

RELATIVE RISK SITE EVALUATION



Biddle ANG Base (Horsham AGS), Pennsylvania

Introduction

The Department of Defense (DoD) identified certain per- and polyfluoroalkyl substances (PFAS) as emerging contaminants of concern which affected installations across the Air Force. When the term "Air Force" is used in this fact sheet, it includes Air National Guard. Specifically, perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and perfluorobutanesulfonic acid (PFBS) are components of legacy Aqueous Film Forming Foam (AFFF) that the Air Force began using in the 1970s as a firefighting agent to extinguish petroleum fires. The U.S. Environmental Protection Agency (EPA) issued lifetime drinking water Health Advisories (HA) for PFOS and PFOA, and health-based regional screening levels for PFBS.

The Air Force has systematically evaluated potential AFFF releases on all Installations and former Installations. It began with the Preliminary Assessments, or PAs, that identified potential release areas. First responders, fire chiefs, and hangar staff were interviewed to determine where a release or a spill may have occurred on an Installation (for example, aircraft crash site or an accidental hangar AFFF release). Once the information in the PA was collected, a Facility Investigation (FI) was initiated, to take soil and water samples and analyzed the media for PFAS compounds at the potential release areas. The intention of the FI was to determine if a release had occurred and to determine the impacts to soil and/or groundwater. The next step in the process is called the Relative Risk Site Evaluation, or RRSE, which is a tool used to sequence Sites/Installations to begin a Remedial Investigation, or RI. Air Force Installations are at the beginning of the more detailed investigative stage, the RI, to determine, where action is needed and to identify remedial technologies.

The Biddle ANG Base (Horsham AGS) PFAS PA and SI can be found at the Air Force CERCLA Administrative Record (AR): <u>https://ar.afcec-cloud.af.mil/</u> Scroll to the bottom of the page and click on "Continue to site", then select Air National Guard (e.g., Active, ANG, BRAC), scroll down the Installation List and click on Biddle ANG Base (Horsham AGS), PA then enter the AR Number 467649 in the "AR #" field for the PA. For the FI, enter the AR Number 5574338. Then click "Search" at the bottom of the page. Click on the spy glass to view the document.

More information on the Air Force response to PFOS and PFOA can be found at: <u>https://www.afcec.af.mil/WhatWeDo/Environment/Perfluorinated-Compounds/</u>

Acronyms

PFAS - Per-and polyfluoroalkyl substances

AFFF - Aqueous Film Forming Foam	PFBS – Perfluorobutanesulfonic acid	
AST – Aboveground Storage Tank	PFOS - Perfluorooctane sulfonate	
CERCLA - Comprehensive Environmental Response, Compensation, and	PFOA - Perfluorooctanoic acid	
	RCRA – Resource Conservation and Recovery Act	
CHF – Contaminant Hazard Factor	RF – Receptor Factor RI – Remedial Investigation	
DoD - Department of Defense		
EPA – US Environmental Protection Agency	RRSE – Relative Risk Site Evaluation	
FTA – Fire Training Area	PRL - Potential Release Location	
HA – Health Advisory	FI – Facility Investigation	
MPF – Migration Pathway Factor	SWMU – Solid Waste Management Unit	
PA – Preliminary Assessment		





Q. What is the Relative Risk Site Evaluation (RRSE)?

A. RRSE is a methodology to sequence environmental restoration work used by the Department of Defense (DoD). The RRSE process is used to evaluate the relative risk posed by an environmental restoration site in relation to other sites. The DoD fundamental premise in site prioritization is "worst first," meaning the DoD Component shall address sites that pose a relatively greater potential risk to public safety, human health, or the environment before sites posing a lesser risk. Relative risk is not the sole factor in determining the sequence of environmental restoration work, but it is an important consideration in the priority setting process. The methodology is described in the DoD, Relative Risk Site Evaluation Primer, Summer 1997 Revised Edition: https://denix.osd.mil/references/dod/ policy-quidance/relative-risk-site-evaluation-primer/

Q. What is the RRSE framework?

A. The RRSE framework provides a DoD-wide approach for evaluating the relative risk to human health and the environment posed by contamination present at sites. The Relative Risk Site Evaluation Concept Summary (shown in the figure) illustrates the selection of sites, evaluation of the site data using three evaluation factors, and placement into high, medium, and low categories. The relative risk site evaluation framework is based on information fundamental to risk assessment: sources, pathways, and receptors to sequence restoration work. The RRSE is not a baseline risk assessment or health assessment in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. Regulators and public stakeholders in the environmental restoration process are provided the opportunity to participate in the process in accordance with the DoD Defense Environmental Restoration Program.



Sites at Each Installation

Q. What restoration sites are required to be evaluated in the RRSE process?

A. Restoration sites in CERCLA phases prior to remedy-in-place are evaluated in the process. Worksheets are developed for environmental media at each site. For consistency across all the Installations, only surface soil (0-1 foot deep) and groundwater media were evaluated in Ì. H the RRSE.

D The figure shows the process for a media to be evaluated using the contaminant hazard factor (CHF), the migration pathway factor (MPF), and the receptor factor (RF). Each media is scored to obtain a relative risk rating



of High, Medium, or Low. The highest media rating determines the Overall Site Category.

Q. How is the Contaminant Hazard Factor (CHF) determined?

A. The Contaminant Hazard Factor (CHF) is determined by dividing the maximum level for a contaminant at each site by the approved screening values (i.e., risk-based comparison values). Contaminant concentration ratios are totaled to arrive at a Contaminant Hazard Factor (CHF). A CHF sum of greater than 100 earns a Significant (High) ranking. Moderate (Medium) is when the total is 2 to 100. Minimal (Low) is when a CHF is less than two

FOR MORE INFORMATION

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Air Force Civil Engineer Center Environmental Restoration Program www.afcec.af.mil

> **AFCEC CERCLA** Administrative Record (AR) https://ar.afcec-cloud.af.mil.

> > POINT OF CONTACT **Bill Myer** (240) 612-7275 william.myer.2@us.af.mil

Q. How is the Migration Pathway Factor (MPF) determined?



A. The movement of contamination at a site is evaluated and assigned a Migration Pathway Factor (MPF) rating. Ratings for MPFs are designated as: evident, potential, or confined (for High, Medium, and Low). Evident exposure means the contamination is at a point where exposure to humans or the environment can occur, such as at a drinking water well. Potential ratings are given to sites where exposure may happen. A confined rating is given to sites where a low possibility for exposure may occur.

Q. How is the Receptor Factor (RF) determined?

A. The Receptor Factor (RF) is determined by a receptor's, such as humans, potential to come into contact with



contaminated media. RFs are designated as: identified, potential, or limited (High, Medium, and Low). Identified rating is given when receptors are in contact or threat of contact with contaminated media. Potential is given when receptor may contact contaminated media. Limited is given when there is little or no contact with contaminated media.

RELATIVE RISK SITE EVALUTION, cont.

Media Relative Risk Rating

Q. How is the media relative risk rating determined?

A. Use the chart to determine the relative risk rating for each media evaluated. Start by choosing the CHF result of the evaluation. If the CHF is Significant, use box 1.; if Moderate, use box 2.; if Minimal, use box 3. Then find the MPF and RF results and move to the square where the results meet. That square indicates the media relative risk rating. For example, if the CHF is Significant (go to box 1.), the MPF is Potential and the RF is Identified, then the rating is High (H).



Overall Site Category	Regulatory and Stakeholder Involvement	
Q. How do I determine the Overall Site Category ? A. The highest relative risk media rating becomes the Overall Site Category for the site. For example, if a site has a groundwater relative risk rating of High , and soil relative risk rating of Low , then the Overall Site Category rating for the site is High .	Q. How do I participate as Stakeholder? A. To offer opportunity to participate in RRSE, the Air Force announces a public comment period in your local newspaper. There is also opportunity to participate during installation Restoration Advisory Committees where active. Installation Restoration Advisory Committee meetings are also announced in your local newspaper.	
Relative Risk Site Evaluation Summary Biddle ANG Base (Horsham AGS).PA		

Overall Site Category	Site Name (Sites are shown on the map below) and RRSE Worksheets are attached)
HIGH	PRL 2, PRL 3, PRL 4, PRL 5, PRL 6, PRL 7, PRL 8, PRL 9, PRL 10, PRL 11, PRL 12, PRL 13
MEDIUM	None
LOW	None



Site Background Information					
Installation:	Biddle ANG Base (Horsham AGS)	Date:	08/26/2021		
Location (State):	Pennsylvania	Media Evaluated:	Groundwater, Soil		
Site Name and ID:	Privet Road Compound (Installation Restoration Program (IRP) SITE 1) -PRL-2	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A		
RPM's Name: Bill Myer Agreement Status (e.g., Federal Facility Agreement date signed): USEPA Administrative					
OVERALL SITE CATEGORY: HIGH					

