µg/L. COC concentrations would be reduced to 1 µg/L or less in approximately 29 years after the installation of the system. During the implementation of this alternative, all federal, state, and local requirements would be followed.

Groundwater Alternative 4 – ISCO Plus MNA: The implementation of ISCO Plus MNA would comply with chemical-specific ARARs in the long-term after treatment. COC concentrations would be reduced to 5 µg/L or less approximately 2 years from the implementation of the alternative. It is anticipated that MNA would be an effective final polishing step in this process to bring concentrations of COCs from 5 µg/L to the final GWQS of 1 µg/L. The anticipated timeframe to attenuate COCs from to 1 µg/L or less in this aquifer zone is approximately 26 years. During the execution of this alternative, all federal, state, and local requirements would be followed.

2.11.2.2 Soil

For soil, Alternative 1, *No Action*, is not compliant with ARARs as no action would be taken. Alternative 2, Excavation and Off-site Disposal, is compliant with ARARs as all soil with COC concentrations exceeding NJDEP Soil Remediation Standards (NJAC 7:26D) would be removed and disposal off-site.

Soil Alternative 1: No Action: Since no action is being taken under this alternative, it will not meet the ARARs for soil and site closure is not possible.

Soil Alternative 2: Excavation and Off-Site Disposal: This alternative will comply with ARARs and protect human health and the environment by removing the impacted soil from the site.

2.11.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

2.11.3.1 Groundwater

Groundwater Alternative 1 – No Action: This alternative provides no controls for exposure and no long-term management measures. While the COC plume may naturally attenuate over the long-term through advection/dispersion processes, these reductions will not be documented and will not be confirmed. Therefore, site closure cannot be obtained through this alternative.

Groundwater Alternative 2 – MNA (Only): Implementation of this alternative will be effective and permanent in the long-term. The advection and dispersion processes that naturally occur in the PCE plume are permanent and irreversible. This alternative would not result in any residual risk as a result of implementation. It is anticipated that the timeframe to reduce COC concentrations from their current high's (Phase II DGI sampling PCE concentration = 48 µg/L) to below clean-up criteria (1 µg/L) is more than 30 years, and will not minimize plume migration.

Groundwater Alternative 3 – Groundwater Extraction and Treatment Plus MNA: Groundwater extraction and treatment systems and specifically the proposed GAC treatment system identified here have been popular remedial technologies and have been proven effective and permanent at sites worldwide. Site conditions, such as sandy soils, at IRP Site 3 are appropriate for this technology, so the reliability of the technology to reduce concentrations to clean-up criteria is high.

Groundwater Alternative 4 – ISCO Plus MNA: This alternative would be effective and permanent in the long-term. The treatment will oxidize the COCs, destroying them permanently and reducing overall COC concentrations in the plume.

ISCO is a proven technology that would be effective in destroying significant quantities of COCs within the radius of influence of the injection wells and downgradient via advective flow due to

the persistent nature of permanganate.

2.11.3.2 Soil

Soil Alternative 1: No Action: This alternative provides no controls for exposure and no long-term management measures. Therefore, this alternative will not be effective in reaching site closure and will not be effective in the long-term.

Soil Alternative 2: Excavation and Off-Site Disposal: This alternative will effectively reduce and/or eliminate the risk associated with impacted soil at IRP Site 3 because it proposes to remove the entire impacted area. Excavation of the impacted area would continue until confirmatory samples indicate that concentrations are below the NJDEP clean-up criteria. This alternative provides a permanent solution and will not require any long-term O&M.

2.11.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

2.11.4.1 Groundwater

Groundwater Alternative 1 – No Action: Since no remedial technologies are proposed, this alternative will not reduce the toxicity, mobility, or volume of contaminants through treatment. The concentration of COCs within the groundwater will continue to exceed GWQSs, as no action will be taken to reduce or isolate contamination in the groundwater. This alternative will also not provide any action to address potential exposure pathways or migration due to transport. The No Action alternative does not meet CERCLA statutory preference for treatment. Therefore, this alternative will not meet this criterion.

Groundwater Alternative 2 – MNA (Only): While implementation of this alternative will reduce the toxicity of the COC plume through advection and dispersion processes, use of the BIOCHLOR Natural Attenuation Decision Support System implies that over the 70 years expected to be required to reach 1 µg/L at the source area, though MNA only, there is the potential for very low concentration contaminant migration (i.e., 2 µg/L) to occur up to 3,150 ft downgradient. Over time, COC concentrations will decrease, which will decrease the toxicity, mobility, and mass of COCs in the groundwater. However, this alternative does not meet the CERCLA statutory preference for selecting remedial actions that employ treatment technologies to permanently and significantly reduce toxicity, mobility, and volume of the contaminants.

Groundwater Alternative 3 – Groundwater Extraction and Treatment Plus MNA: Alternative 3 would reduce the toxicity, mobility, and volume of contaminated groundwater through the direct treatment of COCs, thereby satisfying the CERCLA statutory preference for selecting remedial actions that employ treatment technologies to permanently and significantly reduce toxicity, mobility, and/or volume of the contaminants.

Groundwater Alternative 4 – ISCO Plus MNA: Alternative 4 would reduce the toxicity, mobility, and volume of contaminated groundwater through permanent treatment of COCs through chemical oxidation. This alternative does meet the CERCLA statutory preference for selecting remedial actions that employ treatment technologies to permanently and significantly reduce toxicity, mobility, and/or volume of the contaminants.

2.11.4.2 Soil

Soil Alternative 1: No Action: Since no remedial technologies are proposed, this alternative will not reduce the toxicity, mobility, or volume of contaminants through treatment. Therefore, this alternative will not meet this criterion.

Soil Alternative 2: Excavation and Off-Site Disposal: This alternative does not reduce the principal threats of PCE-impacted soil through the destruction or irreversible reduction in the mass of contaminants. Excavation of the contaminated media is not treatment, thus the RAOs will not be met utilizing a treatment process. This alternative does not meet this criterion.

2.11.5 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

2.11.5.1 Groundwater

Groundwater Alternative 1 – No Action: This alternative will be ineffective during the short-term. Risks, or potential risks, to both human and ecological receptors remain unchanged under the No Action alternative.

Groundwater Alternative 2 – MNA (Only): During the short-term, groundwater use restrictions will be placed on impacted groundwater at IRP Site 3. During remedial actions, workers could be exposed to contaminated groundwater during well installation and groundwater monitoring activities. These risks will be mitigated through use of proper PPE.

Groundwater Alternative 3 – Groundwater Extraction and Treatment Plus MNA: Alternative 3 would be effective in the short-term because it will reduce the COC concentrations in the plume in the short-term, thereby reducing the potential exposure to contaminants. Contaminated groundwater is treated at depth, limiting human and ecological exposure. During implementation of the alternative, the community would be protected through a CEA/WRA LUC. Installation of the extraction wells and the associated system piping would involve drilling into contaminated groundwater. Therefore, procedures and precautions would be implemented to minimize worker exposure to contaminants and all remediation workers would be trained in hazardous waste operations as mandated by 29 CFR 1910.120.

Groundwater Alternative 4 – ISCO Plus MNA: Alternative 4 would be effective in the short-term

by quickly reducing COC concentrations and potential exposure to contaminants. It is estimated that the highest concentrations of COCs would be reduced to below 5 µg/L within approximately 2 years of implementation. Reduction of COC concentrations to GWQSs (1 µg/L) would occur via MNA. During execution of the alternative, the community would be protected by limiting exposure through a CEA/WRA LUC. Procedures and precautions will be implemented to protect workers during the injection of oxidant.

2.11.5.2 Soil

Soil Alternative 1: No Action: This alternative will be ineffective during the short-term. This alternative will not mitigate potential risks to human receptors and does not meet this criterion.

Soil Alternative 2: Excavation and Off-Site Disposal: This alternative will pose short-term risks to remediation workers during its implementation. These risks will be mitigated through the use of proper PPE and engineering controls. Additional risks would be encountered during the transportation of the impacted soil; however, these risks are considered minimal as transport vehicles would be equipped with appropriate protective controls to minimize the risk of a release. No environmental impacts from this alternative are anticipated and the disposal facility will be an USEPA approved facility meeting all necessary containment requirements. This alternative will also provide a relatively short remedial response time.

2.11.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

2.11.6.1 Groundwater

Groundwater Alternative 1 – No Action: The No Action alternative does not involve any construction and; therefore, could be implemented immediately. Issues concerning the availability of services, equipment, space, utilities, or manpower are not relevant for this alternative, and coordination with other agencies or permits is not required.

Groundwater Alternative 2 – MNA (Only): Implementation of this alternative is relatively easy. Initially, the establishment of ICs will be required by the USEPA and NJDEP to limit access to impacted groundwater during long-term monitoring activities. Long-term monitoring of COCs would commence until concentrations reach clean-up levels. All services required (monitoring well installation, environmental sampling activities, laboratory analysis, and environmental reporting) are readily available.

Groundwater Alternative 3 – Groundwater Extraction and Treatment Plus MNA: The implementability of this alternative is considered difficult. This area of the Base contains a high density of structures (e.g., roads, parking areas, buildings) as well as underground utilities. The installation of additional piping, well vaults, and treatment building would be difficult and would

potentially affect the Base mission by occupying areas needed for future use.

All required equipment is readily available. A source of power is assumed to be available at the site to run the system, which will operate continuously (24 hours per day and 7 days per week) for approximately 4 years. However, the power supply for this alternative would likely require significant upgrades and additional construction. The equipment and procedures for collecting and monitoring groundwater samples are routine.

During the installation of the system, 13 flush mount wells vaults and up to 1,400 ft of piping will be trenched primarily in the parking lots above the treatment zone. In addition, a treatment building (30-ft by 40-ft by 15-ft) will be installed.

Prior to implementation, necessary permits such as air quality control equipment permits would be obtained, if necessary.

Groundwater Alternative 4 – ISCO Plus MNA: ISCO Plus MNA would be readily implementable and would not require the installation of horizontal pipes over long distances, limiting disruption to the Base. All required equipment, including "off-the-shelf" systems are available. Sodium permanganate is commercially available and has been used to oxidize significantly greater levels of contamination of the target COCs at other sites. A source of power is available at the site to run the injection pumps. The power supply would only be required intermittently during injection events; therefore, would not need upgrades for this alternative to be implemented. The equipment and procedures for injecting collecting and monitoring groundwater samples are routine and regular O&M is not necessary.

Sufficient space is available for the implementation of ISCO with MNA. Although care would have to be exercised to avoid disrupting Base/FAA operations during injection activities, it is assumed that these activities would have a minimal footprint or effect on day-to-day Base operations. Prior to implementation, permits, such as an underground injection permit, would be obtained.

2.11.6.2 Soil

Soil Alternative 1: No Action: There are no actions required to implement this alternative. There would not be any technical or administrative difficulties in implementing this alternative.

Soil Alternative 2: Excavation and Off-Site Disposal: Implementation of this alternative is technically feasible and labor and equipment needed for implementation are readily available. This alternative uses reliable and proven technologies. Uncertainties do exist with the implementation of this alternative because the utilities have not been identified. All work associated with this alternative would be coordinated through the Base. The estimated timeframe to complete this alternative through site closure is 12 months.

2.11.7 Cost

2.11.7.1 Groundwater

The total present value of Groundwater Alternatives 1, 2, 3, and 4 for IRP Site 3 are $0; $611,573; $2,040,874; and, $1,886,426, respectively.

Groundwater Alternative 1 – No Action: There are no costs associated with this alternative.

Groundwater Alternative 2 – MNA (Only): The total present value of this option is estimated to be $611,573, which includes the equipment and labor associated with, but not limited to, monitoring well installation, environmental sampling activities, laboratory analysis, and environmental reporting. The initial cost of this alternative is relatively inexpensive as no active remediation will be conducted. **Table 2-18** presents the estimated costs for Alternative 2.

Table 2-18. Cost Summary for Alternative 2 – MNA

Description	Total Cost	Total Present Value[a]
Capital Costs	$3,850	$3,850
System Design and Management	$4,000	$4,000
Operation and Maintenance Costs	$1,280,000	$294,994
Reporting	$1,030,000	$253,131
Contingency[b]	$231,785	$55,598
Total	**$2,549,635**	**$611,573**

Notes:
[a] Present value based on 7% discount rate
[b] Contingency is 10% of total project cost
MNA - monitored natural attenuation

Groundwater Alternative 3 – Groundwater Extraction and Treatment Plus MNA: The present value cost of Alternative 3 for IRP Site 3 is estimated to be $2,040,874, which includes the equipment and labor associated with, but not limited to the pilot test, system installation, environmental sampling activities, long-term system O&M, laboratory analysis, and all necessary reporting/permitting. The following is a list of assumptions made in the development of this alternative and cost estimate. Please note that these are assumptions made in order to develop a cost for this FS and a pilot study will be conducted to determine all necessary parameters needed for a final design should this alternative be selected for implementation. **Table 2-19** presents the estimated costs for Alternative 3.

Table 2-19. Cost Summary for Alternative 3 – GW Extraction and Treatment Plus MNA

Description	Total Cost	Total Present Value[a]
Capital Costs	$750,250	$750,250
System Design and Installation	$134,013	$134,013
Operation and Maintenance Costs	$974,330	$552,068

Table 2-19. Cost Summary for Alternative 3 – GW Extraction and Treatment Plus MNA (continued)

Description	Total Cost	Total Present Value[a]
Reporting	$530,000	$264,397
Contingency[b]	$477,719	$340,146
Total	**$2,866,312**	**$2,040,874**

Notes:
[a] Present Value based on 7% discount rate
[b] Contingency is 20% of total project cost
[c] Total Cost and Total Present Value are rounded to nearest $10,000
GW - groundwater
MNA - monitored natural attenuation

Groundwater Alternative 4 – ISCO Plus MNA: The total present value of this option is estimated to be $1,886,426, which includes the equipment and labor associated with chemicals/oxidant, environmental sampling activities, laboratory analysis and pilot testing. These costs also include longer MNA costs for an estimated 24 years to facilitate the MNA polishing component of the final process. **Table 2-20** presents the estimated costs for Alternative 4.

Table 2-20. Cost Summary for IRP Site 3 Alternative 4 – ISCO Plus MNA

Description	Total Cost	Total Present Value[a]
Capital Costs	$781,750	$781,750
System Design and Management	$179,803	$179,803
Operation and Maintenance Costs	$734,250	$362,774
Reporting	$510,000	$247,695
Contingency[b]	$441,161	$314,404
Total[c]	**$2,646,964**	**$1,886,426**

Notes:
[a] Present Value based on 7% discount rate
[b] Contingency is 20% of total project cost
[c] Total Cost and Total Present Value are rounded to nearest $10,000
IRP - Installation Restoration Program
ISCO - in-situ chemical oxidation
MNA - monitored natural attenuation

2.11.7.2 Soil

The total present value of Soil Alternatives 1 and 2 for IRP Site 3 are $0 and $611,959.

Soil Alternative 1: No Action: There are no costs associated with this alternative.

Soil Alternative 2: Excavation and Off-Site Disposal: The total estimated cost for the recommended alternative would be approximately $611,959. **Table 2-21** presents the estimated costs for Excavation and Off-Site Disposal.

