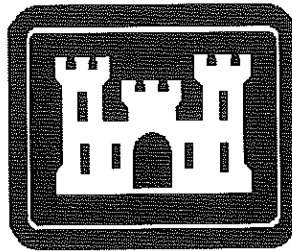


FINAL

**FIRST FIVE-YEAR REVIEW REPORT FOR
FORMER FRANKFORD ARSENAL AREA I SOILS
PHILADELPHIA, PENNSYLVANIA**

FUDS PROPERTY # C03PA004201



Prepared by

**U.S. Army Corps of Engineers
Baltimore District
Baltimore, Maryland**



**COL, John T. Litz
Commander and District Engineer
U.S. Army Corps of Engineers, Baltimore District**



Date

TABLE OF CONTENTS

EXECUTIVE SUMMARY	iii
1 INTRODUCTION	1
1.1 Site Background	2
1.1.1 Site Description.....	2
1.1.2 Land and Resource Use	2
1.1.3 History of Contamination	3
FIVE-YEAR REVIEW SUMMARY FORM	4
2 RESPONSE ACTION SUMMARY	5
2.1 Initial Response	5
2.2 Basis for Taking Action	5
2.3 Remedy Selection.....	6
2.4 Status of Implementation.....	6
3 PROGRESS SINCE THE LAST REVIEW.....	6
4 FIVE-YEAR REVIEW PROCESS.....	6
4.1 Community Notification and Involvement.....	6
4.2 Site Interviews.....	7
4.3 Data Review	7
4.4 Site Inspection	7
5 TECHNICAL ASSESSMENT	8
5.1 QUESTION A: Is the remedy functioning as intended by the decision documents?	8
5.2 QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?.....	8
5.3 QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?.....	8
6 ISSUES/RECOMMENDATIONS	8
7 PROTECTIVENESS STATEMENT.....	9
8 NEXT REVIEW	9
9 REFERENCES	10

LIST OF TABLES

Table 1-1: Investigation Areas at the FFA.....	1
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LIST OF APPENDICES

Appendix A	Figures
Appendix B	Tables
Appendix C	Community Notification
Appendix D	Comment Responses
Appendix E	Interview Questionnaire(s)
Appendix F	Site Inspection Photographs

LIST OF ABBREVIATIONS & ACRONYMS

Mg/kg	Milligrams per Kilograms
ALM	Adult Lead Model
AOC	Area of Concern
AOI	Area of Investigation
Bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DA	Department of the Army
DD	Decision Document
DoD	Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
EPA	Environmental Protection Agency
FFA	Former Frankford Arsenal
Ft	Feet
FUDS	Formerly Used Defense Site
FYR	Five-Year Review
GSA	General Services Administration
HHRA	Human Health Risk Assessment
IUR	Inhalation Unit Risk
Kg	Kilograms
MSC	Medium-Specific Concentration
NCP	National Contingency Plan
NTCRA	Non-Time Critical Removal Action
ORCR	Office of Resource Conservation and Recovery
PADEP	Pennsylvania Department of Environmental Protection
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethene
RAO	Remedial Action Objectives
RME	Reasonable Maximum Exposure
RfCi	Inhalation Reference Concentration
RfDo	Oral Reference Dose
SVOC	Semi-volatile Organic Compounds
TCE	Trichloroethene
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
UST	Underground Storage Tank
UU/UE	Unlimited Use and Unrestricted Exposure
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
VOC	Volatile Organic Compounds

EXECUTIVE SUMMARY

This is the first Five-Year Review of the Former Frankford Arsenal, Area I Soils located in Philadelphia, Pennsylvania. The purpose of the Five-Year Review is to evaluate the implementation and performance of the remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The Five-Year Review is prepared pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act Section 121, consistent with the National Contingency Plan (40 CFR Section 300.430(f)(4)(ii)), and considering the U.S. Environmental Protection Agency, Department of Defense, and Formerly Used Defense Sites policy.

Since the Former Frankford Arsenal was decommissioned in 1976, several environmental studies and cleanups have been conducted. Based on the historical use of the facility and analytical results from environmental investigations, the contaminants in Area I included certain metals, volatile organic compounds, semi-volatile organic compounds, and polychlorinated biphenyls. As detailed in the Decision Document for the Area I soils, interim removal actions previously conducted have proven to be protective of human health and the environment and eliminated the need to conduct additional remedial action. Therefore, No Further Action was selected as the final remedy for the Former Frankford Arsenal Area, Area I Soils.

This Five-Year Review, conducted by the U.S. Army Corps of Engineers, Baltimore District, identifies that the No Further Action remedy at the Former Frankford Arsenal, Area I is protective of human health and the environment. No changes in the land use at the Former Frankford Arsenal, Area I or changes in the risk assessment methodology have occurred during the time period of this review which would call into question the protectiveness of the remedy.

1 INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Department of the Army (DA), is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering the U.S. Environmental Protection Agency (EPA), Department of Defense (DoD), and Formerly Used Defense Sites (FUDS) policy.

This is the first FYR for Area I at the Former Frankford Arsenal (FFA), herein referred to as the Site. The triggering action for this statutory review is the signature date of the Decision Document (DD) on July 1, 2015. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

To manage cleanup efficiently, the FFA property was divided into five areas of investigation (AOI) identified in **Table 1-1** below. This FYR addresses one of the AOIs, Area I. Each of the AOIs are treated separately, therefore the four other AOIs are not included in this FYR. Area III, Area IV, and MMRP do not have DDs, and the remedial activities for Area II were implemented in May – July 2017.

Table 1-1: Investigation Areas at the FFA

Investigation Area	Description
Area I	Site soils on the eastern half of the FFA between Baird Street and Sanger Street.
Area II	Site soils on the western half of the FFA.
Area III	Site soils located on the land owned by the City of Philadelphia and Dietz and Watson.
Area IV	Site wide groundwater at the FFA.
MMRP	Addresses site-wide Military Munition Response Program

The FFA Area I Soils Five-Year Review was led by the U.S. Army Corps of Engineers (USACE), Baltimore District, Project Manager, Mr. Todd Beckwith. Participants from the USACE, Baltimore District included: Ms. Kimberly Berg, Environmental Engineer, Mr. Cliff Opdyke, Risk Assessor, and Mr. Kyle Parker, Biologist. The review began on July, 1 2019.

1.1 Site Background

1.1.1 Site Description

The FFA is a 109.4 acre facility located in an urban, mixed-use area of northeast Philadelphia, Pennsylvania (**Figure 1**). The facility is bounded to the north by Tacony Street and Interstate 95 (I-95); by the Dietz and Watson industrial properties to the east; by Frankford Creek and the Delaware River to the south; and to the west by Bridge Street and several industrial properties.

Area I is a 46 acre commercial/industrial use site occupying the eastern half of the FFA between Baird Street and Sanger Street. The layout of the FFA showing Areas I, II, and III is depicted on **Figure 2**.

