



RELATIVE RISK SITE EVALUATION



Hector Field Air National Guard Base, North Dakota

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, we began Site Inspections, or SIs, to take soil and water samples and analyzed the media for PFAS compounds at the potential release areas. The intention of the SI 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 Hector Field ANGB PFAS PA and SI can be found at the Air Force CERCLA Administrative Record (AR): <https://ar.afcec-cloud.af.mil/> Scroll to the bottom of the page and click on "Continue to site", then select Air National Guard, scroll down the Installation List and click on Hector Field Int'l Airport, ND, then enter the AR Number 474881 in the "AR #" field for the PA. For the SI, enter the AR Number 585342. 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: <https://www.afcec.af.mil/WhatWeDo/Environment/Perfluorinated-Compounds/>

Acronyms

ANG - Air National Guard

ANGB - Air National Guard Base

AFFF - Aqueous Film Forming Foam

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

CHF – Contaminant Hazard Factor

DoD - Department of Defense

EPA – US Environmental Protection Agency

ERP - Environmental Restoration Program

FSS - Fire Suppression System

HA – Health Advisory

MPF – Migration Pathway Factor

PA – Preliminary Assessment

PFAS - Per-and polyfluoroalkyl substances

PFBS – Perfluorobutanesulfonic acid

PFOA - Perfluorooctanoic acid

PFOS - Perfluorooctane sulfonate

PRL - Potential Release Location

RF – Receptor Factor

RI – Remedial Investigation

RRSE – Relative Risk Site Evaluation

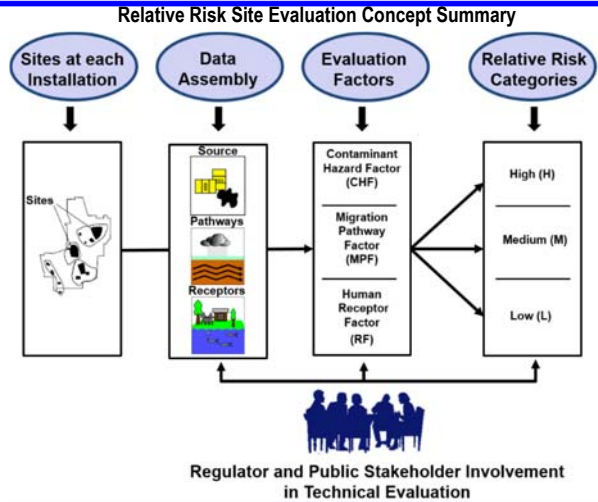
SI – Site Inspection

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-guidance/relative-risk-site-evaluation-primer/>

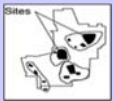
Q. What is the RRSE framework?

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.



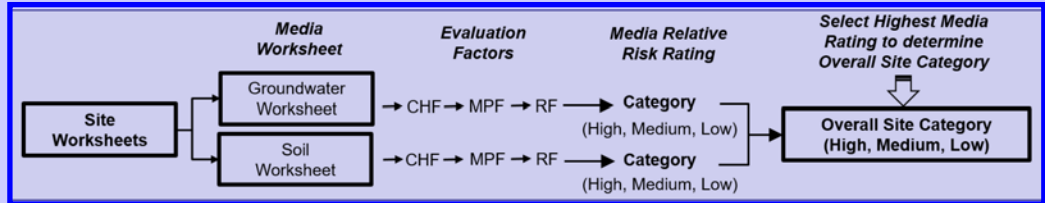
Sites at Each Installation

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

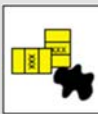


A. Restoration sites in CERCLA phases prior to remedy-in-place are evaluated in the process. Worksheets are developed for environmental media at each site. For consistency across all the Installations, only surface soil (0-1 foot deep) and groundwater media were evaluated in the RRSE.

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.



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

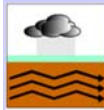
Air Force Civil Engineer Center
Environmental Restoration Program
www.afcec.af.mil

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

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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.