Table 2-21. Cost Summary for IRP Site 3 Alternative 2 – Excavation and Off-Site Disposal

Description	Total Cost	Total Present Value[a]
Capital Costs	$394,039	$394,039
Remedial Design and Management	$70,927	$70,927
Reporting	$45,000	$45,000
Contingency[b]	$101,993	$101,993
Total[c]	**$611,959**	**$611,959**

Notes:
[a] Present Value based on 7% discount rate.
[b] Contingency is 20% of total project cost.
[c] Total Cost and Total Present Value are rounded to nearest $10,000.
IRP - Installation Restoration Program

2.11.8 State/Support Agency Acceptance

The NJDEP has concurred with the preferred alternatives; Groundwater Alternative 4, ISCO Plus MNA, and Soil Alternative 2, Excavation and Off-site Disposal. The USEPA and FAA have expressed their support for the preferred alternatives as well.

2.11.9 Community Acceptance

During the public comment period, no comments were received from the public regarding the PP. In addition, no representatives of the community attended the public meeting held on 30 January 2018.

2.12 Principal Threat Wastes

The NCP expects that treatment that reduces the toxicity, mobility, or volume of the principal threat wastes will be used to the extent practicable. The principal threat concept refers to the source materials at a CERCLA site considered to be highly toxic or highly mobile that generally cannot be reliably controlled in place or present a significant risk to human health or the environment should exposure occur. A source material is material that contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater or air, or that acts as a source for direct exposure.

Although VOCs in soil at the IRP Site 3 may act as a limited source of contamination to groundwater, this source is not considered principal threat wastes at the site. The media contaminated at the site is the soil and groundwater.

2.13 Selected Remedy

The primary indicator of remedial action performance will be satisfying the RAOs for IRP Site 3 and protecting human health and the environment. Performance measures are defined herein as the RAOs (see Section 2.9 – Remedial Action Objectives) plus the required actions to achieve the objectives, as defined in this section. It is anticipated that successful implementation, operation, maintenance, and completion of the performance measures will achieve a protective and legally compliant remedy for IRP Site 3.

The groundwater remedy for IRP Site 3, Groundwater Alternative 4, *ISCO Plus MNA*, was selected based upon its ability to meet the RAOs of minimizing further migration of contaminated groundwater and achieving site closure in approximately 30 years by actively treating groundwater containing COC concentrations greater than 5 µg/L then treating with MNA to GWQSs. This remedial alternative also protects human health and the environment, complies with ARARs, reduces toxicity, mobility, or volume through treatment and is the most self-sufficient independently manageable alternative evaluated.

The soil remedy for IRP Site 3, Soil Alternative 2, *Excavation and Off-site Disposal, was selected as it* ensures total removal of the impacted materials from the site and mitigation of any potential source areas at IRP Site 3, which could impact remediation of the groundwater at IRP Site 3.

Remedy selections are based on the detailed evaluation of remedial alternatives presented in the FS (ANG, 2016). It is expected that these remedies will remain in effect and be protective of human health and the environment until such time as the concentrations of naphthalene, cis-1,2-DCE, PCE, and/or TCE decrease to, or below, applicable cleanup levels. LUCs, to include a CEA/WRA, will remain in effect for as long as site conditions pose an unacceptable risk.

The FAA is responsible for implementing, maintaining, and monitoring the remedial actions identified herein for the duration of the remedies selected in this ROD. The ANG will exercise this responsibility in accordance with CERCLA and the NCP. Concurrence by the FAA, USEPA, and NJDEP is required for any modification of the remedy inconsistent with the objectives of this ROD.

2.13.1 Summary of the Rationale for the Selected Remedy

The selected remedial alternatives for IRP Site 3 is Groundwater Alternative 4 , *ISCO Plus MNA*, and Soil Alternative 2, *Excavation and Off-site Disposal.* The ANG, FAA, USEPA, and NJDEP believe that the selected remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The remedy is expected to satisfy the following statutory requirements of CERCLA § 121(b):

- Threshold criteria
  - Protection of human health and the environment
  - Compliance with ARARs
- Balancing criteria
  - Long-term effectiveness and permanence
  - Toxicity, mobility or volume reduction through treatment
  - Short-term effectiveness
  - Implementability
  - Cost
- Modifying criteria
  - State agency acceptance

- Community acceptance

2.13.1.1 Groundwater

Alternatives 1 (No Action) and 2 (MNA) do not meet one or both of the threshold criteria necessary to be selected as the preferred alternative. Therefore, based on the performance in the primary balancing criteria, these alternatives are not eligible for selection and will not be further discussed/evaluated.

Alternatives 3 and 4 would achieve overall protection of human health and the environment in the long-term and will comply with ARARs. Alternatives 3 and 4 both consist of active remediation of the plume greater than 5 µg/L coupled with MNA to achieve the reduction of COC concentrations to below 1 µg/L. Both alternatives will minimize plume migration and allow for site closure within the defined 30 year parameter. (With full compliance anticipated in approximately 29 years.)

In the balancing criteria, the primary distinction between the two alternatives is with regard to implementability. Groundwater extraction and treatment will require several steps prior to implementation including conducting pumping tests, performing groundwater modeling, and obtaining permit approval for re-injection. In addition, this option will require extensive utility trenching and construction of a treatment\control building that may interfere with Base mission by occupying areas needed for future use.

The ISCO Plus MNA alternative will require a bench-scale study to ensure site-specific conditions are evaluated prior to initiation to ensure that metals are not mobilized and/or other secondary water quality standards are not exceeded. ISCO Plus MNA does not require a system, it does not consume large amounts of energy, or produce a secondary waste stream, but it does require remediation workers to handle sodium permanganate. Sodium permanganate was selected as the primary oxidant based upon its long-term persistence in the subsurface, which allows for secondary transport of oxidant into smaller pore spaces. In addition, daughter products of PCE (parent compound and primary constituent of concern at the IRP Site 3), such as TCE; cis-1,2-DCE; or VC are not produced during the chemical reaction with this oxidant. Although permanganate is effective in treating chlorinated solvents, it is not used to treat naphthalene. Therefore, in the area where naphthalene exceeded its NJDEP GWQS (3MW405), activated persulfate may be used in substitute for permanganate, which has the ability to treat each of the COCs.

In the long-term, both Alternatives 3 and 4 are permanent remedies and each requires the use of MNA to treat the COC plume. However, the staying power of the sodium permanganate, coupled with the lack of a secondary waste stream or significant energy consumption, as well as more completely defined costs, gives Alternative 4 the highest rank as a selected remedy.

2.13.1.2 Soil

Alternative 1 (No Action) does not meet overall protection of human health and the environment, compliance with ARARs, reduction of toxicity or mobility, and is not effective in the short-term or long-term. Therefore, this alternative is not eligible for selection and will not be further evaluated.

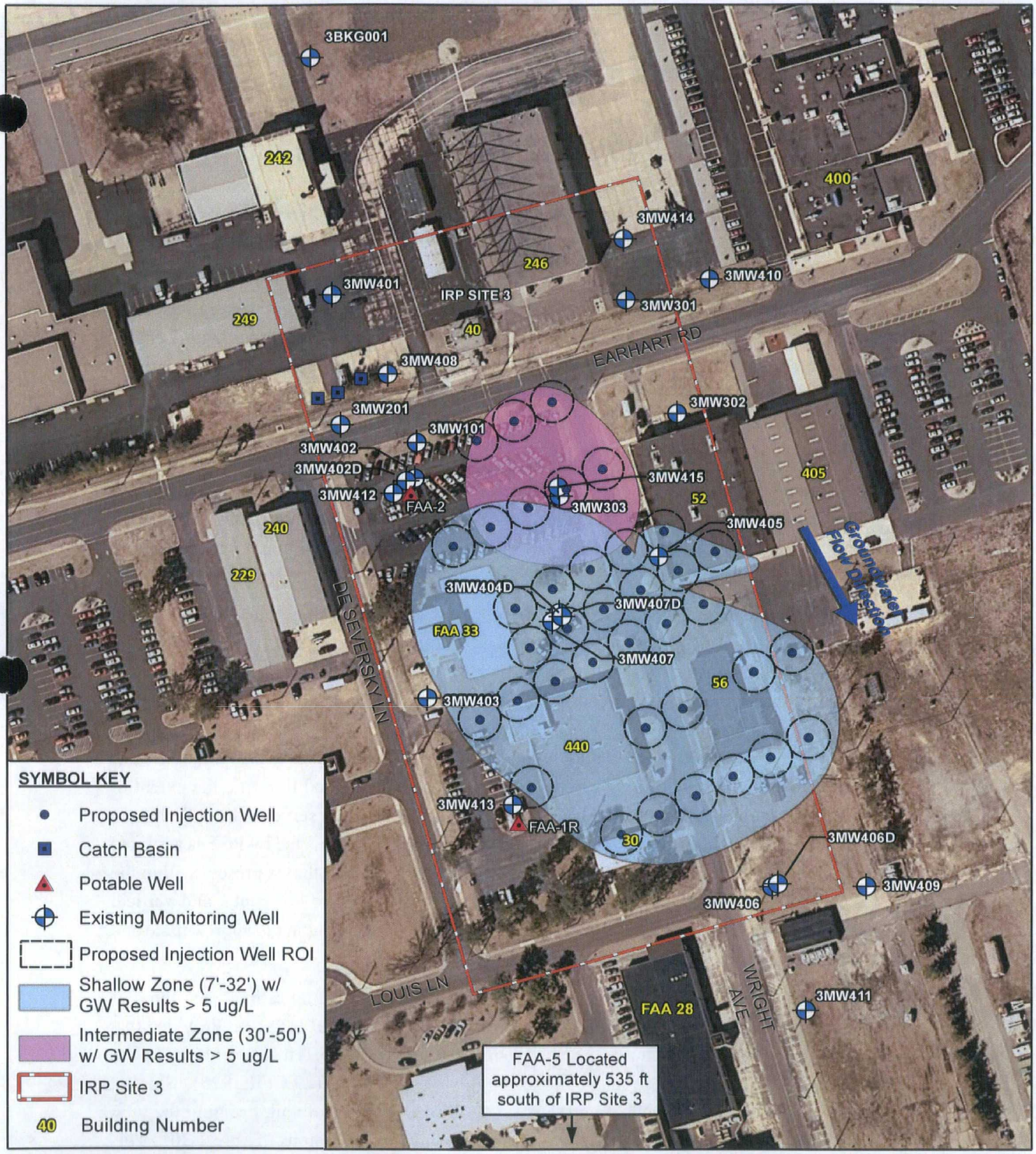
Alternative 2 (Excavation and Off-Site Disposal) is technically feasible for the removal of soil impacts at IRP Site 3, given that equipment and materials are readily available. This alternative would further protect human health and the environment by reducing the mobility, toxicity, and volume of contaminants through removal. This alternative will also meet the ARARs at IRP Site 3.

2.13.2 Description of the Selected Remedy

Groundwater Alternative 4 – ISCO Plus MNA: ISCO involves injection of an oxidant into injection wells drilled into the impacted zone of the aquifer to reduce constituent concentrations through the oxidation of VOCs. At IRP Site 3, injection of ISCO using permanganate solution was selected for evaluation and costing purposes. Permanganate was selected based upon its long-term persistence in the subsurface, which allows for secondary transport of oxidant into smaller pore spaces. In addition, daughter products of PCE (parent compound and primary constituent of concern at the IRP Site 3), such as TCE; cis-1,2-DCE; or vinyl chloride are not produced during the chemical reaction with this oxidant. Although permanganate is effective in treating chlorinated solvents, it is not used to treat naphthalene. Therefore, in the area where naphthalene exceeded its NJDEP GWQS (3MW405), activated persulfate may be used in substitute for permanganate, which has the ability to treat each of the COCs.

Distribution of the permanganate solution would be accomplished utilizing a network of 78, ten (10) ft screened injection points positioned at 37 nested well locations. The 78 injection points would be distributed throughout the area to be actively treated (greater than 5 µg\L plume) (**Figure 2-7**). Thirty of these locations would consist of two injection wells with 10-ft intervals nested in a single boring. Since these wells would target the shallow zone, one screen interval would be 10 to 20 ft and the other from 20 to 30 ft bgs. Five of the locations would target the intermediate zone and would consist of two nested wells screened from 30 to 40 ft and 45 to 55 ft bgs. The remaining two injection locations would each contain both a shallow and intermediate well boring with a total of four screened 10-ft intervals to distribute ISCO to both zones.

The injection point locations are based on an assumed 25-ft radius of influence and are oriented in lines perpendicular to groundwater flow to take advantage of secondary advective transport following injection. This parallel treatment zone layout reduces the overall number of injection sites. Beneath the impacted soil area (scheduled for excavation), an additional row of extraction points was assumed for more complete coverage.



New Jersey Air National Guard
177th Fighter Wing
Egg Harbor Township, NJ

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FIGURE 2-7
Alternative 4- ISCO Injection Well System
Record of Decision
New Jersey Air National Guard 177th Fighter Wing
Egg Harbor Township, New Jersey

0 25 50 75 100 125 Meters
0 100 200 300 400 Feet

03/23/2018	File: E_Harbor_NJ_ANG_Site_3_Alt_4_FS_2015	
PROJ: 276220185	Drawn: JBO	

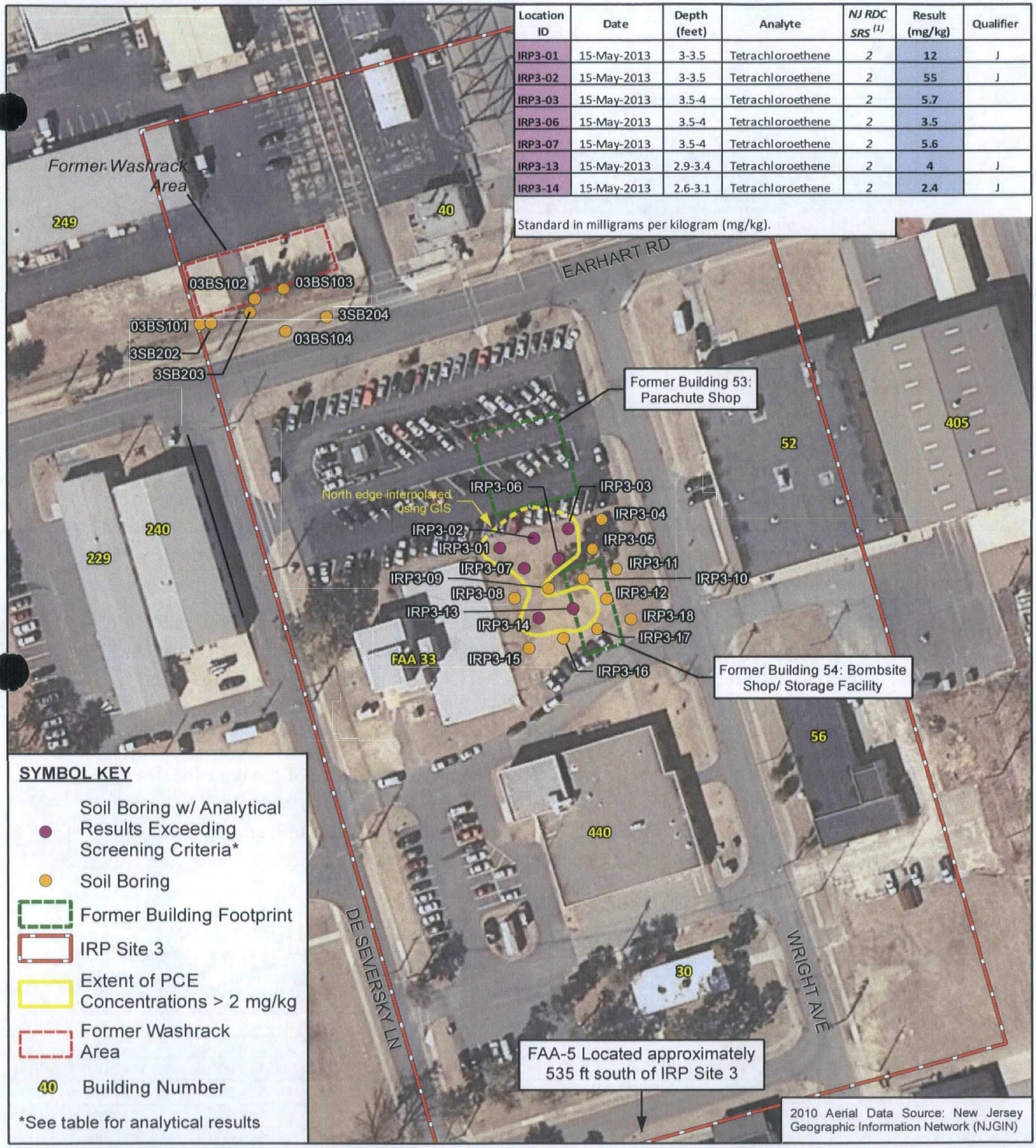
It is assumed that injections using a low concentration permanganate solution (0.5 to 1.0 percent by weight) would be injected two to three times using temporary above ground hoses eliminating the need for expensive subsurface piping. Upon completion of each injection event, performance groundwater monitoring would be conducted to monitor post-remedial effectiveness of the COC plume.