	Site Summary				
Brief Site Description:	The former Privet Road Compound is located west of Privet Road in the south-central portion of Horsham Air Guard Station (AGS). The Privet Road Compound operated by the Navy between 1967 and 1975 and was used as an open disposal area where appreciable quantities of waste were burned and buried. The suspected waste handling area is estimated to include approximately 2 acres (TetraTech NUS 2002). The Privet Road Compound was placed on the National Priorities List (NPL) in 1995 and also labeled Navy IRP Site 01. At present the Privet Road site has been thoroughly renovated and the Armed Forces Reserve Center, constructed in 2010 and 2011, and adjacent stormwater detention basin now occupy the site. As part of the renovation and remedial actions, the Navy conducted a soil removal action of approximately 1,200 cubic yards of soils. The sewage sludge disposed of at the Privet Road Compound had the potential to contain perfluorochemicals (PFCs) due to historical releases of Aqueous Film Forming Foam (AFFF) in buildings containing floor drains and/or sumps that led to the former wastewater treatment plant (WWTP). In addition, since the Base supply wells contained elevated PFAS concentrations, all wastewater received at the former WWTP is expected to contain PFCs.				
Brief Description of Pathways:	The first occurrence of groundwater at Horsham AGS typically occurs between 5 and 20 feet below ground surface (BGS). Upon entering bedrock, groundwater is found in the bedding plane partings and cross-bed joints, in what is termed a leaky, multi-aquifer system, where shallow groundwater is largely unconfined but becomes progressively more confined down dip beneath successive layers of the fine-grained siltstones and, particularly, shales. Groundwater is unconfined in the shallower part of the aquifer and semi-confined or confined in the deeper part of the aquifer. Groundwater flows north in the southern portion of the base and to the northwest in the northern portion of the base. Soil samples were collected from a grassy area with exposed soils.				
Brief Description of Receptors:	Horsham AGS have operated potable supply wells on what is now the Horsham AGS. These wells operated and still operate at 100 gallons per minute or more. PFCs including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorobutane sulfonate (PFBS) have been detected in each of the on-site wells at varying concentrations. Offsite, several high-yield community water supply wells are operated by municipal water authorities. Three Warrington Township supply wells (#1, #2, and #6) are located 0.5 to 1 mile north of the Horsham AGS boundary; with PFOA/ PFOS detections of 0.24 micrograms per liter (µg/L) (#1) to 1.87 µg/L (#2), and 1.46 µg/L (#6). Five Horsham Water and Sewer Authority (HWSA) wells are located within approximately 1.25 miles of the Horsham AGS boundary. HWSA well #40 is approximately 0.75 mile northwest of the Stormwater Basin - all others are cross- or downgradient of the base. Maximum PFOA/PFOS concentrations at the HWSA wells range from 0.118 µg/L (#10) to 1.765 µg/L (#26). Clusters of private wells encircle the Horsham AGS and Naval Air Station (NAS)/ Joint Reserve Base (JRB) Willow Grove facilities. PFCs have been detected at varying concentrations in many of these private wells. In response to the detections, local townships have stopped use of the impacted wells and are also obtaining a portion of their demand from nearby water suppliers. Soil samples were collected from an area located within the base boundary, but is otherwise unrestricted.				

	Groundwater V	Vorksh	neet		
Installation: Biddle AN	G Base (Horsham AGS)				
Site ID: PRL-2	AFFF Release Area #: AFFF 2				
Contaminant	Maximum Concentration (ug/L)	Comparis	on Value (ug/L)	Ratios	
PFOS	1	2	0.04	300.0	
PFOA	1.	9	0.04	47.5	
PFBS	0.5	9	0.602	1.0	
CHF Scale	CHF Value	Contaminat	tion Hazard Factor (CHF)	348.5	
CHF > 100	H (High)		[Maximum Concentration of (Contaminant]	
100 > CHF > 2 2 > CHF	M (Medium)		[Comparison Value for Con	taminant]	
CHF Value		_	CHF VALUE	Н	
	Migratory Pathwa	y Factor			
Evident	Analytical data or direct observation indicates the to a point of exposure (e.g., well).	at contaminatio	n in the groundwater has moved	Н	
Potential	Contamination in the groundwater has moved be available to make a determination of Evident or	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined.			
Confined	Analytical data or direct observation indicates the source via groundwater is limited (possibly d controls).	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls).			
Migratory Pathway Factor	DIRECTIONS: Record the single highest value f value = H).	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).			
	Receptor Fac	ctor			
Identified	ed Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater).			Н	
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).				
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).				
Receptor Factor	DIRECTIONS: Record the single highest value f value = H).	rom above in th	e box to the right (maximum	Н	
			Groundwater Category	HIGH	

Soil Worksheet				
	0 Dece (Userberg 400)			
Site ID: PRI 2	G Base (Horsnam AGS) AFEE Release Area #: AFEE 2			
		O a man a mia d		Deties
		Compariso	on value (mg/kg)	
PFOA	0.02	7	0.120	0.2
PFBS	0.001	1	1.9	0.0
CHF Scale	CHF Value	Contamina	ation Hazard Factor (CHF)	0.2
CHF > 100	H (High)		[Maximum Concentration of (
100 > CHF > 2	M (Medium)	CHF = $\sum_{n=1}^{\infty}$		
2 > CHF	L (Low)		[Comparison value for Con	laminantj
CHF Value			CHF VALUE	L
	Migratory Pathwa	y Factor		
Evident	Analytical data or observable evidence that conta	mination is pre	sent at a point of exposure	
Potential	Contamination has moved beyond the source, co information is not sufficient to make a determinat	Contamination has moved beyond the source, could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined M		
Confined	Low possibility for contamination to be present at or migrate to a point of exposure			
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from value = H).	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		
	Receptor Fac	<u>tor</u>		
Identified	Receptors identified that have access to contamin	nated soil		
Potential	Potential for receptors to have access to contami	nated soil		М
Limited	No potential for receptors to have access to conta	aminated soil		
Receptor Factor	DIRECTIONS: Record the single highest value from value = H).	om above in the	e box to the right (maximum	М
			Soil Category	LOW

Site Background Information				
Installation:	Biddle ANG Base (Horsham AGS)	Date:	08/26/2021	
Location (State):	Pennsylvania	Media Evaluated:	Groundwater, Soil	
Site Name and ID:	Former WWTP/Treatment Mat - PRL-3	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A	
RPM's Name:	Bill Myer	Agreement Status (e.g., Federal Facility Agreement date signed):	USEPA Administrative Order RCRA 3008(H)	
OVERALL SITE CATEGORY: HIGH				

	Site Summary
Brief Site Description:	The former WWTP was located on the northeastern side of Horsham AGS on land acquired from the Navy. Prior to decommissioning, the WWTP received wastewater from NAS/JRB Willow Grove and what is now Horsham AGS. Potential AFFF releases at the Facility would be potentially conveyed to the WWTP. Influent wastewater had the potential to contain PFCs due to releases of AFFF to the sanitary sewer and also from PFAS contamination in the Base water supply. Treated effluent from the former WWTP was discharged to an outfall along the south shore of Park Creek immediately west of the bridge along County Line Road. Discharges to this outfall were monitored under a National Pollutant Discharge Elimination System (NPDES) permit; however, PFCs were not included in the analytical parameters of the permit. The former WWTP operations included a treatment mat located along the northern portion of the WWTP. The treatment mat was likely used for dewatering sewage sludge prior to landfilling.
Brief Description of Pathways:	The first occurrence of groundwater at Horsham AGS typically occurs between 5 and 20 feet below ground surface (BGS). Upon entering bedrock, groundwater is found in the bedding plane partings and cross-bed joints, in what is termed a leaky, multi-aquifer system, where shallow groundwater is largely unconfined but becomes progressively more confined down dip beneath successive layers of the fine-grained siltstones and, particularly, shales. Groundwater is unconfined in the shallower part of the aquifer and semi-confined or confined in the deeper part of the aquifer. Groundwater flows north in the southern portion of the base and to the northwest in the northern portion of the base. Soil samples were collected from a grassy area with exposed soils.
Brief Description of Receptors:	Horsham AGS have operated potable supply wells on what is now the Horsham AGS. These wells operated and still operate at 100 gallons per minute or more. PFCs including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorobutane sulfonate (PFBS) have been detected in each of the on-site wells at varying concentrations. Offsite, several high-yield community water supply wells are operated by municipal water authorities. Three Warrington Township supply wells (#1, #2, and #6) are located 0.5 to 1 mile north of the Horsham AGS boundary; PFOA/PFOS detections of 0.24 µg/L (#1) to 1.87 µg/L (#2), and 1.46 µg/L (#6). Five Horsham Water and Sewer Authority (HWSA) wells are located within approximately 1.25 miles of the Horsham AGS boundary. HWSA well #40 is approximately 0.75 mile northwest of the Stormwater Basin - all others are cross- or downgradient of the base. Maximum PFOA/PFOS concentrations at the HWSA wells range from 0.118 µg/L (#10) to 1.765 µg/L (#26). Clusters of private wells encircle the Horsham AGS and NAS/JRB Willow Grove facilities. PFCs have been detected at varying concentrations in many of these private wells. In response to the detections, local townships have stopped use of the impacted wells and are also obtaining a portion of their demand from nearby water suppliers. Soil samples were collected from an area located within the base boundary, but is otherwise unrestricted.

	Groundwate	er V	/orksh	eet	
Installation: Biddle AN	G Base (Horsham AGS)				
Site ID:PRL-3	AFFF Release Area #: AFFF 3	3			
Contaminant	Maximum Concentration (up	g/L)	Compariso	on Value (ug/L)	Ratios
PFOS		4.1		0.04	102.5
PFOA		0.52		0.04	13.0
PFBS		0.21		0.602	0.3
CHF Scale	CHF Value		Contaminat	ion Hazard Factor (CHF)	115.8
CHF > 100	H (High)			[Maximum Concentration of (Contaminant]
100 > CHF > 2	M (Medium)			[Comparison Value for Con	taminantl
2 > CHF	L (Low)				
CHF Value				CHF VALUE	н
	Migratory Pa	thway	Factor		
Evident	Analytical data or direct observation indica to a point of exposure (e.g., well).	ates that	contamination	in the groundwater has moved	н
Potential	Contamination in the groundwater has mo available to make a determination of Evide	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined.			
Confined	Analytical data or direct observation indica the source via groundwater is limited (post controls).	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls)			
Migratory Pathway Factor	DIRECTIONS: Record the single highest v value = H).	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).			Н
	Recepto	or Fact	or		
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater).			Н	
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).				
Limited	No known water supply wells downgradien drinking water source and is of limited bene	it and gr eficial us	oundwater is n se (Class III).	ot considered potential	
Receptor Factor	DIRECTIONS: Record the single highest v value = H).	alue fro	m above in the	box to the right (maximum	Н
				Groundwater Category	HIGH