Soils at the Site consist of surface deposits of fill material consisting of reworked native soil mixed with bricks, wood, coal, concrete, gravel, slag, and ash. This fill material was encountered from land surface to a depth of approximately nine feet (ft) below ground surface (bgs). Demolition debris was encountered at specific and localized areas, at depths of up to 20 ft. Below the surface deposits, the Site is underlain by unconsolidated sediments of the Coastal Plain province which overlie older crystalline rocks of the Piedmont province. There are no wetlands, streams, or other surface water features located on the FFA property. Regional drainage surrounding the FFA is controlled by Frankford Creek and the Delaware River, which border the Site to the south/southeast (USACE, 2015). Depth to groundwater at the Site is approximately 10 ft bgs. The direction of groundwater flow is toward the south-southeast, discharging into the Delaware River, or locally toward Frankford Creek (Cabrera, 2013).

1.1.2 Land and Resource Use

The FFA was commissioned in 1816 for military use. Previously, the area was farmland and undeveloped wetlands. The wetland areas were filled in over the years. Between 1816 and the decommissioning in 1977, the facility was used for a variety of military activities as its mission was adjusted to fit the military's changing needs. In 1976, the FFA was declared excess by the U.S. Army and on 30 September 1977 the FFA was closed.

The FFA is situated in an urban area consisting of both commercial/industrial and recreational properties. The current land use for Area I is commercial/industrial. In 2014, Dietz and Watson expanded, taking a portion of Area I and a portion of the former Pennsylvania Fish and Boat Commission property. The remaining Pennsylvania Fish and Boat Commission boat launch property was purchased by the City of Philadelphia. The western portion of Area I was purchased by the Philadelphia Industrial Development Corp. These property boundaries are displayed in **Figure 3**. Warehouse facilities owned by Dietz and Watson are currently located on a portion of Area I. The Philadelphia Industrial Development Corporation sold 20-acres of the PIDC property to Honor Foods in the fall of 2019. Honor Foods plans to build a new warehouse on the site in October 2020 as part of its foodservice distribution business.

The future use of the Site is not expected to change. Area I is zoned by the City of Philadelphia for Industrial Use and the existing/planned usage by the current owners are industrial and commercial in nature.

1.1.3 History of Contamination

Activities at the FFA during its years of operation included military ordnance and small arms production, testing and storage, and munitions research. A historical timeline of site-related events for the period between 1816 and 2013 is included in the Final Decision Document dated June 2015 (USACE, 2015).

Analytical results for investigations performed at the Site from 1999 to 2009 were compared to the surface and subsurface soil medium-specific concentration (MSC) established by the Pennsylvania Department of Environmental Protection (PADEP). The results of the comparison showed that the soil concentrations for the following contaminants exceeded their corresponding MSCs in various locations (Cabrera, 2009a):

- Metals – antimony, arsenic, lead, chromium, copper, and mercury;
- VOCs – trichloroethene (TCE), carbon tetrachloride, and tetrachloroethene (PCE);
- SVOCs – benzo(a)pyrene and naphthalene; and
- PCBs – Aroclor-1260.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Former Frankford Arsenal Area I Soils		
FUDS Property #: C03PA004201		
Region: 3	State: PA	City/County: Philadelphia/Philadelphia County
SITE STATUS		
NPL Status: Non-NPL		
Multiple OUs? Yes	Has the site achieved construction completion? No	
REVIEW STATUS		
Lead agency: Other Federal Agency <i>[If "Other Federal Agency", enter Agency name]:</i> United States Army		
Author name (Federal or State Project Manager): Todd T. Beckwith		
Author affiliation: United States Army Corps of Engineers		
Review period: 7/1/2019 - 7/1/2020		
Date of site inspection: 2/25/2020		
Type of review: Statutory		
Review number: 1		
Triggering action date: 7/1/2015		
Due date (five years after triggering action date): 7/1/2020		

2 RESPONSE ACTION SUMMARY

2.1 Initial Response

A number of cleanups were conducted at the FFA by the Army Toxic and Hazardous Materials Agency (USATHAMA) prior to transferring the property to the General Services Administration (GSA) for disposition. Decontamination efforts primarily focused on the removal of munitions, explosives, and radiological wastes. Some chemical-waste cleanup was also conducted to allow for the commercial redevelopment of the FFA.

As a result of the initial investigations, USACE made a decision to conduct removal actions in Area I. An *Engineering Evaluation/Cost Analysis (EE/CA)* was completed in 2009 to evaluate removal action alternatives in response to the soil contamination present within Area I (Cabrera, 2009a). An *Action Memorandum* was prepared in 2009 to document the selected Non-Time Critical Removal Action (NTCRA) (Cabrera, 2009b). The selected Removal Action was excavation and off-site disposal of site soils to reduce the risk posed by elevated concentrations of arsenic, copper, PCE, TCE, and Aroclor-1260 at the Site.

Six NTCRAs were conducted in Area I between September 2009 and August 2013. The purpose of the NTCRAs was to remove the soil contamination and underground storage tanks (USTs) remaining from historical activities and allow for redevelopment of Area I. Each of the NTCRAs are described in greater detail in the June 2015 DD for Area I. The final status of the areas of concern (AOC) identified at the FFA Area I, which includes the areas where the NTCRAs have taken place, is summarized in **Table 1**. Soil contamination remaining in Area I is located beneath the water table. Arsenic contamination is present in surface soil at the Compound Area, Building 238, and AOCs 6 and 9 because the first NTCRA used a cleanup level of 53 milligrams per kilogram (mg/kg) for arsenic, and the subsequent NTCRAs used 29 mg/kg as the cleanup level (USACE, 2015).

2.2 Basis for Taking Action

USACE completed a *Remedial Investigation* of Area I soils to evaluate the nature and extent of contamination present after the NTCRAs were completed. The primary soil contaminants of concern were metals, VOCs, SVOCs, and PCBs. The individual contaminants of potential concern identified for Area I soils, present above the water table, are presented in **Table 2**. A human health risk assessment performed as part of the *Remedial Investigation* evaluated potential exposure to surface and subsurface soil contaminants of potential concern for four reasonable maximum exposure receptors: industrial/commercial worker, construction worker, utility worker, and maintenance worker. The carcinogenic risks for all receptors were within the acceptable cancer risk range of 1×10^{-6} to 1×10^{-4} . Additionally, the non-cancer hazard indices did not exceed the CERCLA limit of 1.0 for any receptor. The results of the Adult Lead Model (ALM) indicates that no potential adverse human health impacts are likely to occur as a result of exposure to lead at the FFA, Area I (USACE, 2015).

An ecological risk evaluation performed during the *Remedial Investigation* evaluated whether releases of chemicals to Site soils may have adversely affected ecological receptors. There are no threatened or endangered species in Area I nor freshwater wetlands on or in the vicinity of Area I. The Site currently has and is expected in the future to continue to have physical features that would reduce potential exposure to Area I soils, such as parking lots, paved areas, and maintained landscaping. Since the soil exposure pathway and ecological habitats and associated receptors are not present, no additional ecological evaluation was necessary for soils at Area 1 (USACE, 2015).

2.3 Remedy Selection

The following excerpt from the June 2015 DD constitutes the essence of the selected remedy:

The "USACE has determined that no further action is necessary to protect public health, welfare or the environment. Interim removal actions previously conducted for the FFA Area I soils have proved to be protective of human health and the environment and have eliminated the need to conduct additional remedial action. Therefore, USACE has selected No Further Action as the final remedy for the Area I soils. Soil contamination present below the water table will be addressed as part of a separate groundwater remedial investigation...Because this selected remedy will result in hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years of the date of this Decision Document to ensure that the remedy is protective of human health and the environment."