Once it has been established that no additional injections are required (COC concentrations have reached the intermediate step of 5 µg/L or less) MNA would begin in accordance with USEPA and NJDEP requirements until COC concentrations are confirmed to be below the RAO of 1 µg\L. It is anticipated that MNA would continue for approximately 24 years until COC concentrations are below the RAO of 1 µg/L. The injection wells would be subsequently abandoned.

Soil Alternative 2 – Excavation and Off-site Disposal: Excavation and Off-Site Disposal has been identified as the presumptive remedy for impacted soil at IRP Site 3 due to its universal applicability regardless of contaminant species. If any circumstances prevent implementation of the presumptive remedy or if implementation becomes cost prohibitive, additional remedial action alternatives will be developed.

This alternative includes the physical removal of soil from the extents shown in **Figure 2-8** and subsequent off-site disposal. Based on soil analytical data, the volume of soil requiring remedial action was estimated by measuring the length and width of the proposed excavation areas using geographic information system (GIS) coordinates associated with data collected as part of DGI soil sampling. The extent of soils containing PCE concentrations exceeding the NJDEP Residential Direct Contact SRS of 43 mg/kg is shown on **Figure 2-8**. This area serves as the basis for the cost estimate within this FS; however, a PDI will be implemented to refine the extent of impacted soil and develop a site-specific IGW SRS. The IGW SRS will serve as the soil cleanup criteria and guide the extent of excavation. The vertical extent of soil impacted by PCE is assumed to be limited by a fine-grained silt and clay lens (0.5 to 1 ft in thickness) that is present within the hotspot area at depths ranging from 1.5 to 4 ft bgs. Since the complete horizontal and vertical extent of impacts were not been delineated during the DGI, the area of impact is approximate and will be confirmed as part of the remedial action.

Based upon the aerial extent and presumed depth of impacted soil, the total estimated volume of soil requiring remedial action is 894 CY or approximately 1,207 tons (**Table 2-20**). Provided that the excavation would be conducted in primarily silty sand soils, a 1.5:1 ft ratio (horizontal to vertical) slope would be required to maintain the stability of side slopes (29 CFR 1926). Sloping of the sidewalls would require the excavation of an additional 265 CY of soil, bringing the total volume of soil requiring excavation to 1,159 CY or approximately 1,565 tons (**Table 2-20**). This volume estimate does not include quantities of additional impacted soil that may be identified during the remedial action.



Location ID	Date	Depth (feet)	Analyte	NJ RDC SRS [1]	Result (mg/kg)	Qualifier
IRP3-01	15-May-2013	3-3.5	Tetrachloroethene	2	12	J
IRP3-02	15-May-2013	3-3.5	Tetrachloroethene	2	55	J
IRP3-03	15-May-2013	3.5-4	Tetrachloroethene	2	5.7	
IRP3-06	15-May-2013	3.5-4	Tetrachloroethene	2	3.5	
IRP3-07	15-May-2013	3.5-4	Tetrachloroethene	2	5.6	
IRP3-13	15-May-2013	2.9-3.4	Tetrachloroethene	2	4	J
IRP3-14	15-May-2013	2.6-3.1	Tetrachloroethene	2	2.4	J

Standard in milligrams per kilogram (mg/kg).

SYMBOL KEY

- Soil Boring w/ Analytical Results Exceeding Screening Criteria*
- Soil Boring
- Former Building Footprint
- IRP Site 3
- Extent of PCE Concentrations > 2 mg/kg
- Former Washrack Area
- 40 Building Number

*See table for analytical results

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Egg Harbor Township, NJ

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FIGURE 2-8
IRP Site 3 - Extent of Soil Impacts
Record of Decision
New Jersey Air National Guard 177th Fighter Wing
Egg Harbor Township, New Jersey

0 25 50 75 100 125 Meters
0 100 200 300 400 Feet

03/23/2018 | File: E_Harbor_NJ_ANG_Site_3_Extent_Soil_FS_2015.mxd
PROJ: 276220119 | Drawn: JBO

Table 2-22. IRP Site 3 – Estimated Volume of Excavated Soil

Location of Impacts	Total Area (ft^2)	Depth (ft bgs)	Impacted Soil Volume (CY)	Slope Stabilization Volume* (CY)	Total Soil Volume (CY)
East of Building FAA 33	4,825	5	894	265	1,159

Notes:
* Estimated volume includes potentially non-impacted soil that will be excavated for slope stability in accordance with 29 CFR 1926.
ft - foot or feet
bgs - below ground surface
IRP - Installation Restoration Program
ft^2 - square feet
CY - cubic yards

The contaminated soil will be excavated using a small track excavator or similar equipment. Soil will be direct loaded into roll-off containers and waste characterization samples collected. It is assumed that the waste will be characterized as non-hazardous. The roll-offs will then be transported to a permitted Subtitle D disposal facility and disposed of as non-hazardous waste. USEPA approval of the disposal site will be obtained prior to the excavated soil being transported offsite. Site restoration following the remedial work will include backfilling with certified clean fill and/or topsoil, soil compaction, final grading, soil stabilization, and seeding in accordance with Base specifications.

Excavation and Off-Site Disposal is an effective remedial option, and is technically feasible for the removal of soil impacts at IRP Site 3, given that equipment and materials are readily available. This alternative would further protect human health and the environment by reducing the mobility, toxicity, and volume of contaminants through removal. This alternative will also meet the ARARs at IRP Site 3.

It is important to note that the remedy may change somewhat as a result of the remedial design and construction processes. Changes, if they occur, to the remedy as described in this ROD will be documented using a technical memorandum in the Administrative Record, an Explanation of Significant Differences (ESD), or ROD amendment.

2.13.3 Summary of Estimated Remedy Costs

Table 2-23. Cost Estimate Summary for Groundwater Alternative 4 – ISCO Plus MNA

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost	Net Present Value (7% discount)
Capital Costs						
1	Bench-Scale Test	1	LS	$10,000	$10,000	$10,000
2	Install shallow nested wells (35 ft)	32	LS	$3,500	$112,000	$112,000
3	Install intermediate nested wells (55 ft)	7	Each	$5,500	$38,500	$38,500
4	Geologist Oversight	20	days	$1,500	$30,000	$30,000
5	Environmental Technician	20	Daily	$1,000	$20,000	$20,000
6	Injection Events (Full Scale)	2	Each	$285,625	$571,250	$571,250
				Subtotal	$781,750	$781,750

Table 2-23. Cost Estimate Summary for Groundwater Alternative 4 – ISCO Plus MNA (continued)

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost	Net Present Value (7% discount)
System Design and Management						
7	Performance/Groundwater Monitoring (Labor and Equipment)	10%	Each	$781,750	$78,175	$78,175
8	Project Management	5%	Each	$781,750	$39,088	$39,088
9	Construction Management	8%	Each	$781,750	$62,540	$62,540
	Subtotal	$179,803	$179,803			
Operation and Maintenance Costs						
10	Performance/Groundwater Monitoring (Labor and Equipment)	36	Each	$15,000	$540,000	$268,403.32
11	ISCO System Decommissioning	1,985	Each	$50	$99,250	$81,018
12	Well Abandonment CMT Wells	10	Each	$7,500	$75,000	$10,542
13	Well Abandonment/Site Decommissioning	20	Each	$1,000	$20,000	$2,811
				Subtotal	$734,250	$362,774
Reporting						
14	Remedial Action Work Plan	1	Each	$20,000	$20,000	$20,000
15	After Action Report	1	Each	$30,000	$30,000	$24,489
16	Groundwater Monitoring Report	36	Each	$10,000	$360,000	$178,935.55
17	5-Year Review	5	Each	$15,000	$75,000	$20,756
18	Well Abandonment/Site Closure Report	1	Each	$15,000	$15,000	$2,108
19	No Further Response Action Planned Record of Decision	1	Each	$10,000	$10,000	$1,406
				Subtotal	$510,000	$247,695
				Subtotal of Alternative	$2,205,803	$1,572,022
20	Contingency	20%	of	$2,205,803	$441,161	$314,404
				Total	**$2,646,963**	**$1,886,426**

Table 2-24. Cost Estimate Summary for Soil Alternative 2 – Excavation and Off-site Disposal

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost	Net Present Value (7% discount)
Capital Costs						
1	Pre-design soil investigation	1	Each	$70,410	$70,410	$70,410
2	Mobilization/Demobilization	1	LS	$12,500	$12,500	$12,500
3	Survey	1	LS	$2,500	$2,500	$2,500
4	Saw Cutting	132	LF	$5	$660	$660
5	Concrete/Asphalt Removal	1640	SF	$1	$2,050	$2,050
6	Erosion Control Installation	1	LS	$1,000	$1,000	$ 1,000
7	Excavation of Impacted Soil	1159	CY	$50	$57,950	$57,950
8	Waste Characterization Sampling	4	Each	$1,156	$4,624	$4,624

Table 2-24. Cost Estimate Summary for Soil Alternative 2 – Excavation and Off-site Disposal (continued)

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost	Net Present Value (7% discount)
10	Transportation and disposal of C&D waste	690	Each	$35	$24,150	$24,150
11	Confirmation Soil Sampling (VOCs)	15	Each	$110	$1,650	$1,650
12	Backfill material	1564.65	ton	$55	$86,056	$86,056
13	Backfilling and compacting excavation	1159	CY	$50	$57,950	$57,950
14	Pavement and curb restoration	1640	Each	$15	$24,600	$24,600
15	Re-seeding	1	Each	$1,000	$1,000	$1,000
				Subtotal	$394,039	$394,039
Remedial Design and Management						
16	Engineering, Permitting, and Design	5%	Each	$394,039	$19,702	$19,702
17	Project Management	5%	of	$394,039	$19,702	$19,702
18	Construction Management	8%	of	$394,039	$31,523	$31,523
				Subtotal	$70,927	$70,927
Reporting						
19	Remedial Action Work Plan	1	Each	$20,000	$20,000	$20,000
20	After Action Report	1	Each	$15,000	$15,000	$15,000
21	No Further Response Action Planned Record of Decision	1	Each	$10,000	$10,000	$10,000
				Subtotal	$45,000	$45,000
				Subtotal of Alternative	$509,966	$509,966
22	Contingency	20%	of	$ 509,966	$101,993	$101,993
				Total	**$611,959**	**$611,959**

The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the AR file, ESD, or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

2.13.4 Expected Outcomes of Selected Remedy

Once complete the alternatives for soil and groundwater will result in NFA being requested based on both soil and groundwater COC concentrations being below applicable regulatory criteria. This objective will support the ANGs mission of unrestricted use/unrestricted exposure for IRP Site 3. **Table 2-25** provides the applicable cleanup levels for soil and groundwater.

Table 2-25. Cleanup Levels for Chemicals of Concern at IRP Site 3

Media: Groundwater and Soil Site Area: IRP Site 3 Available Use: Commercial/Industrial Controls to Ensure Restricted Use: Institutional controls until cleanup levels are reached			
Chemicals of Concern	**Cleanup Level**	**Basis for Cleanup Level**	**Risk at Cleanup Level**
Groundwater			
cis-1,2-dichloroethene	1 µg/L	New Jersey Department of Environmental Protection Groundwater Quality Criteria	UU/UE once cleanup levels are reached
Naphthalene	2 µg/L		
Tetrachloroethene	1 µg/L		
Trichloroethylene	1 µg/L		
Soil			
Tetrachloroethene	43,000 µg/kg	New Jersey Residential Direct-Contact Soil Remediation Standards (2017). A site-specific impact to groundwater cleanup criteria will be developed during pre-design activities that will represent the soil cleanup criteria during the remedial action.	UU/UE once cleanup levels are reached

Notes:
µg/kg - micrograms per kilogram
µg/L - micrograms per liter
IRP - Installation Restoration Program
UU/UE - unrestricted use/unrestricted exposure

2.14 Statutory Determination Summary

Under CERCLA §121 (as required by NCP §300.430(f)(5)(ii)), USEPA must select a remedy that is protective of human health and the environment, complies with ARARs, is cost effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes: 1) a preference for remedies that employ treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element; and 2) a bias against offsite disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

2.14.1 Protection of Human Health and the Environment

The selected groundwater remedy, Groundwater Alternative 4, will protect human health and the environment by reducing the contaminant mass. The target active treatment goal of 5 µg\L or less throughout the aquifer would be met within approximately 2 years (assuming two injections). The ultimate RAOs of COC concentrations reaching the GWQSs would be met following MNA, which is anticipated to require up to 25 additional years.

The selected soil remedy, Soil Alternative 2, will protect human health and the environment in both the short-term and the long-term as it would physically remove the risks associated with the elevated COC concentrations in soils.

2.14.2 Compliance with ARARs

Remedial actions must comply with both Federal and State ARARs. ARARs are legally applicable or relevant and appropriate requirements, standards, criteria, or limitations of Federal and State

environmental laws and regulations.

ARARs fall into three categories: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs are health-based or risk-management-based numbers that provide concentration limits for the occurrence of a chemical in the environment. Location-specific ARARs restrict activities in certain sensitive environments. Action-specific ARARs are activity based or technology-based, and typically control remedial activities that generate hazardous wastes (such as with those covered under the RCRA). Off-site shipment, treatment, and disposal of excavated contaminated soil invoke action-specific ARARs. Criteria to be considered, or TBCs, are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs are considered along with ARARs.