	Soil Worksheet				
Installation: Biddle AN	G Base (Horsham AGS) AFFF Release Area # : AFFF 3				
Contaminant	Maximum Concentration (mg/kg)	Compariso	on Value (mg/kg)	Ratios	
PFOS	0.015	oompanoo	0.126	0.1	
PFOA	0.00085	5	0.126	0.0	
CHF Scale	CHF Value	Contamina	ation Hazard Factor (CHF)	0.1	
CHF > 100	H (High)		Maximum Concentration of (Contaminant]	
100 > CHF > 2	M (Medium)			tominontl	
2 > CHF	L (Low)		[Companson value for Con	taminantj	
CHF Value			CHF VALUE	L	
	Migratory Pathway	y Factor			
Evident	Analytical data or observable evidence that conta	mination is pre	esent at a point of exposure.		
Potential	Contamination has moved beyond the source, co information is not sufficient to make a determination	Contamination has moved beyond the source, could move but is not moving appreciably, or M nformation is not sufficient to make a determination of Evident or Confined.			
Confined	Low possibility for contamination to be present at	ow possibility for contamination to be present at or migrate to a point of exposure.			
Migratory Pathway Factor	/ay DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).			М	
	Receptor Fac	tor			
Identified	Receptors identified that have access to contamin	nated soil.			
Potential	Potential for receptors to have access to contami	Potential for receptors to have access to contaminated soil.			
Limited	No potential for receptors to have access to conta	aminated soil.			
Receptor Factor	DIRECTIONS: Record the single highest value fr value = H).	rom above in th	he box to the right (maximum	М	
			Soil Category	LOW	

Site Background Information				
Installation:	Biddle ANG Base (Horsham AGS)	Date:	08/26/2021	
Location (State):	Pennsylvania	Media Evaluated:	Groundwater, Soil	
Site Name and ID:	Hazardous Waste Storage Bldg, BLDG 633 - PRL-4	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A	
RPM's Name:	Bill Myer	Agreement Status (e.g., Federal Facility Agreement date signed):	USEPA Administrative Order RCRA 3008(H)	
OVERALL SITE CATEGORY: HIGH				

	Site Summary				
Brief Site Description:	Biddle ANG Base previously utilized Building 633 as a Hazardous Waste Central Storage Area. Waste was stored for less than 90 days before it was transported offsite. The preliminary assessment (PA) report did not discover evidence of improper waste storage; however, waste AFFF was occasionally shipped offsite for disposal. Building 633 has since been renovated and is currently utilized by Security Forces as an inspection station at the Biddle ANG Base entrance gate.				
Brief Description of Pathways:	The first occurrence of groundwater at Biddle ANG Base typically occurs between 5 and 20 feet below ground surface (BGS). Upon entering bedrock, groundwater is found in the bedding plane partings and cross-bed joints, in what is termed a leaky, multi-aquifer system, where shallow groundwater is largely unconfined but becomes progressively more confined down dip beneath successive layers of the fine-grained siltstones and, particularly, shales. Groundwater is unconfined in the shallower part of the aquifer and semi-confined or confined in the deeper part of the aquifer. Groundwater flows north in the southern portion of the base and to the northwest in the northern portion of the base.				
Brief Description of Receptors:	Horsham AGS have operated potable supply wells on what is now the Horsham AGS. These wells operated and still operate at 100 gallons per minute or more. PFCs including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorobutane sulfonate (PFBS) have been detected in each of the on-site wells at varying concentrations. Offsite, several high-yield community water supply wells are operated by municipal water authorities. Three Warrington Township supply wells (#1, #2, and #6) are located 0.5 to 1 mile north of the Horsham AGS boundary; PFOA/PFOS detections of 0.24 μ g/L (#1) to 1.87 μ g/L (#2), and 1.46 μ g/L (#6). Five Horsham Water and Sewer Authority (HWSA) wells are located within approximately 1.25 miles of the Horsham AGS boundary. HWSA well #40 is approximately 0.75 mile northwest of the Stormwater Basin - all others are cross- or downgradient of the base. Maximum PFOA/PFOS concentrations at the HWSA wells range from 0.118 μ g/L (#10) to 1.765 μ g/L (#26). Clusters of private wells encircle the Horsham AGS and NAS/JRB Willow Grove facilities. PFCs have been detected at varying concentrations in many of these private wells. In response to the detections, local townships have stopped use of the impacted wells and are also obtaining a portion of their demand from nearby water suppliers. Soil samples were collected from an area located within the base boundary, but is otherwise unrestricted.				

	Groundw	ater Wor	ksheet			
Installation: Biddle AN	G Base (Horsham AGS)					
Site ID: PRL-4	AFFF Release Area #: A	FFF 4				
Contaminant	Maximum Concentration	on (ug/L) Com	nparison Value (ug/L)	Ratios		
PFOS		2.5	0.04	62.5		
PFOA		1.5	0.04	37.5		
PFBS		0.15	0.602	0.2		
CHF Scale	CHF Value	Cont	amination Hazard Factor (CHF)	100.2		
CHF > 100	H (High)		IMaximum Concentration of C	Contaminantl		
100 > CHF > 2	M (Medium)	CH	$= \sum_{i=1}^{n} \sum_{j=1}^{n} \sum_$	aminant]		
2 > CHF	L (Low)		[Companson value for Com	amnang		
CHF Value			CHF VALUE	Н		
	Migrator	y Pathway Fac	tor			
Evident	Analytical data or direct observation indicates that contamination in the groundwater has moved H					
Potential	Contamination in the groundwater h available to make a determination o	as moved beyond th f Evident or Confine	ne source or insufficient information d.			
Confined	Analytical data or direct observation the source via groundwater is limiter controls).	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls)				
Migratory Pathway Factor	DIRECTIONS: Record the single hig value = H).	Н				
	Rec	ceptor Factor				
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA H					
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no k downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class or other beneficial use (e.g., agricultural).					
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).					
Receptor Factor	DIRECTIONS: Record the single hig value = H).	ghest value from abo	ove in the box to the right (maximum	Н		
			Groundwater Category	HIGH		

	Soil Worksheet					
Installation: Biddle ANG Site ID: PRL-4	G Base	e (Horsham AGS) AFFF Release Area # : AFFF 4				
Contaminant		Maximum Concentration (mg/kg)	Compariso	on Value (mg/kg)	Ratios	
PFOS		0.023		0.126	0.2	
CHF Scale		CHF Value	Contamina	ation Hazard Factor (CHF)	0.2	
CHF > 100		H (High)		[Maximum Concentration of	Contaminant]	
100 > CHF > 2		M (Medium)		[Comparison Value for Con	taminantl	
2 > CHF		L (Low)			intariniantj	
CHF Value				CHF VALUE	L	
		Migratory Pathway	/ Factor			
Evident	Anal	ytical data or observable evidence that contar	nination is pres	sent at a point of exposure.		
Potential	Cont infor	Contamination has moved beyond the source, could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.				
Confined	Low possibility for contamination to be present at or migrate to a point of exposure.					
Migratory Pathway Factor	DIRE value	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).				
		Receptor Fac	<u>tor</u>			
Identified	Rec	eptors identified that have access to contamir	nated soil.			
Potential	Potential for receptors to have access to contaminated soil.				М	
Limited	No p	potential for receptors to have access to conta	minated soil.			
Receptor Factor	DIR valu	ECTIONS: Record the single highest value from e = H).	om above in th	e box to the right (maximum	М	
				Soil Category	LOW	

Site Background Information				
Installation:	Biddle ANG Base (Horsham AGS)	Date:	08/26/2021	
Location (State):	Pennsylvania	Media Evaluated:	Groundwater, Soil	
Site Name and ID:	ANG Maintenance Hangar, Bldg 335 - PRL 5	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A	
RPM's Name:	Bill Myer	Agreement Status (e.g., Federal Facility Agreement date signed):	USEPA Administrative Order RCRA 3008(H)	
	OVERALL SITE	CATEGORY: HIGH		

	Site Summary				
Brief Site Description:	Building 335 was a former maintenance hangar and contained a fire suppression system that utilized AFFF. Two 1,200-gallon fiberglass aboveground storage tanks (ASTs) stored 3 percent AFFF solution. Two releases of approximately 150 gallons of 3 percent AFFF occurred in 2001, both of which were diverted to the WWTP via sanitary sewers. The AFFF system was reportedly shut down in 2009, but no documents regarding AFFF disposal were identified. At present, Building 335 is primarily utilized as an exercise facility, office space, and storage.				
Brief Description of Pathways:	The first occurrence of groundwater at Horsham AGS typically occurs between 5 and 20 feet below ground surface (BGS). Upon entering bedrock, groundwater is found in the bedding plane partings and cross-bed joints, in what is termed a leaky, multi-aquifer system, where shallow groundwater is largely unconfined but becomes progressively more confined down dip beneath successive layers of the fine-grained siltstones and, particularly, shales. Groundwater is unconfined in the shallower part of the aquifer and semi-confined or confined in the deeper part of the aquifer. Groundwater flows north in the southern portion of the base and to the northwest in the northern portion of the base. Soil samples collected from a grassy area near Building 335.				
Brief Description of Receptors:	Horsham AGS have operated potable supply wells on what is now the Horsham AGS. These wells operated and still operate at 100 gallons per minute or more. PFCs including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorobutane sulfonate (PFBS) have been detected in each of the on-site wells at varying concentrations. Offsite, several high-yield community water supply wells are operated by municipal water authorities. Three Warrington Township supply wells (#1, #2, and #6) are located 0.5 to 1 mile north of the Horsham AGS boundary; PFOA/PFOS detections of 0.24 µg/L (#1) to 1.87 µg/L (#2), and 1.46 µg/L (#6). Five Horsham Water and Sewer Authority (HWSA) wells are located within approximately 1.25 miles of the Horsham AGS boundary. HWSA well #40 is approximately 0.75 mile northwest of the Stormwater Basin - all others are cross- or downgradient of the base. Maximum PFOA/PFOS concentrations at the HWSA wells range from 0.118 µg/L (#10) to 1.765 µg/L (#26). Clusters of private wells encircle the Horsham AGS and NAS/JRB Willow Grove facilities. PFCs have been detected at varying concentrations in many of these private wells. In response to the detections, local townships have stopped use of the impacted wells and are also obtaining a portion of their demand from nearby water suppliers. Soil samples were collected from an area located within the base boundary, but is otherwise unrestricted.				