2.4 Status of Implementation

Per the June 2015 DD, No Further Action was required to protect public health, welfare or the environment.

3 PROGRESS SINCE THE LAST REVIEW

This is the first Five-Year Review of Area I at the FFA.

4 FIVE-YEAR REVIEW PROCESS

4.1 Community Notification and Involvement

A public notice was made available by newspaper, The Philadelphia Inquirer, on August 27, 2019 stating that there was a five-year review. The results of the review and the report will be made available to the public online, along with other project documents at www.nab.usace.army.mil/frankford. A copy of the notification is included in **Appendix C**.

The FYR report was sent to PADEP for review on April 16, 2020. Comments were received on June 5, 2020. PADEP's comments along with the USACE responses are included in **Appendix D**.

4.2 Site Interviews

During the FYR process, interviews were sought to document any perceived problems or successes with the remedy, to include any land use changes that may have occurred. Interviews were sought from the current Site owners and the State regulatory agency. One response was received from the President of Honor Foods, a current Site owner. The questionnaire is provided in **Appendix E** and summarized below. To date, no other responses have been received.

Honor Foods purchased 20-acres of the Site in the fall of 2019, with plans of an October 2020 occupancy. The company plans to relocate its current warehouse to the Site which will provide more warehouse capacity to grow their Foodservice distribution business. The President of Honor Foods is unaware of any community concerns regarding the Site, or any complaints/violations/other incidents related to the Site that would have required a response by their office.

4.3 Data Review

A data review was performed on the basis of the No Further Action decision. This included a search into the zoning records for the Site to ensure current commercial/industrial use. On 29 January 2020, information was sought using the City of Philadelphia Atlas Search Tool (<https://atlas.phila.gov/>). The Site is mapped in the Search Tool as Map Registry #113N110011, at 5501 Tacony Street, Philadelphia, Pennsylvania. According to the Atlas Search Tool, the Site is zoned I-2, Medium Industrial.

4.4 Site Inspection

A FYR site inspection was conducted by the USACE, Baltimore District on February 25, 2020. In attendance were Mr. Todd Beckwith, Ms. Kimberly Berg and Mr. Kyle Parker from the USACE. The purpose of the inspection was to assess the protectiveness of the remedy. Photos from the site inspection are included in **Appendix F**.

During the site inspection access to the FFA Area I was limited. The roadway leading to the southern boundary of Area I, owned by the City of Philadelphia, was locked and gated. This roadway leads to the Frankford Boat Launch which is currently closed for the season. The majority of Area I is actively under construction to build the Honor Foods warehouse. The Site is gated, and access to the area under construction is monitored by a security guard. No issues were identified during the site inspection that would call into question the use of the Site for commercial/industrial purposes.

5 TECHNICAL ASSESSMENT

5.1 QUESTION A: Is the remedy functioning as intended by the decision documents?

Yes, the remedy for FFA Area I is functioning as intended by the DD. There have been no land use changes at the FFA, Area I which would call into question the protectiveness of the remedy.

5.2 QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Yes, the exposure assumptions and toxicity data used at the time of the remedy selection are still valid. Changes in the toxicity values for the contaminants of potential concern identified in the DD are presented in **Table 3**. Between the Baseline Risk Assessment performed in March 2014 and November 2019, toxicity values changed for seven compounds: benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. The inhalation unit risk (IUR) values for all of these compounds became less stringent, while the inhalation reference concentration (RfCi) and oral reference dose (RfDo) for benzo(a)pyrene became more stringent. Additionally, within this timeframe the recommended exposure value for adult body weight became less stringent increasing from 70 kilograms (kg) to 80 kg. Risk assessments are based upon a number of conservative assumptions, and the identified revisions to both exposure and toxicity factors have not changed sufficiently to affect the protectiveness of the remedy.

No land use changes or changes in the reasonable maximum exposure (RME) receptors detailed in the June 2015 DD were identified during this FYR which would call into question the protectiveness of the remedy. No Further Action was selected as the final remedy for Area I soils, therefore, no remedial action objectives (RAOs) or cleanup levels are associated with the selected remedy.

5.3 QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No, no other information was discovered during this review that would call into question the protectiveness of the remedy.

6 ISSUES/RECOMMENDATIONS

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:

FFA Area I Soils

7 PROTECTIVENESS STATEMENT

Protectiveness Statement		
<i>Operable Unit:</i> FFA Area I Soils	<i>Protectiveness Determination:</i> Protective	<i>Planned Addendum Completion Date:</i> NA
<i>Protectiveness Statement:</i> The remedy at the FFA Area I is protective of human health and the environment. No changes in the land use at the FFA, Area I or changes in the risk assessment methodology have occurred during the time period of this review which would call into question the protectiveness of the remedy.		

8 NEXT REVIEW

The next five-year review report for Area I at the FFA is required five years from the completion date of this review.

9 REFERENCES

- Cabrera Services. 2009a. *Final Engineering Evaluation/Cost Analysis Report, Area I, Former Frankford Arsenal, Philadelphia, Pennsylvania*. September.
- Cabrera Services. 2009b. *Final Action Memorandum, Area I Former Frankford Arsenal, Philadelphia, Pennsylvania, FUDS Site ID: C03PA004201*. September.
- Cabrera Services. 2013. *Final Interim Removal Action Completion Report, Containerized (CON)/Hazardous, Toxic, and Radioactive Waste (HTRW) for the Interim Removal Action (IRA)*. Former Frankford Arsenal, FUDS Site ID: C03PA004201, Philadelphia, Pennsylvania. August.
- Cabrera Services. 2014. *Final Area I Soil Remedial Investigation/Risk Assessment Report*. Former Frankford Arsenal, Philadelphia, Pennsylvania.
- U.S. Army Corps of Engineers (USACE), 2015. *Final Former Frankford Arsenal Area I Soils Proposed Plan*. January.
- USACE Baltimore District. 2015. *Final Former Frankford Arsenal Area I Soils Decision Document*. June.