Table 2-26 summarizes the ARARs and TBCs for the selected remedy at IRP Site 3 and describes how the selected remedy addresses each one.

Table 2-26. Description of ARARs and TBCs

Standard, Requirement, Criteria, or Limitation	Description	Type	Potential ARARs or TBC	Action to be Taken to Attain Requirement
NJDEP Residential Soil Remediation Standards, NJAC 7:26D	Establishes the minimum residential direct contact and non-residential direct contact soil remediation standards.	Chemical	ARARs	Excavation of impacted soils so that residual soils are compliant with ARARs
NJDEP Groundwater Quality Standards, NJAC 7:9C	Contains table of groundwater quality criteria for various substances and chemicals. Specifies groundwater classification, designated uses and groundwater quality criteria. Includes procedures for developing criteria and implementing groundwater quality standards.	Chemical	ARARs	ISCO Plus MNA to reduce groundwater COC concentrations to below ARARs
SDWA National Primary Drinking Water Standards (MCLs) 40 CFR Part 141, Subpart B, pursuant to 42. USC §§ 300g-1 and 300j-9	Establishes maximum contaminant levels (MCLs) for specific contaminants, which are health-based standards for public drinking water systems.	Chemical	ARARs	ISCO Plus MNA to reduce groundwater COC concentrations to below ARARs

Table 2-26. Description of ARARs and TBCs (continued)

Standard, Requirement, Criteria, or Limitation	Description	Type	Potential ARARs or TBC	Action to be Taken to Attain Requirement
NJDEP Site Specific Impact to Groundwater Soil Remediation Standards (NJAC 7:26D and 7:26E)	Establishes the procedures for developing a site-specific Impact to Groundwater Soil remediation Standard at sites with known or suspected releases to soil.	Location, Chemical	TBC	ISCO Plus MNA to reduce groundwater COC concentrations to below ARARs.
New Jersey Safe Drinking Water Act Regulations, NJAC 7:10	Establishes drinking water standards to ensure the provision of a safe and adequate water supply for consumption by the public.	Chemical	ARARs	ISCO Plus MNA to reduce groundwater COC concentrations to below ARARs.
Brownfield and Contaminated Site Remediation, NJSA 58:10B-2 and 58:10B-12	This legislature declares that strict remediation standards are necessary to protect public health and safety and the environment; that these standards should be adopted based upon the risk posed by discharged hazardous substances; that [permanent] unrestricted remedies for contaminated sites are preferable and the State must adopt policies that encourage their use; that institutional and engineering controls should be allowed only when the public health risk and environmental protection standards are met; and that in order to encourage the clean-up of contaminated sites, there must be finality in the process, the provision of financial incentives, liability protection for innocent parties who clean up, clean-up procedures that are cost effective, and regulatory action that is timely and efficient.	Action	TBC	All remedial activities and established institutional controls will be in accordance with NJSA 58:10B-2 and 58:10B-12.
Pinelands Comprehensive Management Plan, NJAC 7:50	These regulations and standards promote the orderly development of the Pinelands to preserve and protect the significant and unique natural, ecological, agricultural, archaeological, historical, scenic, cultural, and recreational resources of the Pinelands. For Federal Facilities, the Pinelands CMP requires the facility to include protection of the Pinelands in the Federal Facility Master Plan.	Location	ARAR	Remedial activities will be conducted in accordance with the FAA's Master Plan.

Table 2-26. Description of ARARs and TBCs (continued)

Standard, Requirement, Criteria, or Limitation	Description	Type	Potential ARARs or TBC	Action to be Taken to Attain Requirement
Off-Site Rule, 40 CFR 300.440 pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(d)(3);	Requires that CERCLA wastes may only be placed in a facility operating in compliance with the Resource Conservation and Recovery Act (RCRA) or other applicable Federal or State requirements. That section further prohibits the transfer of CERCLA wastes to a land disposal facility that is releasing contaminants into the environment and requires that any releases from other waste management units must be controlled.	Action	ARAR	Wastes will be stored, handled, labeled, transported, and disposed in accordance with applicable regulations.
Identification and Listing of Hazardous Waste (40 CFR 261)	Establishes regulations governing hazardous waste identification, and listing.	Action	ARAR	
Threshold Limit Values, American Conference of Governmental Industrial Hygienists	Values established for air concentrations during remedial activities are enforced through Occupational Safety and Health Administration (OSHA).	Action	TBC	Remedial activities will be conducted in accordance with an approved Health and Safety Plan and OSHA regulations.
OSHA Requirements (29 CFR Parts 1910, 1926, and 1904)	Health and safety requirements for workers engaged in on-site remedial activities are established under this act.	Action	TBC	
Standards for Soil Erosion and Sediment Control (NJAC 2:90-1.3 and 1.4 et seq.)	Establishes standards for limiting soil erosion.	Action	ARAR	Remedial activities will be conducted in accordance with applicable guidelines.
New Jersey Technical Requirements for Site Remediation, NJAC 7:26E	Establishes the minimum technical requirements to investigate and remediate contamination at any site.	Action	TBC	

Notes:
ARAR - applicable or relevant and appropriate Federal standards
TBC - to be considered
NJAC - New Jersey Administrative Code
CFR - Code of Federal Regulations
ISCO - in-situ chemical oxidation
COC - chemical of concern
MNA - monitored natural attenuation

The selected remedy complies with the chemical-specific, location-specific, and action-specific ARARs. The implementation of the remedy is required to meet the substantive portions of these requirements and is exempt from administrative requirements such as permitting and notifications.

2.14.3 Cost Effectiveness

In the ANG's judgment, the selected remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (40 CFR 300.430[f][1][ii][D]). This determination was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfy the threshold criteria (that is, is protective of human health and the environment and ARAR-compliant).

Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected remedy for IRP Site 3 was demonstrated in the comparative analysis of alternatives (Section 2.11 – Summary of Comparative Analysis of Alternatives) and is summarized in **Table 2-27** below.

Table 2-27. Cost and Effectiveness Summary for IRP Site 3

Alternative	Present-Worth Cost	Long-Term Effectiveness and Permanence	Reduction of TMV Through Treatment	Short-Term Effectiveness
Groundwater				
1	$0	Will not be able to verify.	No treatment, will not meet CERCLA statutory preference for use of treatment.	Will not reach site closure.
2	$611,573	Permanent Remedy.		Not effective in the short-term.
3	$2,040,874	Permanent Remedy.	Will reduce toxicity and mobility of COCs >5 µg/L through use of treatment.	Expected to take 4 years to reach 5 µg/L and ~25 years to reach clean-up criteria.
4	$1,866,426	Permanent Remedy.		Expected to take 2 years to reach 5 µg/L and ~24 years to reach clean-up criteria.
Soil				
1	$0	Will not be able to verify.	No treatment, will not meet CERCLA statutory preference for use of treatment.	Will not reach site closure.
2	$611,959	Permanent Remedy.		Remedy is immediate upon soil removal.

Notes:
COC - chemical of concern
TMV - toxicity, mobility, or volume
USEPA - United States Environmental Protection Agency
µg/L - micrograms per liter

2.14.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The selected remedies for soil and groundwater are permanent remedies that will be effective in both the short-term and long-term. Groundwater Alternative 4 will utilize treatment via ISCO and will require MNA to reach the cleanup objectives. This alternative was selected over other alternatives based on the staying power of the sodium permanganate, coupled with the lack of a secondary waste stream or significant energy consumption, as well as more completely defined

costs.

Although Soil Alternative 2 does not utilize treatment, this alternative was selected as it will protect human health and the environment by reducing the mobility, toxicity, and volume of contaminants through physical removal of impacts to achieve the RAOs.

2.14.5 Preference for Treatment as a Principal Element

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site wherever practicable (40 CFR 300.430[a][1][iii][A]). The selected groundwater remedy for IRP Site 3 satisfies the statutory preference for treatment as a principal element of the remedy because as ISCO will be used to actively treat groundwater COCs to concentrations below 5 µg/L. Although the soil remedy at IRP does not satisfy the USEPA preference to treatment, soil excavation was selected as a presumptive remedy to address soil impacts because the soil impacted area at IRP Site 3 is considered to be limited to surface and near surface soil (upper 5 ft) and relatively small in size (between 715 and 900 CY of impacted materials). Excavation and off-site disposal has been proven effective and applicable to the nature and extent of impacts present within soil, resulting in a limited need for assessment, evaluation, and screening of soil remedial technologies and alternatives.

2.14.6 Five-Year Review Requirements

Pursuant to CERCLA §121(c) and NCP §300.430(f)(5)(iii)(C), because the selected remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be required within 5 years after initiation of the remedial action to verify that the remedy is, or will be, protective of human health and the environment. The start of the ISCO injection program will signify the initiation of remedial action.

Five-Year Reviews will be conducted until concentrations of hazardous substances, pollutants, or contaminants remaining on-site are reduced to levels that allow for unlimited use and unrestricted exposure. If necessary, as part of the five year review process, the ANG may conduct a RPO assessment and make recommendations to enhance the remedy to achieve RAOs. The ANG may also conduct a RPO sooner than five years if it is deemed necessary.

2.15 Documentation of Significant Changes

The PP for IRP Sites 2, 3, 5, and 6 was released for public comment on 10 July 2017 through 9 August 2017. The PP identified selected remedy for each of the IRP sites. In addition, a public meeting was held on 30 January 2018. During the public participation period (i.e., public comment period and public meeting), no comments were received and there were no public attendees at the public meeting. Therefore, it was determined that no significant changes to the preferred alternatives, as originally identified in the PP were necessary or appropriate.

3.0 RESPONSIVENESS SUMMARY

The Proposed Plan identified the 30-day public comment period and the follow-on Public Meeting. Instructions were given on how to obtain and review information pertaining to IRP Sites 2, 3, 5, and 6 as well as how to submit formal comments. A notice of the availability of the Proposed Plan and historical documents, as well as the notice of a potential Public Meeting, was published in *The Press of Atlantic City*. No written comments were received on the PP, and there were no attendees from the public at the Public Meeting. Based on the lack of verbal or written comments to the ANG's PP, the PP is judged to be acceptable (Attachment 3 – Responsiveness Summary).

3.1 Stakeholder Comments and Lead Agency Responses

No substantive stakeholder comments were received on the PP.

3.2 Technical and Legal Issues

There are no technical or legal issues that require additional discussion.

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4.0 REFERENCES

42 CFR Part. 300, National Oil and Hazardous Substances Pollution Contingency Plan.

42 USC § 7401 et seq., Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act of 1986.

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TRC, 2002c. Quarterly Groundwater Sampling Results, 177th Fighter Interceptor Group, NJANG prepared for the Air National Guard, August.

TRC, 2002d. Quarterly Groundwater Sampling Results, 177th Fighter Interceptor Group, NJANG prepared for the Air National Guard, October.

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USEPA, 2003. *Framework for Cumulative Risk Assessment.* EPA/630/P-02/001F. May.

United States Geological Survey (USGS), 2001. *Relationship of Mercury To Other Chemical Constituents In Ground Water In The Kirkwood-Cohansey Aquifer System, New Jersey Coastal Plain, And Mechanisms For Mobilization Of Mercury From Sediments To Ground Water.*

Watermark ECC, LLC, 2016. *Final Corrective/Remedial Action Report, UST #2 & UST #36*, 177th Fighter Wing, NJANG, prepared for the U.S. Army Corps of Engineers, August.

ATTACHMENT 1

ADMINISTRATIVE RECORD FOR IRP SITES 2, 3, 5, AND 6

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Administrative Record for IRP Sites 2, 3, 5 and 6
177th Fighter Wing, New Jersey Air National Guard, Egg Harbor Township, New Jersey

Subject or Title	Author/Author Affiliation	Document Date	AR #
Letter Providing Transmittal of the Final Proposed Plan for Sites 2,3,5, and 6	FAA	3/19/2018	570885
2018 Monitoring Well Inventory for Sites 2,3,5, UST2, UST36, and 6	AMEC	1/1/2018	569931
Letter Providing Comments on the Proposed Remedial Action Plan for Sites 2,3,5, and 6	US EPA	12/21/2017	569161
Letter Providing Comments on the Draft Final Proposed Plan for Sites 2,3,5, and 6	US EPA	6/8/2017	555198
Final Proposed Plan for Sites 2,3,5, and 6 (Transmittal Letter Attached)	AMEC	6/1/2017	569329
Letter Providing Comments on the Draft Final Proposed Plan for Sites 2,3,5, and 6	NJ DEP	4/7/2017	551307
Letter Providing Transmittal of Draft Proposed Plan for Sites 2,3,5, and 6	NGB/A4OR	3/30/2017	569297
Letter Providing Concurrence with the Response Action Outcome, Unrestricted Use Area of Concern UST 2 and UST 36	NJ DEP	3/27/2017	548926
Letter Providing Comments on the Draft Proposed Plan for Sites 2,3,5, and 6	US DOT	3/8/2017	548270
2017 Monitoring Well Inventory for Sites 2,3,5, 5/UST2, and UST 36	EA Engineering	1/19/2017	546698
Response Action Outcome, Corrective/Remedial Action Report for Remedial Activities at Areas of Concern for the Underground Storage Tanks No.2 and No.36 (Supporting Documentation Attached) (Transmittal Letters Attached)	AMEC	8/22/2016	539050
Letter Providing Comments on the December 2015 Final Perfluorinated Compounds Preliminary Assessment Site Visit Report	US EPA	8/3/2016	538368
Letter Providing Comments on Revised Draft Final Feasibility Study for Sites 2,3,5, and 6	US EPA	4/4/2016	473774
Letter Providing Comments on the Revised Draft Final Feasibility Study for Sites 2,3,5, and 6	NJ DEP	4/4/2016	473803
Response to Comments on Revised Draft Final Feasibility Study for Sites 2,3,5, and 6	NJ DEP	4/4/2016	473773
Final Feasibility Study for Sites 2,3,5, and 6 (Transmittal Letter Attached)	AMEC	4/1/2016	473768
Final Work Plan for Preliminary Assessment/Site Inspection Report for Seven Areas of Concern (Transmittal Letter Attached)	URS	1/1/2016	472321
Letter Regarding Proposed Groundwater Remedies for Affected Areas at Area Y and Site 3	US EPA	12/3/2015	469533
Letter Providing Comments on the Revised Draft Final Feasibility Study at Sites 2,3,5, and 6	US DOT FAA	11/24/2015	469373
Letter Providing Response to the Federal Aviation Administration Comments on Draft Work Plan	GES	9/24/2015	466346
Letter Providing Responses to Comments on Draft Final Data Gap Investigation Report	NGB/A7OR	9/1/2015	465313
Letter Providing Comments on Draft Final Comprehensive Site Evaluation Phase II Report	US DOT FAA	8/11/2015	463631
Letter Providing Comments on Final Data Gap Investigation Report for Sites 2,3,5, and 6	NJ DEP	7/15/2015	462489
Final Data Gap Investigation Report for Sites 2,3,5, and 6 (Part 1 of 12)	AMEC	6/22/2015	461042
Final Data Gap Investigation Report for Sites 2,3,5, and 6 (Part 10 of 12)	AMEC	6/22/2015	461088
Final Data Gap Investigation Report for Sites 2,3,5, and 6 (Part 11 of 12)	AMEC	6/22/2015	461090
Final Data Gap Investigation Report for Sites 2,3,5, and 6 (Part 12 of 12)	AMEC	6/22/2015	461093
Final Data Gap Investigation Report for Sites 2,3,5, and 6 (Part 2 of 12)	AMEC	6/22/2015	461043
Final Data Gap Investigation Report for Sites 2,3,5, and 6 (Part 3 of 12)	AMEC	6/22/2015	461048
Final Data Gap Investigation Report for Sites 2,3,5, and 6 (Part 4 of 12)	AMEC	6/22/2015	461053
Final Data Gap Investigation Report for Sites 2,3,5, and 6 (Part 5 of 12)	AMEC	6/22/2015	461059
Final Data Gap Investigation Report for Sites 2,3,5, and 6 (Part 6 of 12)	AMEC	6/22/2015	461066
Final Data Gap Investigation Report for Sites 2,3,5, and 6 (Part 7 of 12)	AMEC	6/22/2015	461077
Final Data Gap Investigation Report for Sites 2,3,5, and 6 (Part 8 of 12)	AMEC	6/22/2015	461081
Final Data Gap Investigation Report for Sites 2,3,5, and 6 (Part 9 of 12)	AMEC	6/22/2015	461085