	Groundwat	ter W	/orksh	eet		
Installation: Biddle AN	G Base (Horsham AGS)					
Site ID: PRL-5	AFFF Release Area #: AFF	F 5				
Contaminant	Maximum Concentration	(ug/L)	Compariso	n Value (ug/L)	Ratios	
PFOS		12		0.04	300.0	
PFOA		2.2		0.04	55.0	
PFBS		2.7		0.602	4.5	
CHF Scale	CHF Value		Contaminati	on Hazard Factor (CHF)	359.5	
CHF > 100	H (High)			[Maximum Concentration of (Contaminant]	
100 > CHF > 2	M (Medium)			[Comparison Value for Con	ntaminant]	
2 > CHF	L (Low)				anmang	
CHF Value				CHF VALUE	н	
	Migratory I	Pathway	Factor			
Evident	Analytical data or direct observation ind to a point of exposure (e.g., well).	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well).				
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined.					
Confined	Analytical data or direct observation ind the source via groundwater is limited (pr controls).	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls).				
Migratory Pathway Factor	DIRECTIONS: Record the single higher value = H).	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).				
	Recep	tor Fact	tor			
ldentified	dentified Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater).				Н	
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).					
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).					
Receptor Factor	DIRECTIONS: Record the single highes value = H).	st value fro	om above in the	box to the right (maximum	Н	
				Groundwater Category	HIGH	

	Soil Worksheet					
Installation: Biddle AN Site ID: PRL-5	G Base (Horsham AGS) AFFF Release Area #: AFFF 5					
Contaminant	Maximum Concentration (mg/kg)	Comparise	on Value (mg/kg)	Ratios		
PFOS	0.00	8	0.126	0.1		
PFOA	0.001	1	0.126	0.0		
CHF Scale	CHF Value	Contamina	ation Hazard Factor (CHF)	0.1		
CHF > 100	H (High)		[Maximum Concentration of (Contaminant]		
100 > CHF > 2	M (Medium)		[Comparison Value for Con	taminant]		
2 > CHF	L (Low)			-		
CHF Value			CHF VALUE	L		
	Migratory Pathwa	y Factor				
Evident	Analytical data or observable evidence that conta	amination is pre	esent at a point of exposure.			
Potential	Contamination has moved beyond the source, co information is not sufficient to make a determinat	М				
Confined	Low possibility for contamination to be present at	Low possibility for contamination to be present at or migrate to a point of exposure.				
Migratory Pathway Factor	DIRECTIONS: Record the single highest value f value = H).	rom above in th	e box to the right (maximum	М		
	Receptor Fac	<u>ctor</u>				
Identified	Receptors identified that have access to contam	inated soil				
Potential	Potential for receptors to have access to contaminated soil					
Limited	No potential for receptors to have access to cont	taminated soil				
Receptor Factor	DIRECTIONS: Record the single highest value f value = H).	rom above in th	ne box to the right (maximum	Μ		
			Soil Category	LOW		

Site Background Information				
Installation:	Biddle ANG Base (Horsham AGS)	Date:	08/26/2021	
Location (State):	Pennsylvania	Media Evaluated:	Groundwater, Soil	
Site Name and ID:	Former ANG Fuel Systems BLDG 348 - PRL-6	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A	
RPM's Name:	Bill Myer	Agreement Status (e.g., Federal Facility Agreement date signed):	USEPA Administrative Order RCRA 3008(H)	
	OVERALL SITE (CATEGORY: HIGH		

	Site Summary
Brief Site Description:	Building 348 was a former fuel systems maintenance facility and contained an AFFF fire suppression system. The system included two 600-gallon AFFF ASTs. According to Facility personnel, a 1,000-gallon release of AFFF that occurred in 2006 was diverted to the Horsham AGS Stormwater Basin via the Base storm drains. The system was reportedly shut down in 2007, but no documents regarding AFFF disposal were identified. Prior to the site inspection (SI), Building 348 was thoroughly renovated and repurposed. As part of the renovation, the AFFF system and tanks were decommissioned and removed from the site.
Brief Description of Pathways:	The first occurrence of groundwater at Horsham AGS typically occurs between 5 and 20 feet below ground surface (BGS). Upon entering bedrock, groundwater is found in the bedding plane partings and cross-bed joints, in what is termed a leaky, multi-aquifer system, where shallow groundwater is largely unconfined but becomes progressively more confined down dip beneath successive layers of the fine-grained siltstones and, particularly, shales. Groundwater is unconfined in the shallower part of the aquifer and semi-confined or confined in the deeper part of the aquifer. Groundwater flows north in the southern portion of the base and to the northwest in the northern portion of the base. Locations where soil samples were collected are covered by asphalt.
Brief Description of Receptors:	Horsham AGS have operated potables wells on what is now the Horsham AGS. These wells operated and still operate at 100 gallons per minute or more. PFC uding perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorobutane sulfonate (PFBS) have been detected in each of the on-site wells at varying concentrations. Offsite, several high-yield community water supply wells are operated by municipal water authorities. Three Warrington Township supply wells (#1, #2, and #6) are located 0.5 to 1 mile north of the Horsham AGS boundary; PFOA/PFOS detections of 0.24 µg/L (#1) to 1.87 µg/L (#2), and 1.46 µg/L (#6). Five Horsham Water and Sewer Authority (HWSA) wells are located within approximately 1.25 miles of the Horsham AGS boundary. HWSA well #40 is approximately 0.75 mile northwest of the Stormwater Basin - all others are cross- or downgradient of the base. Maximum PFOA/PFOS concentrations at the HWSA wells range from 0.118 µg/L (#10) to 1.765 µg/L (#26). Clusters of private wells encircle the Horsham AGS and NAS/JRB Willow Grove facilities. PFCs have been detected at varying concentrations in many of these private wells. In response to the detections, local townships have stopped use of the impacted wells and are also obtaining a portion of their demand from nearby water suppliers. Soil samples were collected from an area located within the base boundary, but is otherwise unrestricted.

	Groundwater V	Vorksh	neet			
Installation: Biddle AN	G Base (Horsham AGS)					
Site ID: PRL-6	AFFF Release Area #: AFFF 6					
Contaminant	Maximum Concentration (ug/L)	Comparis	on Value (ug/L)	Ratios		
PFOS	5.2	2	0.04	130.0		
PFOA	0.29	9	0.04	. 7.2		
PFBS	0.22	2	0.602	0.4		
CHF Scale	CHF Value	Contaminat	tion Hazard Factor (CHF)	137.6		
CHF > 100	H (High)		[Maximum Concentration of (Contaminant]		
100 > CHF > 2	M (Medium)		[Comparison Value for Con	taminantl		
2 > CHF	L (Low)			tarinianty		
CHF Value			CHF VALUE	н		
	Migratory Pathwa	y Factor				
Evident	Analytical data or direct observation indicates that to a point of exposure (e.g., well).	Analytical data or direct observation indicates that contamination in the groundwater has moved o a point of exposure (e.g., well).				
Potential	Contamination in the groundwater has moved be available to make a determination of Evident or C	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined.				
Confined	Analytical data or direct observation indicates tha the source via groundwater is limited (possibly du controls).	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls).				
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from value = H).	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).				
	Receptor Fac	tor				
ldentified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater).					
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).					
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).					
Receptor Factor	DIRECTIONS: Record the single highest value fr value = H).	om above in th	e box to the right (maximum	Н		
			Groundwater Category	HIGH		

	Soil Worksheet					
Installation: Biddle AN Site ID: PRL-6	G Base (Horsham AGS) AFFF Release Area #: AFFF 6					
Contaminant	Maximum Concentration (mg/kg) Comparis	on Value (mg/kg)	Ratios		
PFOS	0.00	14	0.126	0.0		
PFOA	0.000	56	0.126	0.0		
CHF Scale	CHF Value	Contamin	ation Hazard Factor (CHF)	0.0		
CHF > 100	H (High)		[Maximum Concentration of (Contaminant]		
100 > CHF > 2	M (Medium)		[Comparison Value for Con	ntaminant]		
2 > CHF	L (Low)		[•			
CHF Value			CHF VALUE	L		
	Migratory Pathw	ay Factor				
Evident	Analytical data or observable evidence that cor	tamination is pre	esent at a point of exposure.			
Potential	Contamination has moved beyond the source, information is not sufficient to make a determination	Contamination has moved beyond the source, could move but is not moving appreciably, or nformation is not sufficient to make a determination of Evident or Confined.				
Confined	Low possibility for contamination to be present	ow possibility for contamination to be present at or migrate to a point of exposure.				
Migratory Pathway Factor	DIRECTIONS: Record the single highest value value = H).	from above in th	e box to the right (maximum	М		
	Receptor Fa	actor				
Identified	Receptors identified that have access to contar	ninated soil.				
Potential	Potential for receptors to have access to contar	Potential for receptors to have access to contaminated soil.				
Limited	No potential for receptors to have access to con	ntaminated soil.				
Receptor Factor	DIRECTIONS: Record the single highest value value = H).	from above in th	ne box to the right (maximum	М		
			Soil Category	LOW		

Site Background Information				
Installation:	Biddle ANG Base (Horsham AGS)	Date:	08/26/2021	
Location (State):	Pennsylvania	Media Evaluated:	Groundwater	
Site Name and ID:	Civil Eng./Fire Station BLDG 232 - PRL-7	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A	
RPM's Name:	Bill Myer	Agreement Status (e.g., Federal Facility Agreement date signed):	USEPA Administrative Order RCRA 3008(H)	
	OVERALL SITE (CATEGORY: HIGH		