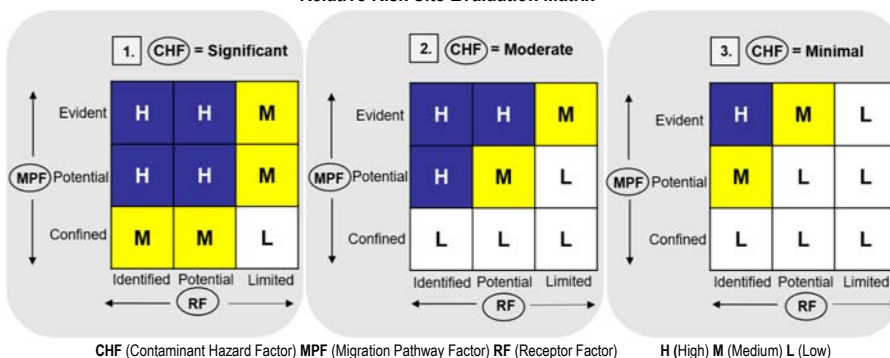
RELATIVE RISK SITE EVALUATION, cont.

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).

Relative Risk Site Evaluation Matrix



Overall Site Category

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**.

Regulatory and Stakeholder Involvement

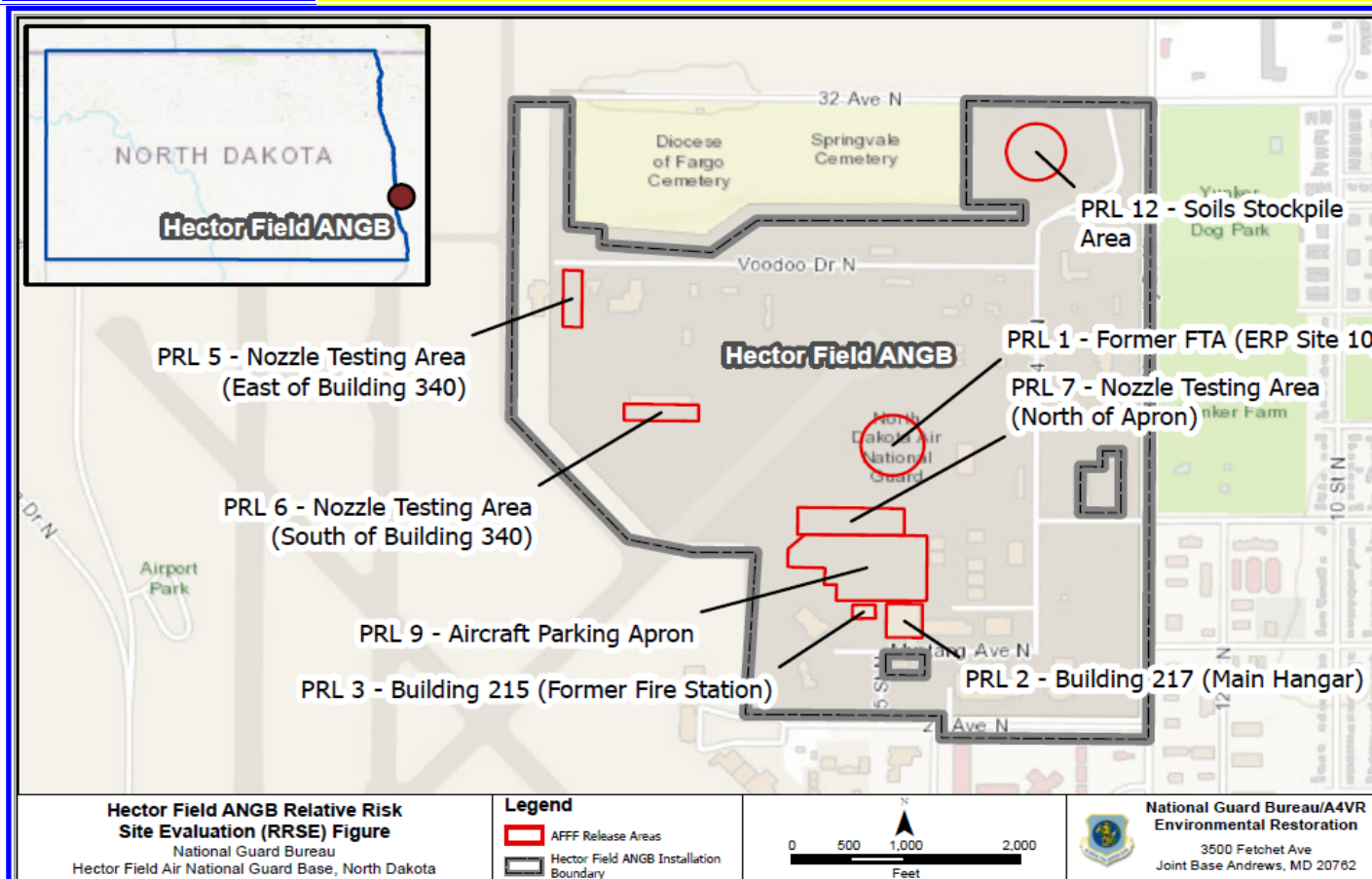
How do I participate as Stakeholder?