Administrative Record for IRP Sites 2, 3, 5 and 6
177th Fighter Wing, New Jersey Air National Guard, Egg Harbor Township, New Jersey

Subject or Title	Author/Author Affiliation	Document Date	AR #
Letter Providing Transmittal of the Final Data Gap Investigation Report for Sites 2,3,5, and 6	AMEC	6/22/2015	569303
Letter Providing Requested Documents for the Draft Final Data Gap Investigation Report for Sites 2,3,5, and 6	AMECFW	3/10/2015	452717
Letter Providing Comments on the Draft Final Data Gap Investigation Report for Sites 2,3,5, and 6	FAA	2/19/2015	569320
Meeting Minutes for Preliminary Assessment/Site Investigation and Initial Site Walk at Buildings 65, 242, 248, and 402, Held on December 23, 2014		1/9/2015	92729
Final Technical Memorandum for Vapor Intrusion Investigation		11/6/2014	92662
Letter from NJ DEP to NGB/A7OR, AMEC, FAA and US EPA Providing Approval to Discharge Groundwater Monitoring for UST 2 and UST 36		5/23/2014	92173
Letter from NJ DEP to NGB/A7OR, NJ ANG, FAA, US EPA and AMEC Providing Comments for Final Corrective/Remedial Action Work Plan for UST #2 and UST #36		5/23/2014	92174
Potable Well/Indoor Air Sampling Notification Form and Spreadsheet for Site 3		4/11/2014	91851
Transmittal from WE to NGB/A7OR, USACE, NJ ANG, NJ DEP, BB and E and AMEC Providing Final Corrective/Remedial Action Work Plan for UST 2 and UST 36		3/4/2014	91497
Final Corrective/Remedial Action Work Plan for UST 2 and UST 36		2/1/2014	91498
Letter from NGB/A7OR to FAA, NJDEP and NJANG Providing Responses to FAA Comments on the Draft Final Data Gap Investigation Work Plan for Sites 2, 3, 5, and 6		6/10/2013	90296
Letter from AMEC to NJ DEP and NGB/A7OR Providing the Licensed Site Remediation Professional (LSRP) Retention Form		5/2/2013	90204
LSRP Notification of Retention or Dismissal Form Indicating Michael Mahnkopf with AMEC has been retained by NGB as a Licensed Site Remediation Professional		4/24/2013	90182
Letter from AMEC to NJ DEP and NGB/A7OR Regarding Licensed Site Remediation Professional Retention Form for Site 5 (Form Attached)		2/28/2013	90000
Letter from FAA to NGB/A7OR, USEPA, NJDEP and NJANG Providing Comments on the Draft Final Data Gap Investigation Work Plan for Sites 2, 3, 5 and 6		2/14/2013	90307
Transmittal Letter from AMEC to ANG/CEVR, NJ ANG, NJ DEP, US EPA, FAA and BB and E Providing Final Data Gap Investigation Work Plan for Sites 2,3,5, and 6		2/13/2013	89880
Final Data Gap Investigation Work Plan for Sites 2,3,5 and 6		2/12/2013	89881
Letter from NJ DEP to NGB/A7OR, USEPA, NJ ANG, FAA, AMEC, Atlantic City Clerk, and Atlantic County Division of Public Health Providing Concurrance to Transfer Site 5 from USEPA to NJDEP LSRP Program		2/12/2013	89913
Letter from NGB/A7OR to NJ DEP, US EPA, Region 2, NJ ANG, AMEC and BB and E Regarding Transfer of Regulatory Oversight for Site 5		1/23/2013	89789
Letter from US EPA to ANG/CEVR, FAA and NJ DEP Approving Transfer of Regulator Oversight Authority for UST No.2 and Site 5 to the NJ DEP		1/23/2013	89801
Draft Corrective Action Summary Report for UST #2 and UST #36. (Did Not Go Final) (Part 1 of 2)		1/1/2013	90240
Draft Corrective Action Summary Report for UST #2 and UST #36. (Did Not Go Final) (Part 2 of 2)		1/1/2013	90240
Letter from NJ DEP to ANG/CEVR, US EPA, NJ ANG, FAA, AMEC, Atlantic City Clerk, and Atlantic County Division of Public Health Regarding Draft Final Data Gap Investigation Work Plan for Sites 2,3,5,and 6 Dated November 29, 2012		12/20/2012	89585
Revised Final Stockholders Meeting Minutes from June 6, 2012 for Sites 2,3,5, and 6		6/6/2012	89320

Administrative Record for IRP Sites 2, 3, 5 and 6
177th Fighter Wing, New Jersey Air National Guard, Egg Harbor Township, New Jersey

Subject or Title	Author/Author Affiliation	Document Date	AR #
Response to Comments from NJ DEP to NGB/A7OR, US EPA NJ ANG, FAA, AMEC, Atlantic City Clerk, Pinelands Commission, Atlantic County Division of Public Health Regarding Draft Final Feasibility Study for Sites 2,3,5 and 6		4/20/2012	87843
Comments from NJ DEP to NGB/A7OR,NJANG,USEPA,AMEC,NJDEP,Pinelands Comm.,Atlantic County Div.of Public Hlth Regarding Draft Final Feasibility Study for Sites 2,3,5 and 6, Dated 11/22/11		2/8/2012	87221
Comments from US DOT FAA to ANG/A7OR, NJ ANG, US EPA and NJ DEP Regarding Draft Feasibility Study for Sites 2,3,5 and 6		2/3/2012	89467
Letter from USEPA to NJ ANG and NJDEP Providing Comments on the Feasibility Study for Sites 2, 3, 5, and 6		1/10/2012	90414
Draft Corrective Action Summary Report for Site 5 UST 2 and UST 36 (Did Not go Final)	AMEC	1/1/2012	569332
Draft Final Stakeholder Meeting Minutes for the Draft Final Feasibility Study, Sites 2, 3, 5, and 6 (This was attached to an e-mail from AMEC to NJ DEP, FAA, NJ ANG, BB and E)		12/14/2011	87219
Transmittal of the Final Remedial Investigation Report (June 2011) for Sites 2, 3, 5 and 6 from AMEC to FAA, NJ ANG, NGB/A7OR and AMEC		12/9/2011	87224
Transmittal from AMEC to ANG/CEVR, NJ ANG, NJ DEP and BB and E Regarding Final 11th Quarter Groundwater Sampling Report, Supplemental Site Investigation		11/30/2011	86918
Transmittal from AMEC to ANG/CEVR, NJ ANG, NJ DEP and BB and E Regarding Final 12th Quarter Groundwater Sampling Report, Supplemental Site Investigation		11/30/2011	86920
Transmittal from AMEC to ANG/CEVR, NJ ANG, NJ DEP and BB and E Regarding Final 13th Quarter Groundwater Sampling Report, Supplemental Site Investigation		11/30/2011	86922
Transmittal from AMEC to ANG/CEVR, NJ ANG, NJ DEP and BB and E Regarding Final 14th Quarter Groundwater Sampling Report, Supplemental Site Investigation		11/30/2011	86924
Transmittal from AMEC to ANG/CEVR, NJ ANG, NJ DEP and BB and E Regarding Final 15th Quarter Groundwater Sampling Report, Supplemental Site Investigation		11/30/2011	86926
Transmittal from AMEC to ANG/CEVR, NJ ANG, NJ DEP and BB and E Regarding Final 16th Quarter Groundwater Sampling Report, Supplemental Site Investigation		11/30/2011	86928
Letter from NJ DEP to NJ ANG, USEPA, AMEC, ANG/CEVR, NJ DEP Atlantic City Clerk and Pinelands Commission Regarding Supplemental Site Investigation Draft Final Quarterly Groundwater Sampling Reports for 11th-16th Quarters, dated October 11		11/28/2011	86894
Final Quarterly Groundwater Sampling Report, 11th Quarter, September 2009, Supplemental Site Investigation		11/1/2011	86919
Final Quarterly Groundwater Sampling Report, 12th Quarter, December 2009, Supplemental Site Investigation		11/1/2011	86921
Final Quarterly Groundwater Sampling Report, 13th Quarter, March 2010, Supplemental Site Investigation		11/1/2011	86923
Final Quarterly Groundwater Sampling Report, 14th Quarter, June 2010, Supplemental Site Investigation		11/1/2011	86925
Final Quarterly Groundwater Sampling Report, 15th Quarter, October 2010, Supplemental Site Investigation		11/1/2011	86927
Final Quarterly Groundwater Sampling Report, 16th Quarter, December 2010, Supplemental Site Investigation		11/1/2011	86929
Letter from NJDEP to NJANG, EPA Region II, AMEC and BOMM Providing Comments on the Final Remedial Investigation Report and the Remedial Investigation Report Revisions for Sites 2, 3, 5, and 6		8/25/2011	90417
Letter from USEPA to NJANG, NJDEP and FAA Provding Comments on the Remedial Investigation Report for Sites 2, 3, 4, 5 and 6		6/9/2011	85707
Transmittal Letter from AMEC to NGB/A7OR, NJ ANG, US EPA, NJ DEP and BB and E Providing the Final Remedial Investigation Report for Sites 2,3,5 and 6		6/6/2011	86171

Administrative Record for IRP Sites 2, 3, 5 and 6
177th Fighter Wing, New Jersey Air National Guard, Egg Harbor Township, New Jersey

Subject or Title	Author/Author Affiliation	Document Date	AR #
Transmittal Letter from AMEC to NJDEP, USEPA, NJANG, NGB/A7OR, and BB and E Providing the Final Remedial Investigation Report for Sites 2, 3, 5, and 6		6/3/2011	90421
Transmittal Letter from AMEC to USEPA Region II, NGB/A7OR, NJANG, NJDEP and BB and E Providing the Final Remedial Investigation Report for Sites 2, 3, 5, and 6		6/3/2011	90419
Final Remedial Investigation Report for Sites 2,3,5 and 6 (Part 1 of 10)		6/1/2011	86170
Final Remedial Investigation Report for Sites 2,3,5 and 6 (Part 10 of 10)		6/1/2011	86170
Final Remedial Investigation Report for Sites 2,3,5 and 6 (Part 2 of 10)		6/1/2011	86170
Final Remedial Investigation Report for Sites 2,3,5 and 6 (Part 3 of 10)		6/1/2011	86170
Final Remedial Investigation Report for Sites 2,3,5 and 6 (Part 4 of 10)		6/1/2011	86170
Final Remedial Investigation Report for Sites 2,3,5 and 6 (Part 5 of 10)		6/1/2011	86170
Final Remedial Investigation Report for Sites 2,3,5 and 6 (Part 6 of 10)		6/1/2011	86170
Final Remedial Investigation Report for Sites 2,3,5 and 6 (Part 7 of 10)		6/1/2011	86170
Final Remedial Investigation Report for Sites 2,3,5 and 6 (Part 8 of 10)		6/1/2011	86170
Final Remedial Investigation Report for Sites 2,3,5 and 6 (Part 9 of 10)		6/1/2011	86170
Letter from NJ DEP to NJ ANG, AFCEE/ERB, AMEC and EPA Region II, Approving the Final Corrective Action Work Plan for Site 5/UST #2 and UST #36		3/10/2011	90415
Final Corrective Action Work Plan for Sites 5/UST #2 and UST #36		2/1/2011	90291
Supplemental Site Investigation Final Quarterly Groundwater Sampling Report, 10th Quarter - June 2009	AMEC	7/1/2010	86432
Supplemental Site Investigation Final Quarterly Groundwater Sampling Report, 9th Quarter - January 2009	AMEC	7/1/2010	569331
Letter Providing Response to Comments on the Draft Final Remedial Investigation Report for Sites 2,3,5, and 6	US EPA	3/5/2010	569322
Letter Providing Comments on the Remedial Investigation Report for Sites 2,3,5, and 6	US EPA	8/5/2008	569321
Letter from NJDEP to the ANG Approving the Remedial Investigation/Feasibility Study Final Work Plan		2/16/2006	83308
Letter from US EPA to ANG/CEVR and NJ DEP Regarding RI/FS Work Plan for Sites 2,3,5 and 6, January 2006		2/9/2006	86946
Transmittal of the Final Work Plan for Sites 2, 3, 5 and 6 to the ANG, NJDEP, and USEPA from AMEC		2/1/2006	83309
Final Remedial investigation/Feasibility Study Work Plan		1/1/2006	82749
Response to Comments Letter From US EPA, NJ DEP and AMEC Regarding RI/FS Work Plan for Sites 2,3,5 and 6, August 2005		11/22/2005	86950
Comments fro US EPA to ANG/CEVR, NJ DEP and AMEC Regarding RI/FS Work Plan for Sites 2,3,5 and 6, August 2005		9/20/2005	86951
Remedial Investigation / Feasibility Study Final Work Plan		8/1/2005	72742
Letter from NJEPA to ANG/CEVR Providing Comments on the RI/FS Work Plan		6/7/2005	82748
Transmittal of USEPAs Comments on the Draft Expanded Supplemental Site Investigation Report to the ANG from the FAA		3/12/2003	83303
Comments from USEPA Region 2 on Draft Expanded Supplemental Site Investigation Report		2/27/2003	53475
Transmittal of the Draft Expanded Supplemental Site Investigation Report to the NJANG from the FAA for Sites 3, 5, and 6		2/12/2003	83306
Transmittal of Comments on Draft Supplemental Site Investigation Report to the fAA, NJDEP, and ANG from the USEPA (Comments Attached) for Sites 3, 5, and 6		2/6/2003	83302
Transmittal of the Quarterly Groundwater Sampling Results - August 1002 to the ANG from the FAA for Site 2		10/22/2002	83300

Administrative Record for IRP Sites 2, 3, 5 and 6
177th Fighter Wing, New Jersey Air National Guard, Egg Harbor Township, New Jersey