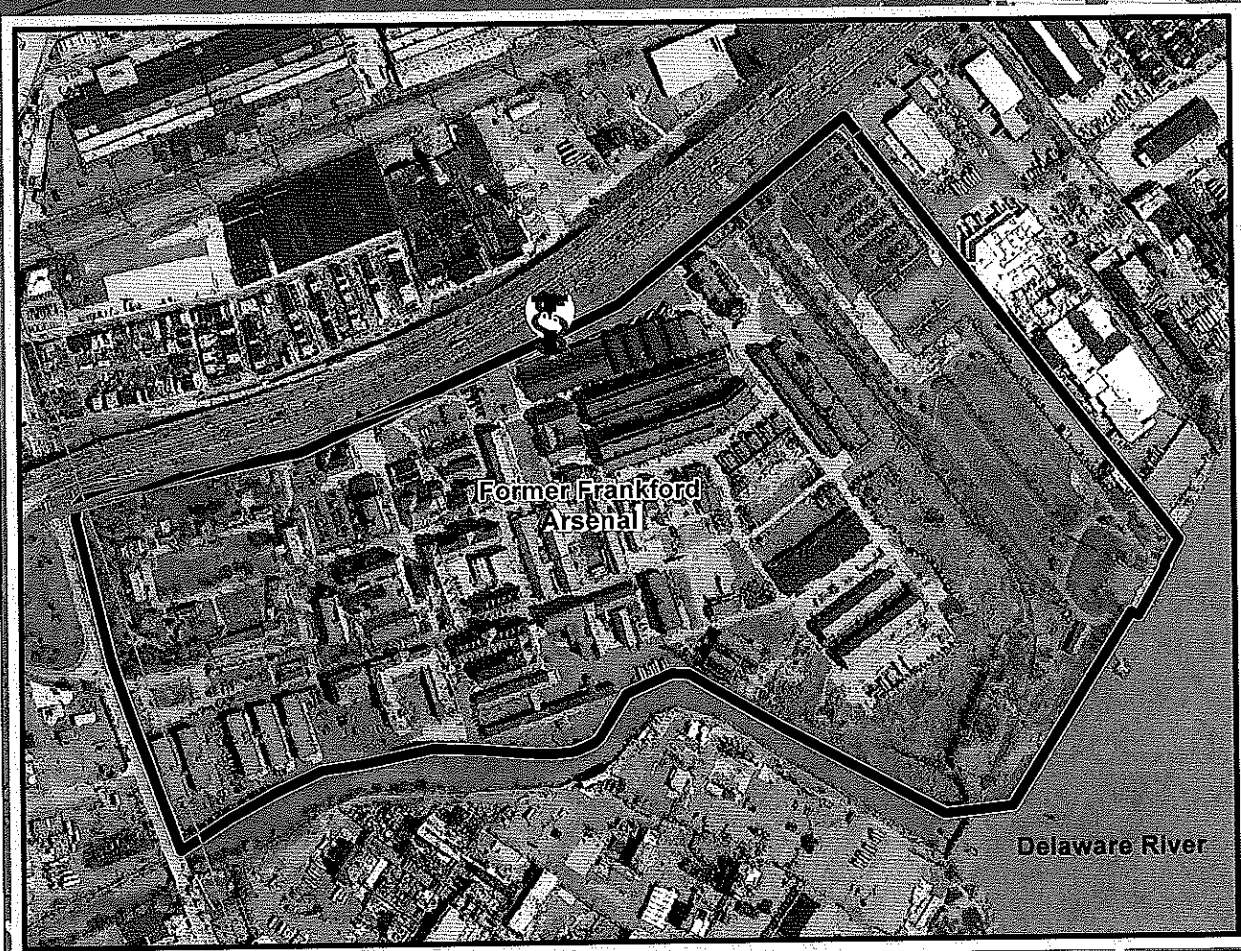
APPENDIX A
FIGURES

Pennsylvania

Maryland

Wilmington

Delaware



Former Frankford Arsenal

Delaware River



Legend

Original Frankford Arsenal Boundary

Waterbodies

Buildings

Existing FFA Building

Demolished FFA Building

Outside FFA Area

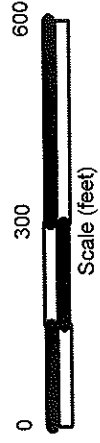
Phase Area Designations

Area I (FFA Hankin)

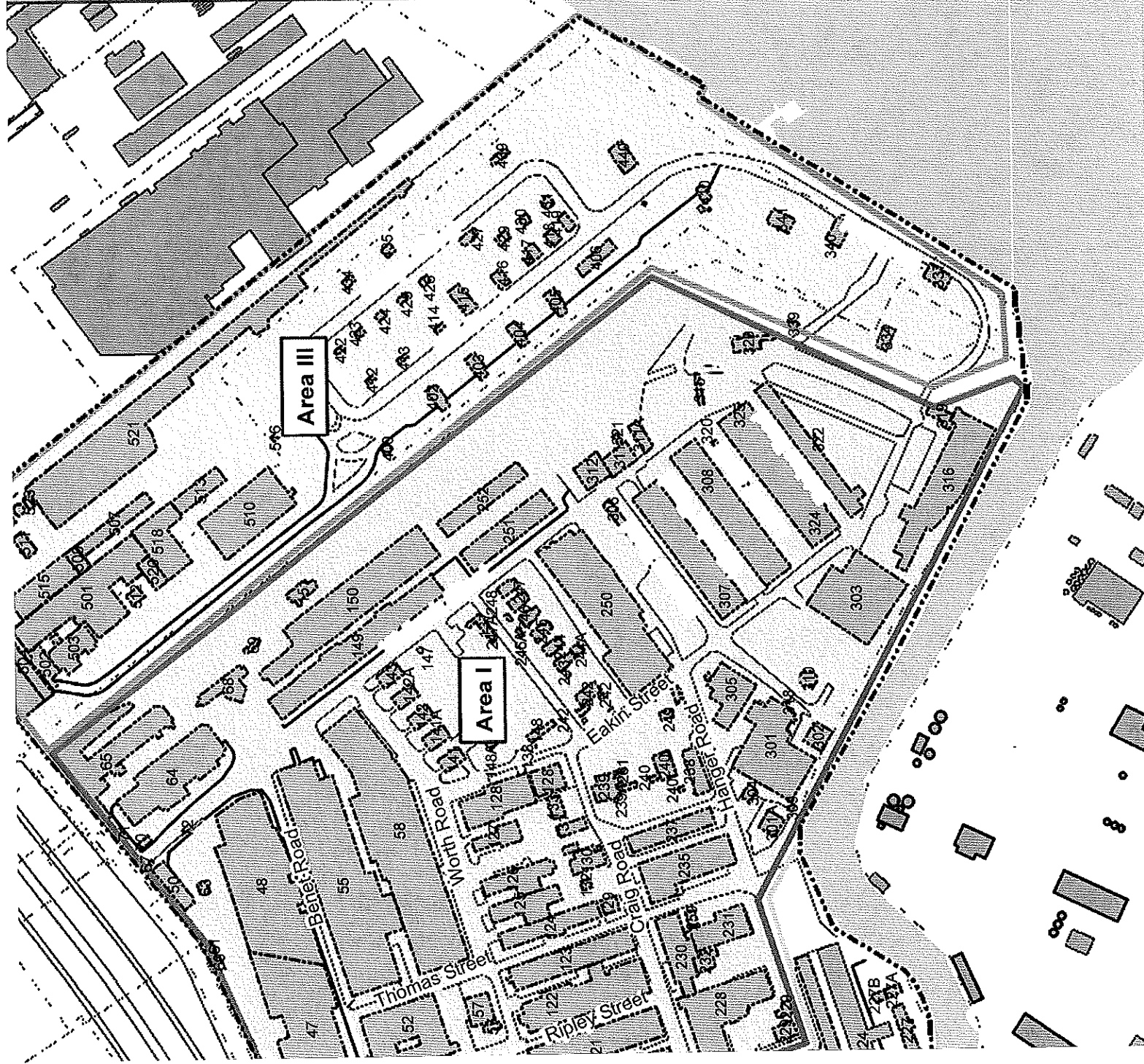
Area II (FFA Hankin)