	Site Summary
Brief Site Description:	Building 232 is the current Civil Engineering building for Horsham AGS; however, it was formerly utilized as the Base Fire Station. During operation as a Fire Station, 3 percent AFFF was reportedly stored in 55-gallon drums and 5-gallon containers used to resupply fire trucks via a hand pump. Building 232 has a trench drain that discharged to the former WWTP via the sanitary sewer system. In addition, Air National Guard (ANG) operated a wash rack at Building 232; therefore, vehicles equipped with AFFF may have been washed at Building 232. Building 232 also had a 150-gallon oil water separator (OWS) that discharged to the sanitary sewer. The OWS was removed in 1998. Due to the date of OWS removal, it is unlikely that soil samples were collected for PFAS analysis.
Brief Description of Pathways:	The first occurrence of groundwater at Horsham AGS typically occurs between 5 and 20 feet below ground surface (BGS). Upon entering bedrock, groundwater is found in the bedding plane partings and cross-bed joints, in what is termed a leaky, multi-aquifer system, where shallow groundwater is largely unconfined but becomes progressively more confined down dip beneath successive layers of the fine-grained siltstones and, particularly, shales. Groundwater is unconfined in the shallower part of the aquifer and semi-confined or confined in the deeper part of the aquifer. Groundwater flows north in the southern portion of the base and to the northwest in the northern portion of the base. Soil samples were collected from a grassy area with exposed soils.
Brief Description of Receptors:	Horsham AGS have operated potable supply wells on what is now the Horsham AGS. These wells operated and still operate at 100 gallons per minute or more. PFCs including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorobutane sulfonate (PFBS) have been detected in each of the on-site wells at varying concentrations. Offsite, several high-yield community water supply wells are operated by municipal water authorities. Three Warrington Township supply wells (#1, #2, and #6) are located 0.5 to 1 mile north of the Horsham AGS boundary; PFOA/PFOS detections of 0.24 µg/L (#1) to 1.87 µg/L (#2), and 1.46 µg/L (#6). Five Horsham Water and Sewer Authority (HWSA) wells are located within approximately 1.25 miles of the Horsham AGS boundary. HWSA well #40 is approximately 0.75 mile northwest of the Stormwater Basin - all others are cross- or downgradient of the base. Maximum PFOA/PFOS concentrations at the HWSA wells range from 0.118 µg/L (#10) to 1.765 µg/L (#26). Clusters of private wells encircle the Horsham AGS and NAS/JRB Willow Grove facilities. PFCs have been detected at varying concentrations in many of these private wells. In response to the detections, local townships have stopped use of the impacted wells and are also obtaining a portion of their demand from nearby water suppliers. Soil samples were collected from an area located within the base boundary, but is otherwise unrestricted.

	Groundwater	Worksh	leet	
Installation: Biddle AN	G Base (Horsham AGS)			
Site ID: PRL-7	AFFF Release Area #: AFFF 7			
Contaminant	Maximum Concentration (ug/L)	Compariso	on Value (ug/L)	Ratios
PFOS		6	0.04	150.0
PFOA	0.	62	0.04	15.5
PFBS	0.	27	0.602	0.4
CHF Scale	CHF Value	Contaminat	ion Hazard Factor (CHF)	165.9
CHF > 100	H (High)		[Maximum Concentration of	Contaminant]
100 > CHF > 2	M (Medium)		[Comparison Value for Con	taminantl
2 > CHF	L (Low)			tariniang
CHF Value			CHF VALUE	н
	Migratory Pathw	ay Factor		
Evident	Analytical data or direct observation indicates the to a point of exposure (e.g., well).	nat contaminatior	n in the groundwater has moved	н
Potential	Contamination in the groundwater has moved be available to make a determination of Evident or	eyond the source Confined.	e or insufficient information	
Confined	Analytical data or direct observation indicates the source via groundwater is limited (possibly controls).	nat the potential f due to geological	or contaminant migration from structures or physical	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value value = H).	from above in th	e box to the right (maximum	Н
		<u>ictor</u>		
Identified	Impacted drinking water well with detected cont well within 4 miles and groundwater is current so groundwater).	aminants or exist ource of drinking	ing downgradient water supply water (EPA Class I or IIA	Н
Potential	Existing downgradient drinking water well beyor known drinking water wells downgradient and g drinking water (i.e., EPA Class I or II groundwat	d 4 miles with no roundwater is cur er) or other bene	o contaminant detection(s) or no rently or potentially usable for ficial use (e.g., agricultural).	
Limited	No known water supply wells downgradient and drinking water source and is of limited beneficia	groundwater is r use (Class III).	not considered potential	
Receptor Factor	DIRECTIONS: Record the single highest value t value = H).	from above in the	box to the right (maximum	Н
			Groundwater Category	HIGH

Site Background Information			
Installation:	Biddle ANG Base (Horsham AGS)	Date:	08/26/2021
Location (State):	Pennsylvania	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Sanitary Sewer Lift Station. BLDG 206 - PRL-8	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Bill Myer	Agreement Status (e.g., Federal Facility Agreement date signed):	USEPA Administrative Order RCRA 3008(H)
OVERALL SITE CATEGORY: HIGH			

	Site Summary
Brief Site Description:	Building 206 was a lift station for the sanitary sewer system. Discharges from the sanitary sewer system were conveyed to the lift station and then pumped offsite. The lift station received waste from the installation since 1958. The waste stream included sanitary and industrial wastewater from the wash rack and OWS discharges. The lift station has periodically overflowed onto the surrounding soils. Wastewater potentially contained PFCs from AFFF releases and PFAS contamination in the Base water supply.
Brief Description of Pathways:	The first occurrence of groundwater at Horsham AGS typically occurs between 5 and 20 feet below ground surface (BGS). Upon entering bedrock, groundwater is found in the bedding plane partings and cross-bed joints, in what is termed a leaky, multi-aquifer system, where shallow groundwater is largely unconfined but becomes progressively more confined down dip beneath successive layers of the fine-grained siltstones and, particularly, shales. Groundwater is unconfined in the shallower part of the aquifer and semi-confined or confined in the deeper part of the aquifer. Groundwater flows north in the southern portion of the base and to the northwest in the northern portion of the base. Soil samples collected from grassy areas near the lift building.
Brief Description of Receptors:	Horsham AGS have operated potable supply wells on what is now the Horsham AGS. These wells operated and still operate at 100 gallons per minute or more. PFCs including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorobutane sulfonate (PFBS) have been detected in each of the on-site wells at varying concentrations. Offsite, several high-yield community water supply wells are operated by municipal water authorities. Three Warrington Township supply wells (#1, #2, and #6) are located 0.5 to 1 mile north of the Horsham AGS boundary; PFOA/PFOS detections of 0.24 μ g/L (#1) to 1.87 μ g/L (#2), and 1.46 μ g/L (#6). Five Horsham Water and Sewer Authority (HWSA) wells are located within approximately 1.25 miles of the Horsham AGS boundary. HWSA well #40 is approximately 0.75 mile northwest of the Stormwater Basin - all others are cross- or downgradient of the base. Maximum PFOA/PFOS concentrations at the HWSA wells range from 0.118 μ g/L (#10) to 1.765 μ g/L (#26). Clusters of private wells encircle the Horsham AGS and NAS/JRB Willow Grove facilities. PFCs have been detected at varying concentrations in many of these private wells. In response to the detections, local townships have stopped use of the impacted wells and are also obtaining a portion of their demand from nearby water suppliers. Area is within the base but access is not otherwise restricted.

	Groundwater V	Vorksheet	
Installation: Biddle AN	G Base (Horsham AGS)		
Site ID: PRL-8	AFFF Release Area #: AFFF 8		
Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	3.	7 0.04	4 92.5
PFOA	0.5	5 0.04	4 13.8
PFBS	0.1	8 0.602	2 0.3
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	106.5
CHF > 100	H (High)	[Maximum Concentration of	Contaminant]
100 > CHF > 2	M (Medium)	[Comparison Value for Cor	ntaminant]
2 > CHF	L (Low)		
CHF Value		CHF VALUE	н
	Migratory Pathwa	y Factor	
Evident	Analytical data or direct observation indicates that to a point of exposure (e.g., well).	at contamination in the groundwater has moved	
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined.		М
Confined	Analytical data or direct observation indicates that the source via groundwater is limited (possibly de controls).	at the potential for contaminant migration from ue to geological structures or physical	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value fr value = H).	om above in the box to the right (maximum	М
	Receptor Fac	ctor	
Identified	Impacted drinking water well with detected conta well within 4 miles and groundwater is current so groundwater).	minants or existing downgradient water supply urce of drinking water (EPA Class I or IIA	н
Potential	Existing downgradient drinking water well beyond known drinking water wells downgradient and gro drinking water (i.e., EPA Class I or II groundwate	4 miles with no contaminant detection(s) or no bundwater is currently or potentially usable for r) or other beneficial use (e.g., agricultural).	
Limited	No known water supply wells downgradient and or drinking water source and is of limited beneficial	groundwater is not considered potential use (Class III).	
Receptor Factor	DIRECTIONS: Record the single highest value fr value = H).	om above in the box to the right (maximum	Н
		Groundwater Category	HIGH

	Soil Wor	ksheet		
Installation: Biddle AN Site ID: PRL-8	G Base (Horsham AGS) AFFF Release Area #: AFFF 8			
Contaminant	Maximum Concentration (mg/l	kg) Comparis	on Value (mg/kg)	Ratios
PFOS	0.0	0021	0.126	0.0
PFOA	0.0	0039	0.126	0.0
CHF Scale	CHF Value	Contamin	ation Hazard Factor (CHF)	0.0
CHF > 100	H (High)		[Maximum Concentration of (Contaminant]
100 > CHF > 2	M (Medium)		[Comparison Value for Cont	taminant]
2 > CHF	L (Low)			-
CHF Value			CHF VALUE	L
	Migratory Path	way Factor	-	
Evident	Analytical data or observable evidence that co	ontamination is pre	esent at a point of exposure.	
Potential	Contamination has moved beyond the source information is not sufficient to make a determi	e, could move but is ination of Evident o	s not moving appreciably, or or Confined.	М
Confined	Low possibility for contamination to be presen	nt at or migrate to a	a point of exposure.	
Migratory Pathway Factor	DIRECTIONS: Record the single highest valu value = H).	ue from above in th	e box to the right (maximum	М
	Receptor	Factor		
Identified	Receptors identified that have access to contain the second secon	aminated soil.		
Potential	Potential for receptors to have access to cont	aminated soil.		М
Limited	No potential for receptors to have access to c	contaminated soil.		
Receptor Factor	DIRECTIONS: Record the single highest valu value = H).	ue from above in th	e box to the right (maximum	М
			Soil Category	LOW