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 Hector Field ANGB, ND

Overall Site Category	Site Name (Sites are shown on the map below and RRSE Worksheets are attached)
HIGH	N/A
MEDIUM	PRL 1, PRL 2, PRL 3, PRL 9
LOW	PRL 5, PRL 6, PRL 7, PRL 12



AFFF Area is another term for Potential Release Location (PRL).

Site Background Information

Installation:	Hector Field ANGB	Date:	10/14/2021
Location (State):	North Dakota	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Former FTA-ERP Site 10 - PRL 1	Phase of Execution (e.g., RI, Record of Decision)	N/A
RPM's Name:	Mark Dickerson	Agreement Status (e.g., Federal Facility Agreement date)	N/A
OVERALL SITE CATEGORY: MEDIUM			

Site Summary

Brief Site Description:	<p>The Site is located south of the east end of Runway 3-21, on property formerly owned by the City of Fargo. Fire training exercises were conducted at the site from the late 1950s until mid-1989. Each training exercise involved the use of ~ 300 to 500 gal of jet propulsion fuel No. 4. Solvent use in fire training exercises was minimal. As part of the Environmental Restoration Program (ERP), a site investigation was conducted in 1992 that indicated elevated levels of VOCs, SVOCs, and metals in soil. Contaminated soil removal and treatment activities were conducted in July 1996 and were completed in July 1997. A total of 5,196 cubic yards of fuel-impacted soil were removed from Site 10 and treated on Base in a soil land-farm treatment location near the northeastern corner of the Base. Approval for reuse of soils as general fill material from the landfarm site was provided by North Dakota Dept of Health, and Site 10 was approved for closure in April 1999. The former location of the land farm site still serves as a general Base soil stockpile location and heavy equipment training area.</p>
Brief Description of Pathways:	<p>The principal aquifer is the West Fargo aquifer, located to the west of the Base. It averages 60 feet (ft) thick and is categorized as hard due to calcium and magnesium content. Small isolated aquifers, which range from a few feet to 20 ft thick, are common. The water quality varies, and the available quantity from these aquifers is small. Although the depth to the water table fluctuates seasonally, the typical depth to groundwater ranges from approximately 4 to 10 ft below ground surface (bgs). The regional groundwater flow direction across the Base is generally towards the east. The average groundwater flow velocity is considered very slow, approximately 0.5 meters per year. The Base lies in the Red River drainage basin. There are no naturally occurring drainage systems, streams, or bodies of water on the Base. Natural drainage in the Base area and surrounding airport are not very well defined due to the flat topography. A high percentage of the active administrative and industrial areas of the installation are paved or roofed and exhibit high run-off coefficients. Surface water is carried away by a series of storm sewers, culverts, and ditches that flow to several open man-made ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.</p>
Brief Description of Receptors:	<p>There are no federal or public water supply wells are within a 1-mile radius of the Base. A review of the EDR Radius Map™ Report lists 14 water wells within a 1-mile radius of the Base. Of these wells, seven are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes, one as an irrigation well, one as an industrial well, one as a stock well, and one as an observation well. Drinking water is supplied to the Hector Field ANGB by the City of Fargo. According to Base personnel, no drinking water wells are located at the Base. The Base is fenced and access is through a controlled gate. The site is a grassy area with a permanent wetland and is between the runway and the secondary fenced area. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