Subject or Title	Author/Author Affiliation	Document Date	AR #
Letter from TRC Environmental Corporation to the FAA Providing the Quarterly Ground Water Sampling Resuts - August 2002		10/15/2002	82751
Transmittal of Quarterly Sampling Results (May 2002) for Area 2 to NJ ANG from FAA		8/27/2002	53473
Letter from TRC Environmental Corporation to the FAA Providing the Quarterly Ground Water Sampling Results - May 2002		8/16/2002	82753
Letter Report Providing Quarterly Groundwater Sampling Results for February 2002 at Site 2, Former Aircraft Defueling Areas	TRC	6/12/2002	82752
Letter from ANG/Cevr to NJ Federal Aviation Regarding July 18, 2001 Meeting Concerning Sites 2,3,5 and 6 and the SSI Reports with a March 2002 Deadline of Completion		7/18/2001	86511
Transmittal Letter from FAA to ANG/CEVR and NJ ANG Providing TRCs Proposal for Environmental Services Expanded Quarterly Monitoring for Site 2 - Aircraft Defueling Area		4/10/2001	90418
Letter from ANG/CEVR to FAA Concerning MOA Request Lead Agency Control of Sites 2, 3, 5, and 6 from FAA Point Paper Comparing SI, SSI, EPA Comments		3/5/2001	3844
Letter from ANG/CEVR to NJ Federal Aviation Administration Center Regarding Letter Dated August,17, 2000 of Supplemental Site Investigation and Telephone Conversation Dated September 13, 2000 Concerning Finalizing SSI and RI		9/14/2000	86506
Transmittal of Draft Expanded Supplemental Site Investigation Report to NJ ANG from FAA		2/12/2000	53474
Letter from USEPA to the FAA and ANG Regarding Comments on the Draft Supplemental Site Investigation Report for Sites 2, 3, 5, and 6		1/10/2000	83298
Letter from ANG to NJ FAA Environmental Section Regarding Memorandum of Agreement Concerning Areas of Concern 2,3,5 and 6		3/26/1998	86621
Letter from FAA to USEPA Region 2 Regarding Site 6 Geophysical Survey Results		12/2/1997	53471
Comments from FAA to USACE on Draft Supplemental Site Investigation Report		2/3/1997	53439
Letter from FAA to NGB/DEVR regarding Presence of Unexploded Ordnance at Site 3		7/30/1996	53469
Transmittal of the Final Supplemental Site Investigation Work Plan/Sampling and Analysis Plan to the ANG from the FAA		4/4/1996	83312
Transmittal of the Supplemental Site Investigation Work Plan/Sampling and Analysis Plan to USEPA and ANG from the FAA		4/4/1996	83329
Transmittal of the Supplemental Site Investigation Work Plan/Sampling and Analysis Plan to the Atlantic City County Health Department, ANG, EPA and NJDEP from the FAA		4/4/1996	83331
Transmittal of the Supplemental Site Investigation Work Plan/Sampling and Analysis Plan to the NJDEP, ANG and USEPA from FAA		4/4/1996	83330
Suppliemental Site Investigation Work Plan/Sampling and Analysis Plan for Sites 2, 3, 5, and 6		3/1/1996	83293
Letter from ANGRC to NJ DEPE providing Status of Site Investigation		3/13/1995	53468
Final Site Investigation Report Volume II Appendices A-M		3/1/1995	82750
Final Site Investigation Report-Volume I		3/1/1995	43025
Comments from USEPA Region 2 to NJ ANG on Draft Site Investigation Report		5/26/1994	53436
Comments from NJ DEPE to FAA on Draft Final Site Investigation Report		12/16/1993	53463
Comments from FAA to NGB/DEVR on Draft Final Site Investigation Report		9/7/1993	53434
ANGRC Response to NJ DEPE Comments on Draft Final Site Investigation Report		5/30/1993	53435

Administrative Record for IRP Sites 2, 3, 5 and 6
177th Fighter Wing, New Jersey Air National Guard, Egg Harbor Township, New Jersey

Subject or Title	Author/Author Affiliation	Document Date	AR #
Letter from NGB/CEVR to USEPA Region II discussing the placement of piezometers at site 2 during the SI and the discovery of free product during the 2nd round of ground water sampling at this site		2/11/1992	3784
LETTER FROM NGB/CEVR TO USEPA REGION II TRANSMITTING THE PA REPORT FOR SITES 1-6		7/15/1991	3831
Transmittal of Final Work Plan and Sampling and Analysis Plan for Site Investigation to USEPA Region II from HAZWRAP		5/6/1991	53412
Transmittal of Meeting Minutes for Site Investigation Final Draft Work Plan Regulatory Review Meeting held February 14, 1991		3/22/1991	53409
Supplemental Site Investigation Report Volume I for Sites 2, 3, 5 and 6		3/1/1991	83278
Supplemental Site Investigation Report, Volume II, Appendix H and I for Sites 2, 3, 5, and 6		3/1/1991	83291
Meeting Minutes for Final Draft Site Investigation Work Plan and Sampling and Analysis Plan Regulatory Review Meeting held February 14, 1991		2/20/1991	53408
Sign In Sheet for Draft Work Plan / Sampling and Analysis Plan Regulatory Review Meeting held February 14, 1991		2/14/1991	53406
Transmittal of Guidance on Pre-Remedial Requirements to NGB from EPA		2/12/1991	53405
Final Site Investigation Sampling and Analysis Plan		2/1/1991	43023
Final Site Investigation Work Plan		2/1/1991	43021
Transmittal of Site Investigation Kickoff Meeting Minutes to FAA from NGB/DEVR		3/12/1990	53391
NJ ANG Press Release regarding Preliminary Assessment		2/9/1990	53384
NJ ANG Press Release regarding recent Meeting with Regulators to discuss Six Potential Sites and Investigation Work Plan		2/8/1990	53365
Press Release from NJ ANG regarding IRP Preliminary Assessment and Six Potential Sites		1/9/1990	53363
Final Preliminary Assessment Report		11/1/1989	43020

ATTACHMENT 2

PUBLIC NOTICE OF PROPOSED PLAN AND PUBLIC MEETING

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THE PRESS
OF ATLANTIC CITY
1000 W. Washington Ave, Pleasantville, NJ 08232

Account Number
8017859

Date
July 10, 2017

AMEC FOSTER WHEELER ENVIRONMENT &
INFRASTRUCTURE, INC.
ATT: ANNE MARRON
200 AMERICAN METRO BLVD., SUITE 113
HAMILTON, NJ 08619

Newspaper reference: 0000042167

Date	Category	Description	Ad Size	Total Cost
07/10/2017	Legal Display Ads	NOTICE OF AVAILABILITY Proposed Plan Installation Restora	2 x 58.00 CL	123.44

Certification
Proof of Publication

Lauren Masco of lawful age, acting in his/her capacity as an employee of The Press of Atlantic City, a daily newspaper printed and published c/o 1000 West Washington Avenue, Pleasantville, New Jersey 08232, and distributed in the following counties: Atlantic, Camden, Cape May, Cumberland, Gloucester, and Ocean and mailed to various parts of the State of New Jersey, the United States, and foreign countries, does hereby certify that the Notice this Certification was published in The Press of Atlantic City on :

07/09, 07/10/2017

All interested parties may rely upon the representations contained herein limited solely to the authenticity of the Notice accompanying this Certification to be an accurate reproduction of the same and the date upon which it was published.

I certify that the foregoing statements made by me are true. I am aware that if any of the foregoing statements made by me are willfully false, I am subject to punishment.

Date: 7/10/2017

Lauren Masco

Lauren Masco

NOTICE OF AVAILABILITY
Proposed Plan
Installation Restoration Program (IRP) Site 2, 3, 5, and 8
177th Fighter Wing, New Jersey Air National Guard
Atlantic City International Airport, Egg Harbor Township, New Jersey

The Air National Guard (ANG) in coordination with the Federal Aviation Administration, United States Environmental Protection Agency, New Jersey Department of Environmental Protection (NJDEP), and the New Jersey Pinelands Comaission is hereby providing public notice and seeking public comment on the Proposed Plan for Installation Restoration Program (IRP) Sites 2, 3, 5, and 8 at the 177th Fighter Wing, New Jersey Air National Guard located at the Atlantic City International Airport in Egg Harbor Township, New Jersey. The proposed action for IRP Sites 2, 5, and 8 is a determination of no further action (NFA), while the proposed action for IRP Site 3 consists of excavation and off-site disposal to address soil impacts and injection of a chemical oxidant to address impacted groundwater. The Proposed Plan recommendation is based upon the results of field investigations, laboratory analyses, data evaluations, current and future land use, and assessments of potential human health and ecological risk. Remedial actions proposed at IRP Site 3 were evaluated against other remedial alternatives during a 2016 Feasibility Study and were selected as the Preferred Alternatives using the nine evaluation criteria developed by the United States Environmental Protection Agency, including protection of human health and the environment, compliance with applicable regulatory criteria, reduction in toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and acceptability by regulatory agencies and the public.

The ANG invites the public to review and comment on the Proposed Plan during the 30-day public comment period detailed below. Based on comments received during the public comment period, the ANG may host a public meeting to present the Proposed Plan and to address substantive comments received. The presentation would summarize the investigation and evaluation activities completed at each site to-date, providing the basis for the recommended actions. The ANG, USEPA, and the NJDEP encourage the public to gain an understanding of these sites and the investigation and cleanup activities that have been conducted. The Proposed Plan is available to the public at the Information Repository identified below.

Information Repository/Document Review Location
10 July 2017 - 9 August 2017
Atlantic County Library System - Mays Landing Branch
40 Farragut Avenue, Mays Landing, NJ 08330
(609) 625-2776
Hours of operation can be found at:
http://www.atlanticlibrary.org

Written comments regarding the Proposed Plan will be accepted during the 30-day public availability period and can be submitted to:

Dennis Pinigis
Senior Program Manager, Environmental Restoration
National Guard Bureau/A7OR
3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Printer Fee: $7.44
Pub Dates: July 9 & 10, 2017 Order #: 0000042167

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THE PRESS
OF ATLANTIC CITY
1000 W. Washington Ave, Pleasantville, NJ 08232

Account Number
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Date
January 28, 2018

AMEC FOSTER WHEELER ENVIRONMENT &
INFRASTRUCTURE, INC.
ATT: ANNE MARRON
200 AMERICAN METRO BLVD., SUITE 113
HAMILTON, NJ 08619

Newspaper reference: 0000067037

Date	Category	Description	Ad Size	Total Cost
01/28/2018	Legal Display Ads	NOTICE OF PUBLIC MEETING Proposed Plan Installation Res	2 x 44.00 CL	62.96

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01/28/2018

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Date: 1/28/2018

Lauren Masco

Lauren Masco

NOTICE OF PUBLIC MEETING
Proposed Plan
Installation Restoration Program (IRP) Site 2, 3, 5, and 6
177th Fighter Wing, New Jersey Air National Guard
Atlantic City International Airport, Egg Harbor Township, New Jersey

The Air National Guard (ANG) in coordination with the Federal Aviation Administration, United States Environmental Protection Agency, New Jersey Department of Environmental Protection (NJDEP), and the New Jersey Pinelands Commission is hosting a public meeting to present the Proposed Plan for Installation-Restoration Program (IRP) Sites 2, 3, 5, and 6 at the 177th Fighter Wing, New Jersey Air National Guard located at the Atlantic City International Airport in Egg Harbor Township, New Jersey. The proposed action for IRP Sites 2, 5, and 6 is a determination of no further action (NFA), while the proposed action for IRP Site 3 consists of excavation and off-site disposal to address soil impacts and injection of a chemical oxidant to address impacted groundwater. The Proposed Plan recommendation is based upon the results of field investigations, laboratory analyses, data evaluations, current and future land use, and assessments of potential human health and ecological risk. Remedial actions proposed at IRP Site 3 were evaluated against other remedial alternatives during a 2015 Feasibility Study and were selected as the Preferred Alternatives using the nine evaluation criteria developed by the United States Environmental Protection Agency, including protection of human health and the environment, compliance with applicable regulatory criteria, reduction in toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and acceptability by regulatory agencies and the public.

The ANG will host a public meeting to present the Proposed Plan and to accept verbal and written comments. A presentation summarizing the investigation and evaluation activities completed at each site to-date will occur at 6:00 pm. After the presentation, the public will have the opportunity to speak one-on-one with representatives of the ANG, USEPA, and NJDEP.

Public Meeting Date, Time, and Location

Tuesday, January 30, 2018; 6:00 - 8:00 pm
Residence Inn by Marriott - Atlantic City Airport
3022 Fire Road
Egg Harbor Township, NJ 08270
(609) 813-2344

Printer Fee: $36.56
Pub Date: January 28, 2018 Order # 0000067037

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ATTACHMENT 3

PUBLIC MEETING TRANSCRIPTS

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NEW JERSEY AIR NATIONAL GUARD
177 th FIGHTER WING
INSTALLATION RESTORATION PROGRAM
(IRP) SITES 2,3, 5, and 6

PROPOSED PLAN REVIEW

MICHAEL MANHKOPF

AMEC FOSTER WHEELER

Transcript of this Public Hearing, was taken by and before Allison L. Spector, a Court Reporter, Notary Public of the State of New Jersey, at the RESIDENCE INN - ATLANTIC CITY, 3022 Fire Road, Egg Harbor Township, New Jersey 08234, on Tuesday, January 30, 2018 at 6:00 p.m.

APPEARANCES:

AMEC FOSTER WHEELER
BY: MICHAEL E. MAHNKOPF, ASSOCIATE SCIENTIST - ENVIRONMENTAL
200 American Metro Blvd - Suite 113
Hamilton, New Jersey 08619

AMEC FOSTER WHEELER
BY: JAY MULLET, PE
46850 Magellan Drive - Suite 190
Novi, Michigan 48377

ALSO PRESENT:

DOUGLAS POCZE, NJEPA

TEMPLE MCCOY, AIR NATIONAL GUARD

BILL FUETTERER, ENGILITY CORP.

RICH DEFEO, NJ INTERNATIONAL GUARD

TOM ROESCH, FAA

JIM CONNELL, FAA

RICH E. BREITENFELDT, FEDERAL AVIATION ADMINISTRATION

- - -

- - -

MR. MAHNKOPF: Good evening, my name is Michael Mahnkopf. I've called this public hearing this evening, on behalf of the Amec Foster Wheeler to discuss: A Proposed Plan and CERCLA Process; a Regulatory Participation; a Site Description, Background, and Proposed Actions of IRP Site 2; IRP Site 3; IRP Site 5; and IRP Site 6.

The agenda will pretty much talk about the proposed plan, where it fits into the CERCLA process a little bit. We will discuss briefly the regulatory participation. We are going to run through the site descriptions backgrounds of the four IPR sites. And at the end we can have a question and answer comment and questions portion of our program.

As you can see here the proposed plan, the CERCLA process, is pretty much a preliminary assessment. The site investigation explains the rationale

for the preferred remedial action alternative selected in the Feasibility Study to determine, which is the most viable remedial action. That's put into a proposed plan. The proposed -- I'm not exactly sure that the record decision contains --

MR. MULLETT: The rod is summary of the remedial investigation and the proposed plan. It summarizes all of that information. It's a much more detailed document. The proposed plan is more of an abbrevlated version format, that is more useful for the public, to sort of read and understand.