Site Background Information			
Installation:	Biddle ANG Base (Horsham AGS)	Date:	08/26/2021
Location (State):	Pennsylvania	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Stormwater Basin (ARF-OT-3) - PRL-9	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Bill Myer	Agreement Status (e.g., Federal Facility Agreement date signed):	USEPA Administrative Order RCRA 3008(H)
OVERALL SITE CATEGORY: HIGH			

	Site Summary
Brief Site Description:	The Stormwater Basin is located along the north-central portion of Horsham AGS and receives runoff from the majority of the Base in addition to portions of former NAS/JRB Willow Grove. The basin was investigated under the IRP and identified as site ARF-OT-03. Previous environmental investigations noted total petroleum hydrocarbons (TPH) in the sediments below action levels. Regardless, a removal action was conducted in 2000. Documented AFFF releases have been diverted to the Stormwater Basin. Given historical use of AFFF at Horsham AGS and former NAS/JRB Willow Grove, surface water, sediments, soils, and underlying groundwater have the potential to be contaminated with PFCs. Prior to field activities associated with the field investigation, National Guard Bureau (NGB) and the Navy have blocked several stormwater Basin.
Brief Description of Pathways:	The first occurrence of groundwater at Horsham AGS typically occurs between 5 and 20 feet below ground surface (BGS). Upon entering bedrock, groundwater is found in the bedding plane partings and cross-bed joints, in what is termed a leaky, multi-aquifer system, where shallow groundwater is largely unconfined but becomes progressively more confined down dip beneath successive layers of the fine-grained siltstones and, particularly, shales. Groundwater is unconfined in the shallower part of the aquifer and semi-confined or confined in the deeper part of the aquifer. Groundwater flows north in the southern portion of the base and to the northwest in the northern portion of the base. Soil samples collected from exposed grassy areas adjacent to the Stormwater Basin.
Brief Description of Receptors:	Horsham AGS have operated potable supply wells on what is now the Horsham AGS. These wells operated and still operate at 100 gallons per minute or more. PFCs including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorobutane sulfonate (PFBS) have been detected in each of the on-site wells at varying concentrations. Offsite, several high-yield community water supply wells are operated by municipal water authorities. Three Warrington Township supply wells (#1, #2, and #6) are located 0.5 to 1 mile north of the Horsham AGS boundary; PFOA/PFOS detections of 0.24 µg/L (#1) to 1.87 µg/L (#2), and 1.46 µg/L (#6). Five Horsham Water and Sewer Authority (HWSA) wells are located within approximately 1.25 miles of the Horsham AGS boundary. HWSA well #40 is approximately 0.75 mile northwest of the Stormwater Basin - all others are cross- or downgradient of the base. Maximum PFOA/PFOS concentrations at the HWSA wells range from 0.118 µg/L (#10) to 1.765 µg/L (#26). Clusters of private wells encircle the Horsham AGS and NAS/JRB Willow Grove facilities. PFCs have been detected at varying concentrations in many of these private wells. In response to the detections, local townships have stopped use of the impacted wells and are also obtaining a portion of their demand from nearby water suppliers. Soil samples were collected from an area located within the base boundary, but is otherwise unrestricted.

		Groundwater V	Vorksh	leet	
Installation: Biddle AN	G Base	e (Horsham AGS)			
Site ID: PRL 9		AFFF Release Area #: AFFF 9			
Contaminant		Maximum Concentration (ug/L)	Comparise	on Value (ug/L)	Ratios
PFOS		3.7		0.04	92.5
PFOA		0.55		0.04	13.8
PFBS		0.18		0.602	0.3
CHF Scale		CHF Value	Contaminat	ion Hazard Factor (CHF)	106.5
CHF > 100		H (High)		Maximum Concentration of	Contaminant]
100 > CHF > 2		M (Medium)	CHF =	[Composioon Volue for Con	tominanti
2 > CHF	-	L (Low)		[Companson value for Con	lamnanij
CHF Value				CHF VALUE	Н
		Migratory Pathway	/ Factor		•
Evident	Anal to a	ytical data or direct observation indicates that point of exposure (e.g., well)	contamination	in the groundwater has moved	
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined M			М	
Confined	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls)				
Migratory Pathway Factor	DIRE value	ECTIONS: Record the single highest value fro e = H).	m above in the	box to the right (maximum	М
		Receptor Fac	<u>tor</u>		
Identified	Impa well grou	acted drinking water well with detected contan within 4 miles and groundwater is current sou ndwater)	ninants or exist rce of drinking	ing downgradient water supply water (EPA Class I or IIA	Н
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural)				
Limited	No k wate	nown water supply wells downgradient and g r source and is of limited beneficial use (Clas	roundwater is r s III)	not considered potential drinking	
Receptor Factor	DIRE value	ECTIONS: Record the single highest value from the single highest v	m above in the	box to the right (maximum	Н
				Groundwater Category	HIGH

	Soil Wo	rks	heet		
Installation: Biddle AN Site ID: PRL-9	G Base (Horsham AGS) AFFF Release Area #: AFFF S	9			
Contaminant	Maximum Concentration (mg	g/kg)	Compariso	on Value (mg/kg)	Ratios
PFOS		0.0022		0.126	0.0
PFOA	0	.00062		0.126	0.0
CHF Scale	CHF Value		Contamina	tion Hazard Factor (CHF)	0.0
CHF > 100	H (High)			[Maximum Concentration of (Contaminant]
100 > CHF > 2	M (Medium)			[Comparison Value for Cont	taminantl
2 > CHF	L (Low)				
CHF Value				CHF VALUE	L
	Migratory Pat	thway	Factor		
Evident	Analytical data or observable evidence that	contam	ination is pres	ent at a point of exposure.	
Potential	Contamination has moved beyond the sour information is not sufficient to make a deter	ce, coul minatio	d move but is n of Evident or	not moving appreciably, or Confined.	М
Confined	Low possibility for contamination to be pres	ent at o	r migrate to a	point of exposure.	
Migratory Pathway Factor	DIRECTIONS: Record the single highest va value = H).	alue fror	n above in the	box to the right (maximum	М
	Recepto	r Fact	<u>or</u>		
Identified	Receptors identified that have access to co	ontamina	ated soil.		
Potential	Potential for receptors to have access to co	ontamina	ated soil.		М
Limited	No potential for receptors to have access to	o contan	ninated soil.		
Receptor Factor	DIRECTIONS: Record the single highest va value = H).	alue fror	m above in the	box to the right (maximum	М
				Soil Category	LOW

Site Background Information				
Installation:	Biddle ANG Base (Horsham AGS)	Date:	08/26/2021	
Location (State):	Pennsylvania	Media Evaluated:	Groundwater, Soil	
Site Name and ID:	AFRES Maintenance Hangar BLDG 201 - PRL-10	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A	
RPM's Name:	Bill Myer	Agreement Status (e.g., Federal Facility Agreement date signed):	USEPA Administrative Order RCRA 3008(H)	
OVERALL SITE CATEGORY: HIGH				

	Site Summary
Brief Site Description:	Building 201 was previously used as a maintenance hangar and as such contained a fire suppression system that utilized PFAS-containing high expansion foam (HEF). According to Facility personnel, a release in 2004 led to HEF filling the building. The fire suppression system at Building 201 includes one 600-gallon AFFF AST and two 5,000-gallon underground storage tanks (USTs) utilized for spill containment. The system was reportedly shut down in 2009, but no documents regarding AFFF disposal were identified. Furthermore, two 250-gallon OWSs that discharged to the sanitary sewer were removed from the building in 1998. Due to the date of OWS removal, it is unlikely that soil samples were collected for PFAS analysis. Adjacent to the southeastern side of Building 201 is a former aircraft wash rack also known as Air Force Environmental Restoration Program site SD-04. SD-04 contained a wash rack and associated structures, including an OWS and two paint storage buildings (Buildings 215 [now demolished] and 223), a grassy area between the paint storage buildings, and a ditch located to the east. The wash rack was primarily used for washing aircraft.
Brief Description of Pathways:	The first occurrence of groundwater at Horsham AGS typically occurs between 5 and 20 feet below ground surface (BGS). Upon entering bedrock, groundwater is found in the bedding plane partings and cross-bed joints, in what is termed a leaky, multi-aquifer system, where shallow groundwater is largely unconfined but becomes progressively more confined down dip beneath successive layers of the fine-grained siltstones and, particularly, shales. Groundwater is unconfined in the shallower part of the aquifer and semi-confined or confined in the deeper part of the aquifer. Groundwater flows north in the southern portion of the base and to the northwest in the northern portion of the base. Building 201 is surrounded by pavement and grassy areas. Soil samples were collected in areas of grass and exposed soil.
Brief Description of Receptors:	Horsham AGS have operated potable supply wells on what is now the Horsham AGS. These wells operated and still operate at 100 gallons per minute or more. PFCs including perfluoroctanoic acid (PFOA), perfluoroctane sulfonic acid (PFOS), and perfluorobutane sulfonate (PFBS) have been detected in each of the on-site wells at varying concentrations. Offsite, several high-yield community water supply wells are operated by municipal water authorities. Three Warrington Township supply wells (#1, #2, and #6) are located 0.5 to 1 mile north of the Horsham AGS boundary; PFOA/PFOS detections of 0.24 µg/L (#1) to 1.87 µg/L (#2), and 1.46 µg/L (#6). Five Horsham Water and Sewer Authority (HWSA) wells are located within approximately 1.25 miles of the Horsham AGS boundary. HWSA well #40 is approximately 0.75 mile northwest of the Stormwater Basin - all others are cross- or downgradient of the base. Maximum PFOA/PFOS concentrations at the HWSA wells range from 0.118 µg/L (#10) to 1.765 µg/L (#26). Clusters of private wells encircle the Horsham AGS and NAS/JRB Willow Grove facilities. PFCs have been detected at varying concentrations in many of these private wells. In response to the detections, local townships have stopped use of the impacted wells and are also obtaining a portion of their demand from nearby water suppliers. PRL-10 is located within the base boundary, but is otherwise unrestricted - the area is accessible to base personnel.