Groundwater Worksheet

Installation Hector Field ANGB

Site ID: PRL 1

AFFF Release Area #: AFFF 1

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOA	0.0085	0.04	0.2
PFBS	0.0041	0.602	0.0
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.2
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value	CHF VALUE		L
<u>Migratory Pathway Factor</u>			
Evident	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		M
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	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M
<u>Receptor Factor</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 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)		L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
Groundwater Category			LOW

Soil Worksheet

Installation: Hector Field ANG

Site ID: PRL 1

AFFF Release Area #: AFFF 1

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	20	0.126	158.7
PFOA	0.018	0.126	0.1
PFBS	0.044	1.9	0.0
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	158.9
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value	CHF VALUE		H
<u>Migratory Pathway Factor</u>			
Evident	Analytical data or observable evidence that contamination is present at a point of exposure		
Potential	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 above in the box to the right (maximum value = H).		M
<u>Receptor Factor</u>			
Identified	Receptors identified that have access to contaminated soil		
Potential	Potential for receptors to have access to contaminated soil		
Limited	No potential for receptors to have access to contaminated soil		L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
Soil Category			MEDIUM

Site Background Information

Installation:	Hector Field ANGB	Date:	10/14/2021
Location (State):	North Dakota	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Building 217-Main Hangar - PRL 2	Phase of Execution (e.g., RI, Record of Decision)	N/A
RPM's Name:	Mark Dickerson	Agreement Status (e.g., Federal Facility Agreement date)	N/A
OVERALL SITE CATEGORY: MEDIUM			

Site Summary

Brief Site Description:	<p>The approximate 25,000-square (sq) ft Main Hangar was originally constructed in the 1950s. An aqueous film forming foam (AFFF) Fire Suppression System (FSS) was installed in approximately 1992, which uses a series of seven low-level AFFF oscillating deck guns. The AFFF FSS remained in use at the time of the 2016 preliminary assessment (PA) site visit. One 700 gallon (gal) AFFF storage tank is utilized as part of the system. Per Fire Department personnel, the AFFF system was likely tested annually following installation until 2000. From 2000 to 2014, the system was tested approximately biannually. It is estimated that up to approximately one 55 gal drum of AFFF concentrate was utilized during each test. Water and AFFF utilized during the tests would have been ultimately discharged to the sanitary sewer system via the building floor drains. IRP Site 11 is located near the southwestern corner of Building 217. IRP Site 11 was identified as having an aboveground storage tank which contained heating oil. Building 217 was identified as a source of a chlorinated solvent plume in the mid-1990s. Multiple investigations took place to delineate the plume and remedial activities have taken place to address the chlorinated solvent contamination.</p>
Brief Description of Pathways:	<p>The principal aquifer is the West Fargo aquifer, located to the west of the Base. It averages 60 ft thick and is categorized as hard due to calcium and magnesium content. Small isolated aquifers, which range from a few feet to 20 ft thick, are common. The water quality varies, and the available quantity from these aquifers is small. Although the depth to the water table fluctuates seasonally, the typical depth to groundwater ranges from approximately 4 to 10 ft bgs. The regional groundwater flow direction across the Base is generally towards the east. The average groundwater flow velocity is considered very slow, approximately 0.5 meters per year. The Base lies in the Red River drainage basin. There are no naturally occurring drainage systems, streams, or bodies of water on the Base. Natural drainage in the Base area and surrounding airport are not very well defined due to the flat topography. A high percentage of the active administrative and industrial areas of the installation are paved or roofed and exhibit high run-off coefficients. Surface water is carried away by a series of storm sewers, culverts, and ditches that flow to several open man-made ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.</p>
Brief Description of Receptors:	<p>There are no federal or public water supply wells are within a 1-mile radius of the Base. A review of the EDR Radius Map™ Report lists 14 water wells within a 1-mile radius of the Base. Of these wells, seven are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes, one as an irrigation well, one as an industrial well, one as a stock well, and one as an observation well. Drinking water is supplied to the Hector Field ANGB by the City of Fargo. According to Base personnel, no drinking water wells are located at the Base. The Base is fenced and access is through a controlled gate. PRL 2 consists of a building with surrounding concrete areas which would limit access to site soils. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