Area III

Other Property Boundaries

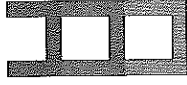


FORMER FRANKFORD ARSENAL
LAYOUT MAP



Area I Boundary

Property Boundary



City of Philadelphia

Dietz & Watson

PIDC

Buildings

Existing FFA Building

Demolished FFA Building

Outside FFA Area

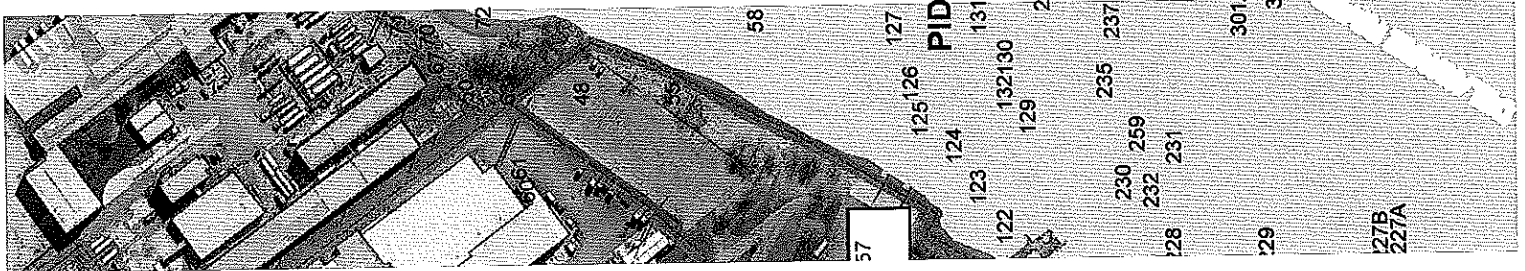
Waterbodies

0 400 800

Scale (feet)

FORMER FRANKFORD ARSENAL
AREA I AND AREA III PROPERTY CHANGES

DECISION DOCUMENT
FORMER FRANKFORD ARSENAL



504

505

504

502

503

501

509

512

520

518

513

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149

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143

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142A

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141A

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148A

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City of Philadelphia

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APPENDIX B
TABLES

Table 1: Area of Concern Summary

AOC	Former Frankford Arsenal Building	Site Constituents	Final Status
1/1	47	VOCs	2009-2013 Interim Removal No remaining exceedances
2/2	47	VOCs	2009-2013 Interim Removal No remaining exceedances
3/3	47/48	VOCs	2009-2013 Interim Removal No remaining exceedances
4/4	64	PCBs	2009-2013 Interim Removal No remaining exceedances
5/5	127-128	Arsenic, chromium, lead, mercury	2009-2013 Interim Removal Remaining exceedances due to arsenic MSC*
6/6	128	Arsenic	2009-2013 Interim Removal Remaining due to arsenic
7/7	149-150	VOCs, SVOCs, arsenic	2009-2013 Interim Removal Remaining exceedances due to arsenic
8/8	237	PCBs	2009-2013 Interim Removal Remaining exceedances due to existing foundations or arsenic
9/9	301	Arsenic, PCBs	Urban fill, depth 1-2 feet, acceptable risk**
10/10	Landfill (MW-3)	Arsenic, chromium, lead, VOCs	Contamination below groundwater table; address in Area IV (Groundwater) RI
11/11	141-143/ Compound Area	Arsenic	2009-2013 Interim Removal Remaining exceedances due to arsenic
12/12	231	Lead, mercury	2009-2013 Interim Removal Remaining exceedances below groundwater table; address in Area IV RI

Table 1: Area of Concern Summary (Continued)

AOC	Former Frankford Arsenal Building	Site Constituents	Final Status
13/13	125-126	PCE	Remaining exceedances below table; address under Area IV RI
14/14	55-58	Arsenic, PCBs, VOCs	Remaining exceedances below table; address under Area IV RI
15/15	324	Arsenic; chromium, lead	Remaining exceedances below table; address under Area IV RI
16/16	46	TCE	Remaining exceedances below table; address under Area IV R
58 Leaking Sump (discovered during building demolition)		PCBs, SVOCs, VOCs	2009-2013 Interim Removal Remaining exceedances below g table; address under Area IV RI
Building 47 Oil/Water Separator (discovered during building demolition)		PCBs, VOCs	2009-2013 Interim Removal No remaining exceedances
Building 48 USTs (discovered during building demolition)		SVOCs, VOCs	2009-2013 Interim Removal No remaining exceedances

Table 1: Area of Concern Summary (Continued)

AOC	Former Frankford Arsenal Building	Site Constituents	Final Status
Building 44/47 Tank Pit (2008 CON/HTRW UST removal)		Lead, PCBs	2009-2013 Interim Removal Remaining exceedances below groundwater table; address in Area IV RI
Building 128 transformer pad		PCBs	2009-2013 Interim Removal No remaining exceedances

* In 2011, the PADEP MSC for arsenic was reduced to 29 mg/kg surface/subsurface from 53mg/kg surface/150 mg/kg subsurface.

**Based upon initial risk assessment performed with 2008 Data Gap samples.

Table 2: Summary of Constituents of Potential Concern

METAL COPCs
ALUMINUM
ANTIMONY
ARSENIC
CHROMIUM
COBALT
COPPER
LEAD
MANGANESE
MERCURY
VANADIUM
VOC COPCs
BENZENE
CARBON TETRACHLORIDE
CHLOROFORM
TETRACHLOROETHENE
TRICHLOROETHENE
SVOC COPCs
BENZO(A)ANTHRACENE
BENZO(A)PYRENE
BENZO(B)FLUORANTHENE
BENZO(K)FLUORANTHENE
CHRYSENE
DIBENZO(A,H)ANTHRACENE
INDENO(1,2,3-CD)PYRENE
NAPHTHALENE
PCB COPCs
AROCLOR 1254
AROCLOR 1260