MR. MAHNKOPF: I guess after the record of decision is approved, we actually will implement the remedial action. Once the remedial action is done, any long-term management and monitoring -- eventually site closure, I guess, we reach site specific soil or groundwater standards.

The site plan itself, IRP 2, 3, 5 and 6 begin in 1996, where there were preliminary assessment performed, and, I guess, based on the P.A. they identified these IRP

sites, which I want to call a series of concern I suppose, were identified.

And again, they went through the site investigation RI process, and then we proposed a remedial alternative in feasibility study. We put together a proposed plan. It was published in the local paper. There was a 30-day comment period. And then based on the process, we're conducting a public meeting.

Again, the proposed plan was made available through publish comments, at the Atlantic County Library, Mays Landing Branch. The notice of availability was originally published in the Press of Atlantic City, on July 9 and 10, 2017. During that comment period, the ANG did not receive any written comments from the public.

Throughout the course of this, the NJDEP the USEPA, have been involved in of review and being approved. There were various investigation work plans across the board. They also, I guess, provided the remedial actions at IRP site 3, and they agreed with no further action with sites 2, 5 and 6. But we are still trying to finalize plans

because the EPA had some comments.

Real briefly IRP site 2 was in an air craft fueling area. It was used primarily between 65 and 75. They, basically, defueled tanker trucks and, I guess, residual fuel from those trucks, went into the two grassy areas. This is sub-area part A and sub-area part B (Indicating).

Previous investigations at site 2 have been, basically, from the period between 1995 and 2015, with feasibility study presented in 2016.

Soil results from IRP site 2, have indicated low level of volatile and semi-vatile compounds, but all below the DEP screening levels, during the RI. Additional samples were taken and the sample residuals were below all of the NJDEP residential soil standards. We did have traces of ethylbenzene and methylene chlorides in that one sample, which was above DEP groundwater criteria. There were no corresponding groundwater impacts in nearest piezometer.

Human ecological risk assessments, there were no risks to human health

in the environment. Therefore NFA was recommended for soil. There was low levels of VOCs and TPH in the groundwater. Quarterly groundwater samples were conducted by DEP in 2002, and again, several VOCs and TPH at that one location. Subsequent groundwater results indicated constituent concentrations were below any NJDEP quality standards. There has been a significant reductions in TPH throughout the years. As we speak tonight DEP does not have a groundwater quality standard for TPH.

Basically the feasibility study recommended no further action for soil or groundwater at IRP site 2.

MR. POCZE: Just one question, you have there above the DEP, you are using residential, for all your standards? I know older documents reference non-residential, but, I guess, in terms of clean up, everything was based upon residential or meeting residential standards so it was unrestricted use?

MR. MAHNKOPF: That's correct.

We are not looking at doing

any kind of engineering controls or deed notice or restrictions for soil aspects at all.

Site 3 was a former washrack. There were also former buildings that were there. Hazardous materials that were used there were, waist oil and chlorinated solvents. It operated from '42 to '74, and it was used by the Navy and in the National Guard.

Same thing as site 2, there were various investigations between '95 and 2015, with a feasibility study coming out in 2016. Some of earlier investigations indicated there was no soil samples above regulatory criteria. We did further data gap investigations between 2012 and 2015, and we did have some low level PCE in the soil Building FAA 33.

Basically, the main contaminants of concern at IRP site 3 are, is solving solvents. Through various investigations along the way, we have PCE and some of the breakdown solvents and some naphthalene, across the plume area. And then only TCE and PCE exceeded their respective USEPA MCL OF 5 ug/L.

Feasibility Study Site 3 included an assessment of the Final Evaluation Criteria, by USEPA. The proposed plan discusses seven of those. And the ROD will, I guess, incorporate criteria eight and nine?

MR. MULLETT: Correct.

MR. MAHNKOPF: Am I correct in that statement?

MR. MULLETT: Yes.

MR. MAHNKOPF: The soil, there's basically two alternatives: One, was to do nothing and the second, was to dig and hall. Alternative two was selected, based on the fact that we are going to dig up the material and remove it.

For groundwater, there were four different alternatives reviewed and considered no action, no action MNA, groundwater extractions in-situ plus MNA, and in-suti oxidation plus MNA.

Again, for soil, we chose to excavate off-site material. We estimated about 900 cubic yards of material be removed during the removal action.

For groundwater, the

preferred alternative was ISCO injections, and the goal was to actively treat the plume, down to five parts per million, sorry per billion, and then utilize MNA to, basically, go from five to one:

MR. POCZE: The five is total or specific COCs? I didn't see it in the plan. A lot of them had one or five on the figures.

MR. MAHNKOPF: I think per compound, so possibly five for TCE and for the Pineland's the groundwater quality standard local compounds. We are going to treat the five, and then hopefully MNA to down to one.

IRP site 5, was a former liquid waste holding area. It was adjacent to a couple of buildings out there, 65 and 116. There was a former gasoline tank removed in 1996, and, I guess, y had a little bit of discharge there, so they cleaned up some soil. They installed monitoring oil. They sampled the well a number of times. I think they had well a number of times. I think they had well level level BTEX compounds, and back in 2013, EPA recommended that that site get transferred to New Jersey LSRP program. We did additional soil

investigations, some additional soil water sampling, LSRP concern. And then back in 2016, the LSRP, recommended a no action for IRP site 5.

Along the way, again from 1995 to 2015 various investigations. Again, we got rid of some soil. They prepared and issued a closure report. Again, due to low levels of VOCs in groundwater, the site was transferred in LSRP program. Some additional work was done, and we closed it out.

IRP site 6, it's former blast pad located out off one of the runways to the airport, and they used it to, basically, test jet engines, once they got repaired. There was a partially buried drum out there, that they removed, and then again, did various investigations between '95 and 2015.

Feasibility study 2016 --

MR. MULLETT: One thing to note on that, is that we did an interim removal in 2010, as part of data gap.

MR. POCZE: I think that interim removal then used residence screening levels -- -

MR. MULLETT: That's correct.

MR. POCZE: -- where I think in earlier investigations, they used non-residential--

MR. MULLETT: That's right.

MR. MAHNKOPF: Based on sample events, through low level PAHs, today are above DEP soil mitigation standards. Lead was detected above for RES and non-Res as well -- I'm sorry, they were below, the res and non-residential groundwater. Okay, there are no groundwater sampling out there. They sampled for VOCs, SVOCs, pesticides, PCBs and TPH. Hey were all below the groundwater quality standarsds.

We had some metals out there, that were consistent with natural backgrounds. As Jay mentioned, we did interim soil removal, where, I believe, we excavated about 150 yards of lead and PAHs impacted soil. We, basically, met compliance through -- post excavations -- DEP -- through the DEP. We also sampled the wells two more times, lead was not detected in both those rounds. And then, basically, based on the impact soil removal, and the lack of any

groundwater impacts we had out there, we -- the FS, basically recommended no further action for site 6.

Does anybody have any questions?

MR. POCZE: Well, I have a lot of questions, but is there a schedule with regards to what the next phase is for the draft ROD, when that's coming in? Because there is a lot of other steps that -- I think that's why we are at that point here, now. And I want to avoid going forward.

You know the approval on the consult PRAP (ph), comes from our director. Even though at the RPM level or my level, we can say, we have no comments or whatever, but we're fairly confident technically the PRAP, the actual approval doesn't come from me, it comes from up above. That's why for one of the issues of our letter, that we're not able to approve that. And that also requires our attorneys to look at it, the final version. It might also go to management and then the letter goes out from the director on the PRAP.

MR. MAHNKOPF: Excuse me, I

thought EPS doesn't approve the PRAP?

MR. POCZE: We don't actually approve, we make sure that we have no further comments or issues of the cause, and that we can go forward on the paroled letter awarded with Federal Facility. Simply because the Federal Agency or National Guard or DOT, is -- via-via with an agency -- on all PRAP proposed plan, public notice is I don't know of any that have gone forward without EPA and State approval, for that.

State approval usually is also a letter that comes from, someone who is delegated authority in the State to issue approval. Sometimes the RPM will say, I have no further issues with this. I haven't reached my management yet, but I may or may not expect anything. Sometimes we start the ball rolling from that standpoint.

I know on these, our director contacts the State and asks his counterpart, what do think of the proposed plan, or record of decision. At that point all things, I guess, have to be in a row. One, says they haven't been briefed or they are not in all agreement--

then it's just kind of --

MR. MAHNKOPF: I know the case manager for the DEP, Lynn Vogal, back in June. She said that only comment letter they had was they typo in one of the figures.

MR. POCZE: I haven't seen anything with regards from their management, with regards to -- or higher, up that the proposed plan has been briefed further up. So that concern -- not to say it would be a problem, but I haven't seen anything. I know when it goes up, first thing our director will say is, where does his counter-point stand? They have been briefed, and are they in agreement? We can't yes, or they have been notified, whether or not to the facts or wisdom, defending upon the site. Some sites go off with a facts sheet, and up above we want a briefing and we'll do it -- if not just kind of initial and say, okay.

That's what we would have done with this -- this is terms of the briefing. That is what we've done ESD and depending upon the site, so sometimes we say, yeah the case manager or whatever, it has been approved. It's

really not delegated to doing it. If it's getting a record of decision with my signature, it's not valid I'm not authorized to sign a record of decision.

So that's some of the behind the scenes that goes on. I know the draft ROD at that point we need concurrence letter from the DEP, stating that they are in agreement with the record of decision, and by the time that that letter comes, they've already been briefed and kind of know that they've spoken and that they have no issues.

MR. DEFEO: My question is: Your original question was what was their next step -- but then you went to that the State didn't feel the need to upgrade, so are they supposed to -- what is your next step?

MR. POCZE: Our next step was trying to explain when the letter went out in terms of our saying, we don't concur, we don't approve at this point, the paroled plan at that point. The next step we would go back, probably draft, put you the package together with regards to this document, and have a letter go out or -- I don't know if you're working on the draft

ROD --

MR. MAHNKOPF: When you say letter, what letter?

MR. POCZE: Letter from our director saying we've already gone forward with the proposed plan, saying we have no further comments on the proposed plan. And that's usually a branch chief or director's level that's gone out. That's what we have done for all of our Federal facility.

MR. MULLETT: When do you have anticipate that letter coming back --

MR. POCZE: Again, that usually goes in where the DEP stands on that. A lot of times, the plan say, DEP has provided this. In realty, stepping back, I don't know if the case manager has okayed it. It's not necessarily the same as the beuro chief or someone at that level --

MR. MAHNKOPF: So you need to get a concurrence --

MR. POCZE: -- you need --

(Whereupon there was cross-talking going on).

MR. MAHNKOPF: -- to get a

concurrence letter from the DEP.

MR. POCZE: Usually it's some type of approval between upper levels, that there's no further questions on this to proceed to the next step. Whether that's a phone call or an email message and it depends on the site.

MR. MULLETT: We have got a letter from Lynn Vogal -- -

MR. POCZE: -- she is a case manager --

MR. ROESCH: Do we need something higher than you or she --

(Cross-talk).

MR. DEFEO: -- part of process?

MR. POCZE: We would do that on our side on, but, I know, at that point I know, this was finalized the other day. We got this in the mail. So we have upper management saying okay, we have a proposed plan. He's going to say, is it finalized? Is it done? That's why it ends up going up any further. That is why the letter was issued.

At that point Lynn -- we would check with Lynn and say, Lynn, does Mark

Peterson -- that's the director, was he notified of this, and is he in agreement? Then, she will usually say, he is done briefing, the facts sheet shows no comments, and at that point we would set up to our director saying, here, sign this letter saying. We have no further comment on the proposed plan. DEP is -- it's in our memo to the director who would say, he's in agreement, and that Mark Peterson had no comments. And the same goes with the record of decision.

MR. MULLETT: We can certainly reach back to Lynn tomorrow, to see, --

MR. POCZE: -- right. And Lynn has been out and this came the other day, and that was another concern. Also, the document I can tell you, go two to three layers of our attorney review. So, you know, to say we get it, for an attorney to say, here you go quickly. Do you have any comments on it? It's not going to go through the attorneys in one day, two days. That's another reason for the letter. I don't know maybe, Temple, you can get it through your attorney's quicker then we can.

MS. MCCOY: Not likely.

MR. POCZE: I mean anything with the directors signature, again, we have a certain level of attorney review and concurrence on it. So it's not just the case manager's attorney and maybe chief, branch chief. Debbie Mallot (ph), who is the attorney, Marina Moral (ph, would be case manager attorney, Debbie Mallot, is the section chief. I'm not going to say everything goes to that level. It all depends on the sites and issues.

Ans there are nuances with each of the sites -- I mean you, the National Guard, then from the FAA. So it's a little different. We have the Federal facility agreement with the FAA, not with the National Guard, but it has to follow the same process.

MR. DEFEO: Sure.

MR. POCZE: We appreciate you having this public meeting. We've never -- don't to say never, but I don't know of many cases not having a public meeting, even if no one showed up for it. It hasn't been done. We've done that but we've always have given the public the opportunity in written form and a

meeting should they want it.

MR. MULLETT: So at this the point, you're sending this document up the line to your legal and superiors?

MR. POCZE: We gave it to legal the other day. I don't know if they looked at it. And I met with them today, saying we've gone through it. A lot of the issues we talked about have been cleaned up -- Federal facility qualifications are very hard because you're dealing with a multiple units, so when people look at it from an attorneys side from up above, they're used to one or two sites, and everything falls into play. They're easy to read versus a Federal facility site, that does investigations, multiple site investigations, multiple data gap -- which --

MR. MULLETT: -- make it more cumbersome.

MR. POCZE: Makes it more cumbersome -- then when you're looking at that, now you've got the data gap investigation maybe for two of the sites, but not four of the sites. It makes it even more difficult when you're following through, so they are harder to read

and review multiple umm --

MR. MAHNKOPF: For this particular -- for the ANG site, we've done that. We've don't all the steps for those, for all four sites.

MR. POCZE: Right --

MR. MAHNKOPF: -- so.

(Cross-talking)

MR. POCZE: -- and going through it and going through the changes quickly, makes it difficult sometimes. To do it in one day or two days. Like I said you start out in someplace is talking about non-residential, but as you go through, you're going through multiple units later -- it might be two pages later, you talk about now we're using residential, which is the nature of the document. It makes it harder to explain, but it is in there. You did it an excavation, so in that excavation, you met residential, which is fine. Starts out talking about non-residential and then there's four sites, and they are not always the same for all four sites because they're on different tracks or different activities. Not all four sites have had the

expanded site investigation and data gap investigation and then the RI, so when some one looks at it, then why are we talking about?

MR. MULLETT: In a perfect world you would rather say one proposed plan for one side?

MR. POCZE: It does get cumbersome. That's something we can talk about for the draft ROD. We have some new attorneys. They are not used to Federal facility sites. Sometimes it may be easier, then you're getting a document that is just pages upon pages upon pages and the proposed plan -- I mean, yours is what about 30 pages 40 pages, that's not bad. We've proposed pages of 120. You know, the public can't read that. It gets very cumbersome with 20 something sites and it is very difficult.