Groundwater Worksheet

Installation Hector Field ANGB

Site ID: PRL 2

AFFF Release Area #: AFFF 2

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	58	0.04	1450.0
PFOA	16	0.04	400.0
PFBS	8.4	0.602	14.0

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	1864.0
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CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$
100 > CHF > 2	M (Medium)	
2 > CHF	L (Low)	

CHF Value	CHF VALUE	H
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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)	
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined	M
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	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M

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 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)	L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	L

Groundwater Category

MEDIUM

Soil Worksheet

Installation: Hector Field ANG

Site ID: PRL 2

AFFF Release Area #: AFFF 2

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.017	0.126	0.1
PFOA	0.0022	0.126	0.0
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.2
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value	CHF VALUE		L
<u>Migratory Pathway Factor</u>			
Evident	Analytical data or observable evidence that contamination is present at a point of exposure		
Potential	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 above in the box to the right (maximum value = H).		M
<u>Receptor Factor</u>			
Identified	Receptors identified that have access to contaminated soil		
Potential	Potential for receptors to have access to contaminated soil		
Limited	No potential for receptors to have access to contaminated soil		L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
Soil Category			LOW

Site Background Information

Installation:	Hector Field ANGB	Date:	10/14/2021
Location (State):	North Dakota	Media Evaluated:	Soil
Site Name and ID:	Bldg 215 - Former Fire Station - PRL 3	Phase of Execution (e.g., RI, Record of Decision)	N/A
RPM's Name:	Mark Dickerson	Agreement Status (e.g., Federal Facility Agreement date)	N/A
OVERALL SITE CATEGORY: MEDIUM			

Site Summary

Brief Site Description:	<p>Building 215 is a 10,552 square foot building that was built in 1955 and served as the former Base Fire Station from 1955 until 2011 when Building 340 – Current Fire Station was completed. Fire vehicles with AFFF were historically utilized and parked inside the building's bay area, and were cleaned inside the building. Trench or floor drains within the fire station drain to the sanitary sewer via an oil/water separator installed in 1989. According to FD personnel, unused AFFF from fire rescue vehicles was discharged to the sanitary sewer in ~2001 when the fire station acquired new rescue vehicles. It is estimated that approximately 180 gal of AFFF were released on three occasions during the transition from the old to new fire rescue vehicles. The discharge was coordinated with the local wastewater treatment plant. At the time of the PA site visit, Building 215 was still present and located immediately west of Building 217. Building 215 was used as the Deployment Processing Center.</p> <p>Groundwater data from co-located monitoring wells at PRL 2 were used in this evaluation.</p>
Brief Description of Pathways:	<p>The principal aquifer is the West Fargo aquifer, located to the west of the Base. It averages 60 ft. thick and is categorized as hard due to calcium and magnesium content. Small isolated aquifers, which range from a few feet to 20 ft thick, are common. The water quality varies, and the available quantity from these aquifers is small. Although the depth to the water table fluctuates seasonally, the typical depth to groundwater ranges from approximately 4 to 10 ft bgs. The regional groundwater flow direction across the Base is generally towards the east. The average groundwater flow velocity is considered very slow, approximately 0.5 meters per year. The Base lies in the Red River drainage basin. There are no naturally occurring drainage systems, streams, or bodies of water on the Base. Natural drainage in the Base area and surrounding airport are not very well defined due to the flat topography. A high percentage of the active administrative and industrial areas of the installation are paved or roofed and exhibit high run-off coefficients. Surface water is carried away by a series of storm sewers, culverts, and ditches that flow to several open man-made ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.</p>
Brief Description of Receptors:	<p>There are no federal or public water supply wells are within a 1-mile radius of the Base. A review of the EDR Radius Map™ Report lists 14 water wells within a 1-mile radius of the Base. Of these wells, seven are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes, one as an irrigation well, one as an industrial well, one as a stock well, and one as an observation well. Drinking water is supplied to the Hector Field ANGB by the City of Fargo. According to Base personnel, no drinking water wells are located at the Base. The Base is fenced and access is through a controlled gate. PRL 3 consists of a building with surrounding grassy/concrete areas which would limit access to site soils. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