Table 3: Toxicity Table

Chemical COPCs	Toxicity Values												Change				
	Cancer						Non-Cancer										
	IUR (ug/m ³) ⁻¹		SfO (mg/kg-day) ⁻¹		RfC (mg/m ³)		RfD _c (mg/kg-day)		RfD _n (mg/kg-day)								
	May-13	Nov-19	May-13	Nov-19	May-13	Nov-19	May-13	Nov-19	May-13	Nov-19	May-13	Nov-19					
Aluminum																	
Antimony																	
Arsenic	4.3E-03	4.3E-03	1.5E+00	1.5E+00	1.5E-05	1.5E-05	1.5E-05	1.5E-05	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04
Chromium VI	8.4E-02	8.4E-02	5.0E-01	5.0E-01	1.0E-04	1.0E-04	1.0E-04	1.0E-04	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03
Cobalt	9.0E-03	9.0E-03			6.0E-06	6.0E-06			3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04
Copper									4.0E-02	4.0E-02	4.0E-02	4.0E-02	4.0E-02	4.0E-02	4.0E-02	4.0E-02	4.0E-02
Manganese					5.0E-05	5.0E-05			2.4E-02	2.4E-02	2.4E-02	2.4E-02	2.4E-02	2.4E-02	2.4E-02	2.4E-02	2.4E-02
Mercury					3.0E-04	3.0E-04			3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04	3.0E-04
Nickel	2.6E-04	2.6E-04			9.0E-05	9.0E-05			2.0E-02	2.0E-02	2.0E-02	2.0E-02	2.0E-02	2.0E-02	2.0E-02	2.0E-02	2.0E-02
Vanadium					1.0E-04	1.0E-04			5.0E-03	5.0E-03	5.0E-03	5.0E-03	5.0E-03	5.0E-03	5.0E-03	5.0E-03	5.0E-03
Zinc									3.0E-01	3.0E-01	3.0E-01	3.0E-01	3.0E-01	3.0E-01	3.0E-01	3.0E-01	3.0E-01
Benzene	7.8E-06	7.8E-06	5.5E-02	5.5E-02	3.0E-02	3.0E-02			4.0E-03	4.0E-03	4.0E-03	4.0E-03	4.0E-03	4.0E-03	4.0E-03	4.0E-03	4.0E-03
Carbon Tetrachloride	6.0E-06	6.0E-06	7.0E-02	7.0E-02	1.0E-01	1.0E-01			4.0E-03	4.0E-03	4.0E-03	4.0E-03	4.0E-03	4.0E-03	4.0E-03	4.0E-03	4.0E-03
Chloroform	2.3E-05	2.3E-05	3.1E-02	3.1E-02	9.8E-02	9.8E-02			1.0E-02	1.0E-02	1.0E-02	1.0E-02	1.0E-02	1.0E-02	1.0E-02	1.0E-02	1.0E-02
Tetrachloroethylene (PCE)	2.6E-07	2.6E-07	2.1E-03	2.1E-03	4.0E-02	4.0E-02			6.0E-03	6.0E-03	6.0E-03	6.0E-03	6.0E-03	6.0E-03	6.0E-03	6.0E-03	6.0E-03
Trichloroethylene (TCE)	4.1E-06	4.1E-06	4.6E-02	4.6E-02	2.0E-03	2.0E-03			5.0E-04	5.0E-04	5.0E-04	5.0E-04	5.0E-04	5.0E-04	5.0E-04	5.0E-04	5.0E-04
Benz[a]anthracene	1.1E-04	6.0E-05	7.3E-01	7.3E-01													
Benzo[a]pyrene	1.1E-03	6.0E-04	7.3E+00	7.3E+00													
Benzo[b]fluoranthene	1.1E-04	6.0E-05	7.3E-01	7.3E-01													
Benzo[k]fluoranthene	1.1E-04	6.0E-06	7.3E-02	7.3E-02													
Chrysene	1.1E-05	6.0E-07	7.3E-03	7.3E-03													
Dibenz[ah]anthracene	1.2E-03	6.0E-04	7.3E+00	7.3E+00													
Indeno[1,2,3-cd]pyrene	1.1E-04	6.0E-05	7.3E-01	7.3E-01													
Naphthalene	3.4E-05	3.4E-05															
Aroclor 1254	5.7E-04	5.7E-04	2.0E+00	2.0E+00													
Aroclor 1260	5.7E-04	5.7E-04	2.0E+00	2.0E+00													

Notes:

- Toxicity values were obtained from the EPA Regional Screening Level (RSL) Tables, November 2019. <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>
- Highlighted values identify changes in the toxicity values from May 2013 to November 2019.
- Abbreviations:

ug = micrograms
m = meters
kg = kilograms
mg = milligrams
IUR = Inhalation Unit Risk
SfO = Oral Slope Factor
RfC = Inhalation Reference Concentration
RfD_c = Oral Reference Dose

APPENDIX C
COMMUNITY NOTIFICATION

Proof of Publication in The Philadelphia Daily News
Under Act. No 587, Approved May 16, 1929

STATE OF PENNSYLVANIA
COUNTY OF PHILADELPHIA

Helene Sweeney being duly sworn, deposes and says that **The Philadelphia Daily News** is a newspaper published daily, except Sunday, at Philadelphia, Pennsylvania, and was established in said city in 1925, since which date said newspaper has been regularly issued in said County, and that a copy of the printed notice of publication is attached hereto exactly as the same was printed and published in the regular editions and issues of the said newspaper on the following dates:

August 28, 2019

Affiant further deposes and says that she is an employee of the publisher of said newspaper and has been authorized to verify the foregoing statement and that she is not interested in the subject matter of the aforesaid notice of publication, and that all allegations in the foregoing statement as to time, place and character of publication are true.



Sworn to and subscribed before me this 28th day of
August 2019.

d

My Commission Expires:

C:OMMOHWELTHOFPENNSYLVANIA
NOTARIAL SIA1. '
CINDY JAKUBOWSKI, Notary Public
City Of Philadelphia, Phila, County
My Commission Expires November 30, 2020

Copy of Notice of Publication

Former Frankford Arsenal Formerly Used
Defenses Bldg (FUDS)
Notification of Five - Year Review

The U.S. Army Corps of Engineers is conducting its first Five-Year Review for Area 1 at the former Frankford Arsenal in Philadelphia, Pennsylvania. The purpose of a Five-Year Review is to determine whether the remedial actions remain protective of human health and the environment at sites where hazardous substances, pollutants, or contaminants remain. In addition, the Five-Year Review will make recommendations to address any issues if they are identified during the review.

The Frankford Arsenal started operating as an arsenal in 1816. A wide variety of ordnance-related activities took place over the years including the development of artillery and infantry equipment, producing loading of musket and rifle powder and manufacturing of small arms and ammunition, and many other years search and development initiatives. The arsenal was closed in 1977.

To improve efficiency with the clean-up activities at the former Frankford Arsenal, the Corps of Engineers divided the site into four active projects (Area 1, Area 2, Area 3, and Groundwater). This Five-Year Review focuses on Area 1 soils where previous environmental investigations identified metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs). Based on soil removal activities previously completed over the years, the Corps of Engineers determined that No Further Action was necessary to protect human health or the environment in its 2015 Decision Document. However, since the selected remedy did not allow for unlimited use and unrestricted exposure, the Five-Year Review is being conducted to ensure the remedy remains protective.

After completion, estimated for July 2020, the Five-Year Review report will be available to the public online, along with other project documents and reports, at www.nab.usace.army.mil/frankford.

For information, the public is invited to attend a public meeting on August 28, 2019, at 10:00 AM in the meeting room at the address above. The meeting is being held for consideration as part of the Five-Year Review. Please contact Todd Beckwith, Project Manager, at 484-875-1111, ext. 4111, for more information.