So we appreciate you doing this on the fly but it does get difficult to get it through everyone to read and a sort of timeframe. And a Federal facility agreement allows 30 days with an extension that we follow for the FAA.

Jessica will probably set up

a meeting to talk with what is the easiest way. I talked with two attorneys, as to whether it's better to have individual sites running sequentially. It might be easier to read your, and you're looking at -- you're able to focus on that one site, put it down and then go to the next one, versus looking at risk or cost or feasibility study occupational hazard.

So that might be something I would like is draft ROD -- technically if it's not hard, I would a draft ROD with proceeding through review. On our side, absolutely.

MR. MAHNKOPF: Well, so --

MR. MULLETT: -- our draft ROD has to go through an internal review and FAA review, before it gets to you guys. I would think we are probably going to push the draft ROD out possibly pretty soon. That way, it's going through these other reviews, before it even gets -- so that way it's more sequential when you are ready for it.

MR. POCZE: Are you looking at two months?

MR. MULLETT: I would say probably 30 to 45 days, we would like to see it

internally and the FAA gets their review. But, you know, if we're going to have to split this thing up into multiple RODs, that's something I should talk to --

MR. POCZE: It might be -- it's not multiple Rods, it's multiple section in one ROD. Like here's a chapter, chapter one for the IRP Site 2. He might be using a read, I'm not sure.

MR. MULLETT: But we have to see how it's set up. How we get it structured. Because when you're jumping between sections and every section touches on all four sites, that's where I think the confusion probably -- not confusion, more cumbersome to read and understand. We will have to take a look at that and we can talk it through, but my goal would be we're still hoping to put a shovel in the ground, next fall. And we have a work plan, that needs to be approved for the actual Site 3 work. So, you know, we still got two documents to get through in the next six, seven, even eight months. I would -- it seems like a long time but, then but then again, we had draft proposed plan done in November of '16. So we

are 13, 14 months later, so I think we are going to certainly try to push this and hopefully make it easier for everybody to look at, you know, with a goal of move forward, especially at Site 2.

MR. POCZE: I think it's good to get the it draft in and reviewed and hopefully get the final in, and to be honest, if you can by early summer, if you come in around August and September is just about the fiscal year. And every attorney is looking at every other site. You know, five-year reviews. It gets to be crunch time.

MR. MULLETT: So the ROD I think as far as the attorneys' -- as far as a work plan -- you wouldn't have to have the authority?

MR. POCZE: No.

MR. MULLETT: So it's really the ROD we are looking at. The ROD in September. I will be really disappointed. I mean, I think that we all need to try to -- our goal would be ti have as much sooner than that -- I'm looking at a work plan maybe in September is more, you know, I think we are hopeful the

ROD would be some time earlier summer.

MR. POCZE: When would the draft ROD come to us?

MR. MULLETT: If we get ours out internally in the next 30 to 45 days, I would think it would come to you guys some time around, you know, April, May.

MR. POCZE: Okay. Remember we have to get concurrence from DEP. So if the DEP has comments going back and forth --

MR. MULLETT: -- typically we submit our documents to both and the DEP at the same time, but it is after it's gone through FAA and it's gone through us, not us, but the Government.

MR. ROESCH: So who signs this ROD? To my knowledge if it's signed by the Guard, it has to be signed by a lead agency. It think it's EPAA.

MR. MULLETT: They will have to sign the ROD.

MR. POCZE: That's a legal question.

MR. POCZE: That's a federal facility agreement is with FAA, with regard to

submitting the record of position. In the big scheme of things, I'm not sure about this issue legally. You know, lawyers like to pick us apart, and go, wait a minute. I don't know who the lead agency is on a NPL site, super fund site --

MR. CONNELL: -- the outcome of that decision there. So there has to be some coordination and signs on the FAAs part. That's the decision we want our property to be represented at --

MR. MULLETT: If that's something we have to add a signature block. Whatever you guys work out we'll do what you guys need to. So Temple, that would have to --

MR. ROESCH: I'd run parallel path right now, just because that will be a legal issue, you know, the FAA, as the land owner and ANG, as the lessee. We have FAA with EPA. There's an onion in there that we are trying to peel back, that I think we all kind of this is it first time run into it because something actually being signed.

MR. CONNELL: Work is buying done --

MR. ROESCH: So, I don't know how long that process takes, but we know Doug has already talked the about the EPA, legal -- arm of his review. We have a similar legal arm that takes time, especially to pound through that.

MR. MULLETT: We will expedite as much as we can.

MR. CONNELL: The Air Guard works well with our environmental group, in Tom's area. But the important part, is how we align ourselves in reporting back to Doug. We're accountable from our property, as the landlords, you're doing work on our property, that can't circumvent the landlord. It has to be in that process. Because we have to make sure what you're doing -- the sooner the better that we're involved, the better the outcome is going to be.

MR. POCZE: Who from the FAA would have sign?

MR. ROESCH: Usually there is a hierarchy, in terms of our director sign and comparable --

MR. CONNELL: --it would be

myself and the director of the facility. I'm the operations manager.

I will talk to legal about that as well.

MR. POCZE: You will write a letter to whatever --

MR. DEFEO: Is there a signature block?

MR. MULLETT: Right. Specifically you would sign it.

MR. DEFEO: One owns the land, the other is spending the money.

MR. MULLETT: We'll make sure there's an extra signature block on it.

MR. POCZE: Who from the National Guard signs?

MR. MULLETT: Typically, their legal would sign it, Randy Chambers (ph). The Air Guard would have their legal.

MR. POCZE: For the record of decision?

MR. MULLETT: Probably her boos, but we'll verify that.

MR. DEFEO: The branch chief.

MR. POCZE: Whoever --

usually there's a deligation.

MR. MULLETT: It has been a while since I did a ROD through you guys.

MR. POCZE: Lynn Vogel--

that will take some time.

MR. MULLETT: The sooner we start pushing this ROD through, the better I know -- whenever you get lawyers involved, it takes time.

MR. CONNELL: I'm not seeing 45 days.

MR. MULLETT: No, I've got -- we will push it through on our end. I understand it could take longer.

MR. CONNELL: It will take a while.

MR. MULLETT: We will just try to keep it moving. I think we're not going to -- at this point push forward with the draft ROD, at least get it in, reviewed internally by the Guard, as soon as we can. I would think that would give you time, for your director to --

MR. CONNELL: Are there constraints on your budget line? Do you have to

have it executed by a certain window?

MR. MULLETT: Well, it' a performance based contract, so if do implement in '18, and that puts us behind schedule, we are trying to get -- we have a clean up goal, by the end of the period of performance. If we lose a year of the POP, unless we get added a year on the back end, it's five year money, we probably won't ever that availability. We'll have a less probability of meeting our objective. So, you know, when you are talking injections, and come on to all about the contact time and distribution contact -- digging the holes is easy, but, you know, if Chem Ox (ph), we need time. We need as much time as we can. I don't have a goal. I don't someone telling me that I have to do it this year, but our performance and what our initial schedule was, is that we were supposed to implement it in '18.

MR. CONNELL: So, as far as a timeline is--

MR. MAHNKOPF: Five or six months behind.

MR. ROESCH: Maybe through Temple, but I think there will be official chain

of events here through email --

MR. CONNELL: That would be helpful. We'll do that we can.

MR. POCZE: Once the ROD issues, then other documents don't need legal review.

MR. MULLETT: Right. Okay.

MR. MAHNKOPF: Going forward with the work plan, will then the EPA issue a letter saying, we approve of your work plan?

MR. POCZE: That we reviewed the work plan. I'm guessing the comments, the response to comments and some type of letter saying, we have no further comments on the work plan. And then checking with the DEP, also.

MR. MULLETT: We'll probably hangout for a while. We will open the door back up, and we'll stick around until 7:30, to see if anybody shows up.

(Whereupon the Public Hearing was concluded for the evening.

CERTIFICATION

I, ALLISON SPECTOR, a Court Reporter and Notary Public of the State of New Jersey, do hereby certify that I reported the testimony in the above-captioned matter; that the said witnesses were duly sworn by me; that the foregoing is a true and correct transcript of the stenographic notes of testimony taken by me in the above-captioned matter.

_____

ALLISON SPECTOR

ATTACHMENT 4

FINAL RESPONSIVENESS SUMMARY

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LIST OF ACRONYMS

ANG	Air National Guard
IRP	Installation Restoration Program
NFA	No Further Action

FINAL RESPONSIVENESS SUMMARY

Comment Period: July 10, 2017 through August 9, 2017
Proposed Plan for Installation Restoration Program Sites 2, 3, 5, and 6
177th Fighter Wing, New Jersey Air National Guard
Atlantic City International Airport – Egg Harbor Township, New Jersey

This Responsiveness Summary has been prepared by the Federal Aviation Administration (FAA) as part of the process for making a recommendation of the Preferred Alternative of Further Action for Installation Restoration Program (IRP) Site 3 and the Preferred Alternative of No Further Action (NFA) for IRP Sites 2, 5, and 6, 177th Fighter Wing, New Jersey ANG, Atlantic City International Airport, Egg Harbor Township, New Jersey. A Proposed Plan for the Preferred Alternative of Further Action at IRP Site 3 and NFA at IRP Sites 2, 5, and 6 was issued by the National Guard Bureau on June 30, 2017. This Responsiveness Summary documents public comments and issues raised during the public comment period on the Proposed Plan, and presents responses to those comments.

The Proposed Plan and Information Repository for IRP Sites 2, 3, 5, and 6 were made available to the public during this public comment period at the Atlantic County Library System, Mays Landing Branch, 40 Farragut Avenue, Mays Landing, New Jersey 08330. As published on July 9 and 10, 2017, in *The Press of Atlantic City*, the public comment period began on July 10, 2017, and ran through August 9, 2017. During this public comment period, the public was encouraged to provide comments on the Proposed Plan to the Environmental Restoration Technical Advisor for the ANG. The public was also encouraged to contact the Environmental Restoration Technical Advisor for the ANG if there was interest in holding a public meeting to discuss the Proposed Plan and Preferred Alternative. Although no comments were received and no interest in holding a public meeting was demonstrated, the ANG held a public meeting on January 30, 2018. The intent to hold a public meeting was communicated via a Notice of Public Meeting that was published in *The Press of Atlantic City* on January 28, 2018. The public meeting was held on January 30, 2018 at the Residence Inn by Marriot – Atlantic City Airport located at 3022 Fire Road, Egg Harbor Township, New Jersey 08270. The transcript for the public meeting is included in Attachment 3 of this Record of Decision.

During the public comment period, no comments were received from the public. In addition, no attendees representing the public were present at the public meeting. Therefore, there are no technical or legal issues identified that require additional discussion.

ATTACHMENT 5

SELECTED REMEDY CONCURRENCE LETTER

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U.S. Department
of Transportation
Federal Aviation Administration

Delivery Via: FedEx # 8106 8259 9373

MAR 1 9 2018

Ms. Jessica Mollin
U.S. Environmental Protection Agency
Federal Facilities Section
290 Broadway, 18th Floor
New York, New York 10007-1866

Dear Ms. Mollin:

SUBJECT: Final Proposed Plan, Installation Restoration Program Sites 2, 3, 5 and 6, 177th Fighter Wing, New Jersey Air National Guard, Egg Harbor Township, New Jersey

Enclosed, please find the above referenced National Guard Bureau (NGB), Final Proposed Plan for the 177th Fighter Wing, New Jersey Air Nation Guard located on the Federal Aviation Administration (FAA), William J. Hughes Technical Center (Technical Center). The Technical Center and the NGB are pleased to submit this document as a final report. The FAA Technical Center has no objection to this final document and is looking forward to working with the NGB to expedite remedial designs and field activities to accomplish stated goals.

Additional hard copies of this document were previously provided under separate cover to Ms. Vogel of the New Jersey Department of Environmental Protection, Major Defeo of the New Jersey Air National Guard, and Mr. Deman of the New Jersey Pinelands Commission.

The FAA Technical Center and the NGB are working cooperatively on this issue and can provide any additional information you may require. Please contact John Floyd, Manager, Site Engineering of my staff at 609-485-6938 or John.Floyd@faa.gov.

Sincerely,

James Connett
Center Operations Division Manager, ANG-E3

Enclosure

cc: L. Vogel, NJDEP
Major R. Defeo, ANG
E. Deman, NJ Pinelands Commission (elec. Copy)
T. McCoy, ANG

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Site Remediation & Waste Management Program
Mail Code 401-406
P.O. Box 420
Trenton, New Jersey 08625-0420
Telephone: 609-292-1250

CATHERINE R. MCCABE
Acting Commissioner

Temple L. McCoy
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157

APR 11 2018

and

John Floyd
ANG-E343, Bldg. 305, A065
William J. Hughes Technical Center
Atlantic City Int'l Airport, New Jersey 08405

Re: Proposed Plan for Installation Restoration Project (IRP) Sites 2, 3, 5, and 6
NJANG, 177th Fighter Wing, at the FAA WJHTC, Atlantic City International Airport
Egg Harbor Twp., Atlantic County, NJ
SRP PI No. 005885, EA No. RPC000001

Dear Ms. McCoy and Mr. Floyd:

The New Jersey Department of Environmental Protection (Department) has reviewed the Proposed Plan dated January 26, 2018 and submitted by the Federal Aviation Administration (FAA) in a letter dated March 22, 2018. The January 2018 Proposed Plan presents the preferred alternatives for the Installation Restoration Project (IRP) Sites 2, 3, 5, and 6 for the New Jersey Air National Guard (NJANG), 177th Fighter Wing, at the FAA William J. Hughes Technical Center, Atlantic City International Airport, Egg Harbor Twp., Atlantic County, NJ. The January 2018 Proposed Plan addresses soil and groundwater at IRP Sites 2, 3, 5 and 6.

As part of the Proposed Plan, the NJANG requests a No Further Action determination for IRP Sites 2, 5, and 6 based on soil and groundwater data which indicates that constituents of concern (COC) no longer present a risk to human health or the environment.

As indicated, the Preferred Alternative for IRP Site 3 include:

- Soil Alternative 2 - Excavation and Off-site Disposal (Alternative 2) such that no institutional controls will be required. In addition, catch basin sediments determined to be hazardous under RCRA will also be removed for off-site disposal.

- Groundwater Alternative 4 - In-Situ Chemical Oxidation (ISCO) Plus Monitored Natural Attenuation (MNA) with the establishment of Institutional Controls (i.e. Classification Exception Area and Well Restriction Area) until the remedial action objectives are met.

The preferred alternatives are protective of human health and the environment, comply with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost effective, and uses permanent solutions and treatment technologies to the maximum extent practicable.

The Department concurs with preferred alternative of No Further Action for IRP Sites 2, 5 and 6 and the preferred alternatives for soil, groundwater, and catch basin sediments for IRP Site 3.

The Department appreciates the opportunity to participate in the decision-making process to select an appropriate remedy. If you have any questions, please contact Stephen E. Maybury, Chief, Bureau of Case Management at (609) 633-1455.

Sincerely,

Mark J. Pedersen, Assistant Commissioner
Site Remediation and Waste Management Program

CC: Lynn Vogel, NJDEP, BCM
Major Rich DeFeo, NJANG
Jessica Mollin, USEPA
Thomas Roesch, FAA WJHTC

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