Groundwater Worksheet

Installation: Hector Field ANGB

Site ID: PRL 3

AFFF Release Area #: AFFF 3

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFBS	8.4	0.602	14.0
PFOA	16	0.04	400.0
PFOS	58	0.04	1450.0

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	1864.0
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CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$
100 > CHF > 2	M (Medium)	
2 > CHF	L (Low)	

CHF Value	CHF VALUE	H
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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)	
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined	M
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	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M

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 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)	L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	L

Groundwater Category

MEDIUM

Soil Worksheet

Installation: Hector Field ANG

Site ID: PRL 3

AFFF Release Area #: AFFF 3

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	1.2	0.126	9.5
PFOA	0.023	0.126	0.2
PFBS	0.002	1.9	0.0
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	9.7
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value	CHF VALUE		M
<u>Migratory Pathway Factor</u>			
Evident	Analytical data or observable evidence that contamination is present at a point of exposure		
Potential	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 above in the box to the right (maximum value = H).		M
<u>Receptor Factor</u>			
Identified	Receptors identified that have access to contaminated soil		
Potential	Potential for receptors to have access to contaminated soil		
Limited	No potential for receptors to have access to contaminated soil		L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
Soil Category			LOW

Site Background Information

Installation:	Hector Field ANGB	Date:	10/14/2021
Location (State):	North Dakota	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Nozzle Testing Area East of Building 340 - PRL 5	Phase of Execution (e.g., RI, Record of Decision)	N/A
RPM's Name:	Mark Dickerson	Agreement Status (e.g., Federal Facility Agreement date)	N/A
OVERALL SITE CATEGORY: LOW			

Site Summary

Brief Site Description:	<p>Fire equipment and nozzle testing was typically conducted annually immediately east of the Current Fire Station in grassy areas off the concrete drive (PRL 5). Testing at this location was likely conducted in the general timeframe of 2011 to 2014. Fire equipment and nozzle testing was discontinued on Base in approximately 2014. The AFFF and water mixture was allowed to dissipate on the concrete drive and grassy areas to the east side of the Fire Station. It is estimated that less than 1 gal of AFFF and water mixture would have been discharged per testing event, depending on the duration of the test. There is a drainage swale between the testing area and the concrete drive which intercepts drainage off the cap. Storm drainage discharges enter swales near Building 340 – Current Fire Station, which discharges to the north-south trending airport drainage ditch in this location. This drainage feature eventually discharges to the county drain running west-east along the northern Base boundary.</p>
Brief Description of Pathways:	<p>The principal aquifer is the West Fargo aquifer, located to the west of the Base. It averages 60 ft thick and is categorized as hard due to calcium and magnesium content. Small isolated aquifers, which range from a few feet to 20 ft thick, are common. The water quality varies, and the available quantity from these aquifers is small. Although the depth to the water table fluctuates seasonally, the typical depth to groundwater ranges from approximately 4 to 10 ft bgs. The regional groundwater flow direction across the Base is generally towards the east. The average groundwater flow velocity is considered very slow, approximately 0.5 meters per year. The Base lies in the Red River drainage basin. There are no naturally occurring drainage systems, streams, or bodies of water on the Base. Natural drainage in the Base area and surrounding airport are not very well defined due to the flat topography. A high percentage of the active administrative and industrial areas of the installation are paved or roofed and exhibit high run-off coefficients. Surface water is carried away by a series of storm sewers, culverts, and ditches that flow to several open man-made ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.</p>
Brief Description of Receptors:	<p>There are no federal or public water supply wells are within a 1-mile radius of the Base. A review of the EDR Radius Map™ Report lists 14 water wells within a 1-mile radius of the Base. Of these wells, seven are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes, one as an irrigation well, one as an industrial well, one as a stock well, and one as an observation well. Drinking water is supplied to the Hector Field ANGB by the City of Fargo. According to Base personnel, no drinking water wells are located at the Base. The Base is fenced and access is through a controlled gate. PRL 5 consists of a vegetated area near a roadway and several other buildings. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