APPENDIX D
COMMENT RESPONSES

Responses to Comments for the Draft Final First Five-Year Review Report for Former Frankford Arsenal Area I Soils Philadelphia, Pennsylvania (FUDS Property # C03PA004201)			
Response Code: A = Accepted/Concur D = Action Deferred N = Non-concur W = Withdrawn		USACE Response	PADEP Response Code
Comment Number	Commenter	Comment	USACE Response
TECHNICAL COMMENTS			
1	PADEP	Section 1.1.1 indicates that there are no surface water features on the Site. The Five-Year Review (FYR or report) should indicate how the site is drained. The report should also state whether any construction discharge permits were obtained for the redevelopment work and if these permits considered the known soil contamination?	N
2	PADEP	Please indicate how soil was managed during the redevelopment process to avoid onsite and offsite exposures.	N
3	PADEP	Are any institutional or engineering controls in place? If so, please indicate what documentation is present outlining those controls, their maintenance, testing, and demonstration of effectiveness.	N
4	PADEP	The report should indicate whether or not uncharacterized soils (i.e., soils beneath former building slabs) have been exposed during the redevelopment activities.	N
5	PADEP	At AOC-5 the Decision Document (DD) indicates that additional planned excavation could not be completed due to concerns related to building stability. Please indicate how were these soils managed during demolition and construction activities?	N

Responses to Comments for the

**Draft Final First Five-Year Review Report for Former Frankford Arsenal Area I Soils
Philadelphia, Pennsylvania (FUDS Property # C03PA004201)**

Response Code: A = Accepted/Concur D = Action Deferred N = Non-concur W = Withdrawn

Comment Number	Commenter	Comment	USACE Response	PADEP Response Code
6	PADEP	The report should any exposure assumptions that changed as a result of the demolition and construction that have taken place since the Decision Document (DD) was issued.	As identified in Section 2.2 of the FYR report, the human health risk assessment performed as part of the RI evaluated potential exposure to surface and subsurface soil COPCs for four reasonable maximum exposure (RME) receptors: industrial/commercial worker, construction worker, utility worker, and maintenance worker. There have been no changes to the RME receptors as a result of the demolition activities.	N
7	PADEP	Was dewatering needed to support construction activities? If so, please provide information regarding how the water was managed.	The purpose of a FYR is to evaluate the implementation and performance of a remedy in order to determine if the remedy is or will be protective of human health and the environment. The focus of this FYR is to evaluate the No Further Action decision at the FFA for Area I soils. Dewatering needs during the construction activities were not evaluated during this review.	N
8	PADEP	Was the Site accessed during the visit? All photos appear to be from outside the Site boundary and construction fencing. The report should indicate whether the property was accessed for the inspection. At the next FYR, DEP would like to participate in the site visit.	Noted. Access to the Site is discussed in Section 4.4 of the FYR report. Access to the FFA Area I was limited. The roadway leading to the southern boundary of Area I, owned by the City of Philadelphia, was locked and gated. The majority of Area I is actively under construction to build the Honor Foods warehouse. The Site is gated, and access to the area under construction is monitored by a security guard. USACE initially coordinated with the Property Manger and construction team to gain access to the site, however due to the weather conditions, the crew was not on-site to provide access. Despite the limited access, as noted in the FYR report, no issues were identified during the site inspection that would call into question the protectiveness of the remedy.	N
9	PADEP	Section 5.1 states that there have been no land use changes since the DD was issued, however, elsewhere in the FYR construction of warehouses at Dietz and Watson and ongoing warehouse construction by Honor Foods are discussed. These changes are consistent with future land uses identified in the DD but should be noted as changes in the technical assessment and evaluated in a supplemental risk assessment during the next FYR cycle.	Changes to the land use of the Site is discussed in Section 1.1.2 of the FYR report. The existing/planned usage of the Site by the current owners are industrial and commercial in nature. The risk assessment performed as part of the RI evaluated potential exposure to surface and subsurface soil COPCs for four reasonable maximum exposure (RME) receptors: industrial/commercial worker, construction worker, utility worker, and maintenance workers.	N

Responses to Comments for the

**Draft Final First Five-Year Review Report for Former Frankford Arsenal Area I Soils
Philadelphia, Pennsylvania (FUDS Property # C03PA004201)**

Response Code: A = Accepted/Concur D = Action Deferred N = Non-concur W = Withdrawn

Comment Number	Commenter	Comment	USACE Response	PADEP Response Code
10	PADEP	Vapor intrusion into structures built since issuance of the DD was issued should be evaluated.	Vapor intrusion is being evaluated under the Area IV, Site-wide Groundwater. Based on discussions with the Contractor and Groundwater impacts at Area I, vapor intrusion was considered as part of the building design. The Developer plans to install a vapor barrier beneath the entire footprint of the building. Specific details of vapor mitigation at the Site were discussed with Pam Trowbridge prior to implementation.	N
11	PADEP	The 2014 risk assessment did not evaluate indoor air and the FYR should account for the current land use. In addition, the site risk assessment should accurately represent the cumulative risk profile to include contributions to exposure to residual soil and groundwater impacts. DEP recommends evaluating these VI risks cumulatively in the risk assessment associated with site-wide groundwater, and in the supplemental risk assessment described above.	The Section 7.4.6 of the RI report provides a discussion of the vapor intrusion screening process performed for Area I Soils. However, as noted in Comment #10 vapor intrusion is being evaluated under the Area IV, Site-wide Groundwater. In accordance with DoD Policy (DoDM 4715.20), when there are no existing structures overlaying or near the potential vapor intrusion pathway the DoD Component should document the potential vapor intrusion risk and provide notice of the potential vapor intrusion risk to non-DoD property owners in writing. USACE notified the property owner of the potential VI risk, and VI was considered as part of the building design.	N
12	PADEP	Section 5.2 states that toxicity data used at the time of the DD remain valid. Since certain toxicity values have become more stringent during the period, impacts of these changes to cumulative risk can be included in the supplemental risk assessment.	Changes in RSL toxicity values for the COPCs identified in the DD are presented in Table 3 of the FYR report and further discussed in Section 5.2.	N
13	PADEP	Is the commercial/industrial worker reasonable maximum exposure (RME) scenario still appropriate, since construction/utility work was ongoing at the time of the FYR visit and may take place in the future?	The exposure scenarios evaluated in the 2014 RI as part of the HHPA evaluated exposure scenarios for the industrial/commercial worker, construction worker, utility worker, and maintenance worker. Therefore, as the construction scenario was evaluated in the RI, there is no change to the protectiveness of the remedy.	N

Responses to Comments for the

**Draft Final First Five-Year Review Report for Former Frankford Arsenal Area I Soils
Philadelphia, Pennsylvania (FUDS Property # C03PA004201)**

Response Code: A = Accepted/Concur D = Action Deferred N = Non-concur W = Withdrawn