	Groundwater Worksheet				
Installation: Biddle AN	G Base	e (Horsham AGS)			
Site ID: PRL-10		AFFF Release Area #: AFFF 10			
Contaminant		Maximum Concentration (ug/L)	Comparis	on Value (ug/L)	Ratios
PFOS		23	3	0.04	575.0
PFOA		0.92	2	0.04	23.0
PFBS		1.4		0.602	2.3
CHF Scale		CHF Value	Contamina	tion Hazard Factor (CHF)	600.3
CHF > 100		H (High)		[Maximum Concentration of	Contaminant]
100 > CHF > 2		M (Medium)		[Comparison Value for Con	taminant]
2 > CHF		L (Low)			tarninantj
CHF Value				CHF VALUE	Н
		Migratory Pathway	y Factor		
Evident	Anal to a	ytical data or direct observation indicates that point of exposure (e.g., well).	contamination	in the groundwater has moved	Н
Potential	Cont avail	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined.			
Confined	Anal the s contr	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls).			
Migratory Pathway Factor	DIRE value	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).			Н
		Receptor Fac	tor		
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA H groundwater).				
Potential	Exist know drink	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).			
Limited	No k drink	nown water supply wells downgradient and g ing water source and is of limited beneficial u	roundwater is i ise (Class III).	not considered potential	
Receptor Factor	DIRE value	ECTIONS: Record the single highest value fro e = H).	om above in the	e box to the right (maximum	Н
				Groundwater Category	HIGH

	Soil Worksheet					
Installation:Biddle Al Site ID: PRL-10	NG B	ase (Horsham AGS) AFFF Release Area #: AFFF 10				
Contaminant		Maximum Concentration (mg/kg)	Compariso	on Value (mg/kg)	Ratios	
PFOA		0.00038		0.126	0.0	
CHF Scale		CHF Value	Contamina	ation Hazard Factor (CHF)	0.0	
CHF > 100		H (High)		[Maximum Concentration of	Contaminant]	
100 > CHF > 2		M (Medium)	[Comparison Value for Con	for Contaminant]		
2 > CHF		L (Low)			Contaminantj	
CHF Value				CHF VALUE	L	
		Migratory Pathway	Factor			
Evident	Ana	lytical data or observable evidence that contar	nination is pres	sent at a point of exposure.		
Potential	Con infor	ontamination has moved beyond the source, could move but is not moving appreciably, or formation is not sufficient to make a determination of Evident or Confined.			М	
Confined	Low	v possibility for contamination to be present at or migrate to a point of exposure.				
Migratory Pathway Factor	DIR valu	ECTIONS: Record the single highest value fro e = H).	m above in the	e box to the right (maximum	М	
		Receptor Fac	tor			
Identified	Rec	eptors identified that have access to contamin	ated soil.			
Potential	Pote	ential for receptors to have access to contamin	ated soil.		М	
Limited	No p	potential for receptors to have access to contain	minated soil.			
Receptor Factor	DIR valu	ECTIONS: Record the single highest value fro e = H).	m above in the	e box to the right (maximum	М	
				Soil Category	LOW	

Site Background Information				
Installation:	Biddle ANG Base (Horsham AGS)	Date:	08/26/2021	
Location (State):	Pennsylvania	Media Evaluated:	Groundwater, Soil	
Site Name and ID:	AFRES Fuel Cell BLDG 230 - PRL-11	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A	
RPM's Name:	Bill Myer	Agreement Status (e.g., Federal Facility Agreement date signed):	USEPA Administrative Order RCRA 3008(H)	
	OVERALL SITE (CATEGORY: HIGH		

	Site Summary
Brief Site Description:	Building 230 is a hangar that was previously used as a fuel cell. The building contained a fire suppression system that utilized HEF. The system included a single 250-gallon fiberglass AFFF AST. According to Facility personnel, the system was shut down in 2007, but no documents regarding AFFF disposal were identified (BB&E 2015). Furthermore the building has a 1,000-gallon OWS that discharges to the sanitary sewer system associated with the building. The PA did not indicate whether the OWS was removed.
Brief Description of Pathways:	The first occurrence of groundwater at Horsham AGS typically occurs between 5 and 20 feet below ground surface (BGS). Upon entering bedrock, groundwater is found in the bedding plane partings and cross-bed joints, in what is termed a leaky, multi-aquifer system, where shallow groundwater is largely unconfined but becomes progressively more confined down dip beneath successive layers of the fine-grained siltstones and, particularly, shales. Groundwater is unconfined in the shallower part of the aquifer and semi-confined or confined in the deeper part of the aquifer. Groundwater flows north in the southern portion of the base and to the northwest in the northern portion of the base. Soil samples were collected from a grassy area with exposed soils.
Brief Description of Receptors:	Horsham AGS have operated potable supply wells on what is now the Horsham AGS. These wells operated and still operate at 100 gallons per minute or more. PFCs including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorobutane sulfonate (PFBS) have been detected in each of the on-site wells at varying concentrations. Offsite, several high-yield community water supply wells are operated by municipal water authorities. Three Warrington Township supply wells (#1, #2, and #6) are located 0.5 to 1 mile north of the Horsham AGS boundary; PFOA/PFOS detections of 0.24 µg/L (#1) to 1.87 µg/L (#2), and 1.46 µg/L (#6). Five Horsham Water and Sewer Authority (HWSA) wells are located within approximately 1.25 miles of the Horsham AGS boundary. HWSA well #40 is approximately 0.75 mile northwest of the Stormwater Basin - all others are cross- or downgradient of the base. Maximum PFOA/PFOS concentrations at the HWSA wells range from 0.118 µg/L (#10) to 1.765 µg/L (#26). Clusters of private wells encircle the Horsham AGS and NAS/JRB Willow Grove facilities. PFCs have been detected at varying concentrations in many of these private wells. In response to the detections, local townships have stopped use of the impacted wells and are also obtaining a portion of their demand from nearby water suppliers. PRL-11 is located within the base boundary, but is otherwise unrestricted - the area is accessible to base personnel.

	Groundwater Worksheet				
Installation: Biddle AN	G Base (Horsham AGS)				
Site ID: PRL-11	AFFF Release Are	a #: AFFF 11			
Contaminant	Maximum Conce	ntration (ug/L)	Compariso	on Value (ug/L)	Ratios
PFOS		1.4		0.04	35.0
PFOA		0.46		0.04	11.5
PFBS		0.2		0.602	0.3
CHF Scale	CHF Value		Contaminat	ion Hazard Factor (CHF)	46.8
CHF > 100	H (Hi	igh)		[Maximum Concentration of (Contaminant]
100 > CHF > 2	M (Mee	dium)		Comparison Value for Con	taminant1
2 > CHF	L (Lo	ow)			
CHF Value				CHF VALUE	Μ
	M	igratory Pathway	Factor		
Evident	Analytical data or direct obset to a point of exposure (e.g.,	ervation indicates that well).	contamination	in the groundwater has moved	н
Potential	Contamination in the ground available to make a determir	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined.			
Confined	Analytical data or direct obso the source via groundwater i controls).	unalytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls).			
Migratory Pathway Factor	DIRECTIONS: Record the si value = H).	ingle highest value from	m above in the	box to the right (maximum	Н
		Receptor Fact	tor		
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater).				
Potential	Existing downgradient drinki known drinking water wells o drinking water (i.e., EPA Cla	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).			
Limited	No known water supply wells drinking water source and is	s downgradient and gr of limited beneficial us	oundwater is n se (Class III).	ot considered potential	
Receptor Factor	DIRECTIONS: Record the si value = H).	ingle highest value from	m above in the	box to the right (maximum	Н
				Groundwater Category	HIGH

	Soil Works	sheet			
Installation: Biddle ANG Site ID: PRL-11	G Base (Horsham AGS) AFFF Release Area #: AFFF 11				
Contaminant	Maximum Concentration (mg/kg)	Comparis	on Value (mg/kg)	Ratios	
PFOA	0.0006	1	0.126	0.0	
CHF Scale	CHF Value	Contamina	ation Hazard Factor (CHF)	0.0	
CHF > 100	H (High)		[Maximum Concentration of	Contaminant]	
100 > CHF > 2	M (Medium)		[Comparison Value for Con	ontaminant]	
2 > CHF	L (Low)				
CHF Value			CHF VALUE	L	
	Migratory Pathwa	y Factor			
Evident	Analytical data or observable evidence that conta	mination is pre	sent at a point of exposure.		
Potential	Contamination has moved beyond the source, cc information is not sufficient to make a determinat	Contamination has moved beyond the source, could move but is not moving appreciably, or nformation is not sufficient to make a determination of Evident or Confined.			
Confined	Low possibility for contamination to be present at	ow possibility for contamination to be present at or migrate to a point of exposure.			
Migratory Pathway Factor	DIRECTIONS: Record the single highest value fr value = H).	om above in th	e box to the right (maximum	М	
	Receptor Fac	<u>ctor</u>			
Identified	Receptors identified that have access to contami	nated soil.			
Potential	Potential for receptors to have access to contami	nated soil.		М	
Limited	No potential for receptors to have access to cont	aminated soil.			
Receptor Factor	DIRECTIONS: Record the single highest value fr value = H).	om above in th	e box to the right (maximum	Μ	
			Soil Category	LOW	

Site Background Information				
Installation:	Biddle ANG Base (Horsham AGS)	Date:	8/26/2021	
Location (State):	Pennsylvania	Media Evaluated:	Groundwater, Soil	
Site Name and ID:	Wash Rack Refueler Maintenance BLDG 238 - PRL-12	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A	
RPM's Name:	Bill Myer	Agreement Status (e.g., Federal Facility Agreement date signed):	USEPA Administrative Order RCRA 3008(H)	