Groundwater Worksheet

Installation Hector Field ANGB

Site ID: PRL 5

AFFF Release Area #: AFFF 5

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOA	0.00056	0.04	0.0
PFBS	0.0012	0.602	0.0
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.0
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value	CHF VALUE		L
<u>Migratory Pathway Factor</u>			
Evident	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		M
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	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M
<u>Receptor Factor</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 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)		L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
Groundwater Category			LOW

Soil Worksheet

Installation: Hector Field ANG

Site ID: PRL 5

AFFF Release Area #: AFFF 5

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.014	0.126	0.1
PFOA	0.00081	0.126	0.0
PFBS	0.0083	1.9	0.0
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.1
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value	CHF VALUE		L
<u>Migratory Pathway Factor</u>			
Evident	Analytical data or observable evidence that contamination is present at a point of exposure		
Potential	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 above in the box to the right (maximum value = H).		M
<u>Receptor Factor</u>			
Identified	Receptors identified that have access to contaminated soil		
Potential	Potential for receptors to have access to contaminated soil		
Limited	No potential for receptors to have access to contaminated soil		L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
Soil Category			LOW

Site Background Information

Installation:	Hector Field ANGB	Date:	10/14/2021
Location (State):	North Dakota	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Nozzle Testing Area South of Building 310 - PRL 6	Phase of Execution (e.g., RI, Record of Decision)	N/A
RPM's Name:	Mark Dickerson	Agreement Status (e.g., Federal Facility Agreement date)	N/A
OVERALL SITE CATEGORY: LOW			

Site Summary

Brief Site Description:	<p>Fire equipment and nozzle testing was periodically conducted, as part of annual testing requirements, immediately south of Building 310 onto the concrete and grassy areas at this location. Testing was done at PRL 6 based on wind conditions, as this location is more sheltered due to a soil berm located on the south side of Building 310. The exact dates of testing are unknown. Fire equipment and nozzle testing was discontinued on Base in approximately 2014. The AFFF and water mixture was allowed to dissipate on the concrete drive and grassy areas. It is estimated that less than 1 gal of AFFF and water mixture would have been discharged per testing event, depending on the duration of the test. Storm drains in this vicinity discharge to Outfall 003, which discharges to the county drain running west-east along the northern Base boundary.</p>
Brief Description of Pathways:	<p>The principal aquifer is the West Fargo aquifer, located to the west of the Base. It averages 60 ft thick and is categorized as hard due to calcium and magnesium content. Small isolated aquifers, which range from a few feet to 20 ft thick, are common. The water quality varies, and the available quantity from these aquifers is small. Although the depth to the water table fluctuates seasonally, the typical depth to groundwater ranges from approximately 4 to 10 ft bgs. The regional groundwater flow direction across the Base is generally towards the east. The average groundwater flow velocity is considered very slow, approximately 0.5 meters per year. The Base lies in the Red River drainage basin. There are no naturally occurring drainage systems, streams, or bodies of water on the Base. Natural drainage in the Base area and surrounding airport are not very well defined due to the flat topography. A high percentage of the active administrative and industrial areas of the installation are paved or roofed and exhibit high run-off coefficients. Surface water is carried away by a series of storm sewers, culverts, and ditches that flow to several open man-made ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.</p>
Brief Description of Receptors:	<p>There are no federal or public water supply wells are within a 1-mile radius of the Base. A review of the EDR Radius Map™ Report lists 14 water wells within a 1-mile radius of the Base. Of these wells, seven are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes, one as an irrigation well, one as an industrial well, one as a stock well, and one as an observation well. Drinking water is supplied to the Hector Field ANGB by the City of Fargo. According to Base personnel, no drinking water wells are located at the Base. The Base is fenced and access is through a controlled gate. This PRL is a maintained grass berm with a concrete parking strip within a secondary fenced area. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