Comment Number	Commenter	Comment	USACE Response	PADEP Response Code
14	PADEP	<p>Table 1 AOC Summary – General Comments:</p> <ul style="list-style-type: none"> * The 2013 RI was reviewed for the site and there seem to be data gaps for the outlined AOCs. * Overall, it is recognized that some areas are no longer accessible. * The statement that no remaining exceedances exist is misleading and indicates the absence of residual impacts. Residual impacts likely exist, for example – At building 47, the soil exceedances documented in May 2012, for VOCs were at shallow depths and along the perimeter of what was characterized, indicating additional lateral delineation was needed. Additionally, deeper samples do not appear to have been collected where shallow (0-2') impacts were present (47-CS-101-P01 1ft for example) resulting in a potential concern that vertical characterization is incomplete. * The depth of excavation is not clear for the AOCs. 	<p>The RI for the FFA Area I Soils addresses the nature and extent of contamination. The RI risk assessment was comprised of data from both the remaining elevated soil sample locations and IRA confirmatory sample results. The results of the baseline risk assessment were the basis for the No Further Action decision in which PADEP provided their concurrence. Table 1 of the FYR report was meant to be a summary of the removal actions that were completed. Multiple removal actions were completed at the noted Building 47. As documented in the FFA Interim Removal Action Completion Report (Appendix C to the RI report), the VOC soil exceedances identified in the May 2012 confirmation samples were subsequently addressed during the October 2012 interim removal action in this area. Additional details for the AOCs, including depths of excavation, can be found in the IRA Completion Report.</p>	N
15	PADEP	<p>Potential data gaps noted above raise the concern that soil residual impacts are present in areas across the site and need to be accounted for as part of the supplemental risk assessment.</p>	<p>The data set used for the risk assessment was comprised of the data from both remaining elevated soil sample locations and IRA confirmatory sample results. PADEP provided concurrence with the RI report and the No Further Action Decision Document.</p>	N
16	PADEP	<p>Please clarify how AOC 9/9 Arsenic and PCB exceedances have been address through the initial risk assessment performed with 2008 data gap samples.</p>	<p>The exceedances at AOC 9/9 were evaluated in the baseline risk assessment performed as part of the RI. After all the removal actions were completed at Area I, a baseline risk assessment was performed on all the data collected from Area I (excluding the data from the removed soil). The arsenic and PCB results from AOC 9 were included in the arsenic and PCB data from across Area I; an EPC was calculated; and the risk characterization was completed. The results of this baseline risk assessment were the basis for the No Further Action decision in which PADEP provided their concurrence.</p>	N
17	PADEP	<p>In the supplemental risk assessment, please also refer to DEP's current VI guidance as well evaluate cumulative risk for both soil and groundwater impacts.</p>	<p>Vapor intrusion is being evaluated under the Area IV, Site-wide Groundwater. Based on discussions with the Contractor and groundwater impacts at Area I, vapor intrusion was considered as part of the building design. The Developer plans to install a vapor barrier beneath the entire footprint of the building.</p>	N

**Responses to Comments for the
Draft Final First Five-Year Review Report for Former Frankford Arsenal Area I Soils
Philadelphia, Pennsylvania (FUDS Property # C03PA004201)**

Response Code: A = Accepted/Concur D = Action Deferred N = Non-concur W = Withdrawn

Comment Number	Commenter	Comment	USACE Response	PADEP Response Code
18	PADEP	Please re-evaluate COCs with current standards. Vanadium is listed as a COC in Table 2, the standards significantly changed, and no comments were made to the effects of the changes. The supplemental risk assessment will need to account for all compounds that have residual concentrations above statewide health standards (SHSs). This may result in additional COCs.	The purpose of a FYR is to evaluate the implementation and performance of a remedy in order to determine if the remedy is or will be protective of human health and the environment. Changes in RSL toxicity values for the COCs identified in the DD are presented in Table 3 of the FYR report and further discussed in Section 5.2.	N

APPENDIX E
INTERVIEW QUESTIONNAIRE(S)

CERCLA Five Year Interview
Former Frankford Arsenal
Area I Soils
Philadelphia, Pennsylvania

The U.S. Army Corps of Engineers (USACE), Baltimore District is conducting the first Five – Year Review of the former Frankford Arsenal (FFA), Area I soils. The USACE determined that No Further Action is necessary to protect public health, welfare or the environment. However, because the selected remedy results in hazardous substances, pollutant, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure, a statutory Five - Year Review is conducted to ensure that the remedy remains protective of human health and the environment.

As a part of the Five – Year Review process, the USACE, Baltimore District requests your response to the following interview questions:

1. What is your overall impression of the project?
 - The project provided Honor Foods, a longstanding Phila. Business, a new home. Having purchased 20 acres from the city last fall, we are anticipating an October 2020 occupancy with more warehouse capacity to grow our Foodservice distribution business.

2. Are you aware of any community concerns regarding the Site or its operation and administration? If so, please give details.
 - No

3. Are you aware of any land use changes that have or may have occurred at the Site? If so, please give details.
 - As noted above, Honor Foods will relocate its current warehouse (that is expansion constrained) to this site this fall.

4. Have there been any complaints, violations, or other incidents related to the Site requiring a response by your office? If so, please give details of the events and results of the responses.
 - No

5. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

- No

6. Do you feel well informed about the Site's activities and progress?

- Yes

7. Do you have any comments, suggestions, or recommendations regarding the Site (i.e., design, construction documents, constructability, management, regulatory agencies, etc.)?

- No

Name: [REDACTED]

Title: President Honor Foods

Date: 2/13/2020

Contact Information (Office address, E-mail and Phone number):

[REDACTED]

[REDACTED]

[REDACTED]

APPENDIX F
SITE INSPECTION PHOTOGRAPHS



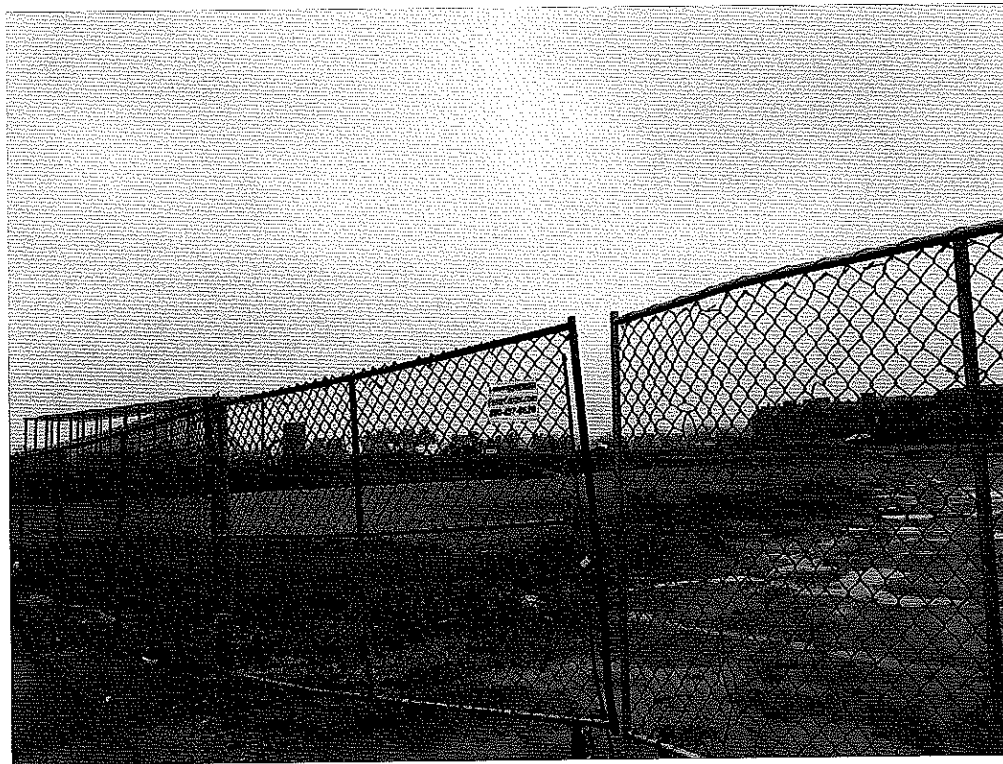
Photograph 1 – Entrance to Frankford Boat Launch



Photograph 2 – Bio retention basin on the southern portion of Area I



Photograph 3 – Former Frankford Arsenal Area I facing west



Photograph 4 – Former Frankford Arsenal Area I facing southwest



Photograph 5 – Former Frankford Arsenal Area I facing east



Photograph 6 – Former Frankford Arsenal Area I facing northwest