	Site Summary
Brief Site Description:	Building 238 was not identified as a potential source area in the preliminary assessment (PA) Report. However during the proposal site visit associated with the field investigation contract, a 250-gallon AFFF AST was noted in Building 238. Building 238 is a garage that was previously utilized for maintenance, refueling, and washing. A drainage swale along the northern side of the building conveys runoff toward the Stormwater Basin.
Brief Description of Pathways:	The first occurrence of groundwater at Horsham AGS typically occurs between 5 and 20 feet below ground surface (BGS). Upon entering bedrock, groundwater is found in the bedding plane partings and cross-bed joints, in what is termed a leaky, multi-aquifer system, where shallow groundwater is largely unconfined but becomes progressively more confined down dip beneath successive layers of the fine-grained siltstones and, particularly, shales. Groundwater is unconfined in the shallower part of the aquifer and semi-confined or confined in the deeper part of the aquifer. Groundwater flows north in the southern portion of the base and to the northwest in the northern portion of the base. Soil samples were collected from a grassy area with exposed soils.
Brief Description of Receptors:	Horsham AGS have operated potable supply wells on what is now the Horsham AGS. These wells operated and still operate at 100 gallons per minute or more. PFCs including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorobutane sulfonate (PFBS) have been detected in each of the on-site wells at varying concentrations. Offsite, several high-yield community water supply wells are operated by municipal water authorities. Three Warrington Township supply wells (#1, #2, and #6) are located 0.5 to 1 mile north of the Horsham AGS boundary; PFOA/PFOS detections of 0.24 µg/L (#1) to 1.87 µg/L (#2), and 1.46 µg/L (#6). Five Horsham Water and Sewer Authority (HWSA) wells are located within approximately 1.25 miles of the Horsham AGS boundary. HWSA well #40 is approximately 0.75 mile northwest of the Stormwater Basin - all others are cross- or downgradient of the base. Maximum PFOA/PFOS concentrations at the HWSA wells range from 0.118 µg/L (#10) to 1.765 µg/L (#26). Clusters of private wells encircle the Horsham AGS and NAS/JRB Willow Grove facilities. PFCs have been detected at varying concentrations in many of these private wells. In response to the detections, local townships have stopped use of the impacted wells and are also obtaining a portion of their demand from nearby water suppliers. PRL-12 is located within the base boundary, but is otherwise unrestricted - the area is accessible to base personnel.

		Groundwater V	Vorksh	leet	
Installation: Biddle AN	G Base	e (Horsham AGS)			
Site ID: PRL-12		AFFF Release Area #: AFFF 12			
Contaminant		Maximum Concentration (ug/L)	Comparise	on Value (ug/L)	Ratios
PFOS		2.6	5	0.04	65.0
PFOA		0.39		0.04	9.7
PFBS		0.18		0.602	0.3
CHF Scale		CHF Value	Contaminat	tion Hazard Factor (CHF)	75.0
CHF > 100		H (High)		Maximum Concentration of	Contaminantl
100 > CHF > 2		M (Medium)	CHF =	Comparison Value for Con	taminantl
2 > CHF		L (Low)			lannnantj
CHF Value				CHF VALUE	М
		Migratory Pathway	/ Factor		
Evident	Anal to a	ytical data or direct observation indicates that point of exposure (e.g., well).	contamination	in the groundwater has moved	н
Potential	Cont avai	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined.			
Confined	Anal the s cont	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls).			
Migratory Pathway Factor	DIRE value	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).			Н
	_	Receptor Fac	<u>tor</u>		
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA H groundwater).				
Potential	Exis knov drink	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).			
Limited	No k drink	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).			
Receptor Factor	DIRE value	ECTIONS: Record the single highest value fro e = H).	om above in the	e box to the right (maximum	Н
				Groundwater Category	HIGH

	Soil Worksheet			
Installation: Biddle AN Site ID: PRL-12	G Base (Horsham AGS) AFFF Release Area #: AFFF 12			
Contaminant	Maximum Concentration (mg/kg)	Comparis	on Value (mg/kg)	Ratios
PFOS	0.15	5	0.126	1.2
PFOA	0.0013	3	0.126	0.0
CHF Scale	CHF Value	Contamina	ation Hazard Factor (CHF)	1.2
CHF > 100	H (High)		[Maximum Concentration of (Contaminant]
100 > CHF > 2	M (Medium)		[Comparison Value for Cont	taminant]
	L (LOW)			
			CHF VALUE	L
	Migratory Pathwa	y Factor		
Evident	Analytical data or observable evidence that conta	mination is pre	sent at a point of exposure.	Н
Potential	Contamination has moved beyond the source, co information is not sufficient to make a determination	uld move but is on of Evident o	not moving appreciably, or r Confined.	
Confined	Low possibility for contamination to be present at	or migrate to a	point of exposure.	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from value = H).	om above in th	e box to the right (maximum	Н
	Receptor Fac	<u>tor</u>		
Identified	Receptors identified that have access to contamir	nated soil.		
Potential	Potential for receptors to have access to contamin	nated soil.		М
Limited	No potential for receptors to have access to conta	aminated soil.		
Receptor Factor	DIRECTIONS: Record the single highest value from value = H).	om above in th	e box to the right (maximum	М
			Soil Category	MEDIUM

Site Background Information				
Installation:	Biddle ANG Base (Horsham AGS)	Date:	8/26/2021	
Location (State):	Pennsylvania	Media Evaluated:	Groundwater	
Site Name and ID:	Former Air National Guard (ANG) Weapons/Release - BLDG 346 - PRL-13	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A	
RPM's Name:	Bill Myer	Agreement Status (e.g., Federal Facility Agreement date signed):	USEPA Administrative Order RCRA 3008(H)	
	OVERALL SITE (CATEGORY: HIGH		

	Site Summary			
Brief Site Description:	Building 346 was identified as a potential source area in the PA, but ANG later confirmed that the building did not have an AFFF fire suppression system. Therefore, Building 346 was eliminated as a potential source area.			
Brief Description of Pathways:	The first occurrence of groundwater at Horsham AGS typically occurs between 5 and 20 feet below ground surface (BGS). Upon entering bedrock, groundwater is found in the bedding plane partings and cross-bed joints, in what is termed a leaky, multi-aquifer system, where shallow groundwater is largely unconfined but becomes progressively more confined down dip beneath successive layers of the fine-grained siltstones and, particularly, shales. Groundwater is unconfined in the shallower part of the aquifer and semi-confined or confined in the deeper part of the aquifer. Groundwater flows north in the southern portion of the base and to the northwest in the northern portion of the base.			
Brief Description of Receptors:	Horsham AGS have operated potable supply wells on what is now the Horsham AGS. These wells operated and still operate at 100 gallons per minute or more. PFCs including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorobutane sulfonate (PFBS) have been detected in each of the on-site wells at varying concentrations. Offsite, several high-yield community water supply wells are operated by municipal water authorities. Three Warrington Township supply wells (#1, #2, and #6) are located 0.5 to 1 mile north of the Horsham AGS boundary; PFOA/PFOS detections of 0.24 µg/L (#1) to 1.87 µg/L (#2), and 1.46 µg/L (#6). Five Horsham Water and Sewer Authority (HWSA) wells are located within approximately 1.25 miles of the Horsham AGS boundary. HWSA well #40 is approximately 0.75 mile northwest of the Stormwater Basin - all others are cross- or downgradient of the base. Maximum PFOA/PFOS concentrations at the HWSA wells range from 0.118 µg/L (#10) to 1.765 µg/L (#26). Clusters of private wells encircle the Horsham AGS and NAS/JRB Willow Grove facilities. PFCs have been detected at varying concentrations in many of these private wells. In response to the detections, local townships have stopped use of the impacted wells and are also obtaining a portion of their demand from nearby water suppliers. PRL-13 is located within the base boundary, but is otherwise unrestricted - the area is accessible to base personnel.			

Groundwater Worksheet								
Installation: Biddle ANG Base (Horsham AGS)								
Site ID: PRL-13 AFFF Release Area #: AFFF 13								
Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)		Ratios				
PFOS	5.2		0.04	130.0				
PFOA	0.29		0.04	. 7.2				
PFBS	0.22		0.602	0.4				
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)		137.6				
CHF > 100	H (High)	Maximum Concentration of		Contaminant]				
100 > CHF > 2	M (Medium)		[Comparison Value for Contaminant]					
2 > CHF	L (Low)			tarninantj				
CHF Value			CHF VALUE	Н				
Migratory Pathway Factor								
Evident	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well).			н				
Potential	Contamination in the groundwater has moved bey available to make a determination of Evident or C							
Confined	Analytical data or direct observation indicates that the source via groundwater is limited (possibly du controls).							
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).			Н				
Receptor Factor								
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater).							
Potential	Existing downgradient drinking water well beyond known drinking water wells downgradient and gro drinking water (i.e., EPA Class I or II groundwater							
Limited	No known water supply wells downgradient and g drinking water source and is of limited beneficial u							
Receptor Factor	DIRECTIONS: Record the single highest value fro value = H).	Н						
			Groundwater Category	HIGH				

Soil Worksheet								
Installation: Biddle ANG Site ID: PRL-13	G Base (Horsham AGS) AFFF Release Area #: AFFF 13			_				
Contaminant	Maximum Concentration (mg/kg)) Comparison Value (mg/kg)		Ratios				
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)		No Data				
CHF > 100	H (High)		[Maximum Concentration of (Contaminant]				
100 > CHF > 2	M (Medium)	$CHF = \sum_{i=1}^{n}$	[Comparison Value for Con	ontaminantl				
2 > CHF	L (Low)			tarrintarity				
CHF Value			CHF VALUE	NA				
Migratory Pathway Factor								
Evident	Analytical data or observable evidence that contain	mination is pre	sent at a point of exposure.					
Potential	Contamination has moved beyond the source, cou information is not sufficient to make a determination	itamination has moved beyond the source, could move but is not moving appreciably, or rmation is not sufficient to make a determination of Evident or Confined.						
Confined	Low possibility for contamination to be present at	possibility for contamination to be present at or migrate to a point of exposure.						
Migratory Pathway Factor	DIRECTIONS: Record the single highest value fro value = H).	Record the single highest value from above in the box to the right (maximum ue = H).						
Receptor Factor								
Identified	Receptors identified that have access to contamin	ceptors identified that have access to contaminated soil.						
Potential	Potential for receptors to have access to contamir	ential for receptors to have access to contaminated soil.						
Limited	No potential for receptors to have access to conta	potential for receptors to have access to contaminated soil.						
Receptor Factor	DIRECTIONS: Record the single highest value from value = H).	RECTIONS: Record the single highest value from above in the box to the right (maximum ue = H).						
			Soil Category	NA				