Groundwater Worksheet

Installation Hector Field ANGB

Site ID: PRL 6

AFFF Release Area #: AFFF 6

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	0.02	0.04	0.5
PFOA	0.0032	0.04	0.1
PFBS	0.0039	0.602	0.0
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.6
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value	CHF VALUE		L
<u>Migratory Pathway Factor</u>			
Evident	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		M
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	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M
<u>Receptor Factor</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 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)		L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
Groundwater Category			LOW

Soil Worksheet

Installation Hector Field ANGB

Site ID: PRL 6

AFFF Release Area #: AFFF 6

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.018	0.126	0.1
PFOA	0.0017	0.126	0.0
PFBS	0.00017	1.9	0.0
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.2
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value	CHF VALUE		L
<u>Migratory Pathway Factor</u>			
Evident	Analytical data or observable evidence that contamination is present at a point of exposure		
Potential	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		L
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
<u>Receptor Factor</u>			
Identified	Receptors identified that have access to contaminated soil		
Potential	Potential for receptors to have access to contaminated soil		
Limited	No potential for receptors to have access to contaminated soil		L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
Soil Category			LOW

Site Background Information

Installation:	Hector Field ANGB	Date:	10/14/2021
Location (State):	North Dakota	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Nozzle Testing Area - North of Apron - PRL 7	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Mark Dickerson	Agreement Status (e.g., Federal Facility Agreement date)	N/A
OVERALL SITE CATEGORY: LOW			

Site Summary

Brief Site Description:	<p>Fire equipment and nozzle testing was periodically conducted, as part of annual testing requirements, immediately north of the Aircraft Parking Apron on the grassy area. The exact dates of testing are unknown. Fire equipment and nozzle testing was discontinued on Base in approximately 2014. The AFFF and water mixture was allowed to dissipate on the grassy areas to the north of the current apron. It is estimated that less than 1 gal of AFFF and water mixture would have been discharged per testing event, depending on the duration of the test. Storm drains located in this vicinity discharge to Outfall 002, which discharges to the county drain running west-east along the northern Base boundary.</p>
Brief Description of Pathways:	<p>The principal aquifer is the West Fargo aquifer, located to the west of the Base. It averages 60 ft thick and is categorized as hard due to calcium and magnesium content. Small isolated aquifers, which range from a few feet to 20 ft thick, are common. The water quality varies, and the available quantity from these aquifers is small. Although the depth to the water table fluctuates seasonally, the typical depth to groundwater ranges from approximately 4 to 10 ft bgs. The regional groundwater flow direction across the Base is generally towards the east. The average groundwater flow velocity is considered very slow, approximately 0.5 meters per year. The Base lies in the Red River drainage basin. There are no naturally occurring drainage systems, streams, or bodies of water on the Base. Natural drainage in the Base area and surrounding airport are not very well defined due to the flat topography. A high percentage of the active administrative and industrial areas of the installation are paved or roofed and exhibit high run-off coefficients. Surface water is carried away by a series of storm sewers, culverts, and ditches that flow to several open man-made ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.</p>
Brief Description of Receptors:	<p>There are no federal or public water supply wells are within a 1-mile radius of the Base. A review of the EDR Radius Map™ Report lists 14 water wells within a 1-mile radius of the Base. Of these wells, seven are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes, one as an irrigation well, one as an industrial well, one as a stock well, and one as an observation well. Drinking water is supplied to the Hector Field ANGB by the City of Fargo. According to Base personnel, no drinking water wells are located at the Base. The Base is fenced and access is through a controlled gate. This PRL is a grassy area immediately north of the apron within a secondary fenced area. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

Groundwater Worksheet

Installation Hector Field ANGB

Site ID: PRL 7

AFFF Release Area #: AFFF 7

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	0.0039	0.04	0.1
PFOA	0.21	0.04	5.2
PFBS	0.18	0.602	0.3

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	5.6
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CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$
100 > CHF > 2	M (Medium)	
2 > CHF	L (Low)	

CHF Value	CHF VALUE	M
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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)	
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined	M
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	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M

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 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)	L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	L

Groundwater Category

LOW

Soil Worksheet

Installation Hector Field ANGB

Site ID: PRL 7

AFFF Release Area #: AFFF 7

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.091	0.126	0.7
PFOA	0.0037	0.126	0.0
PFBS	0.00014	1.9	0.0
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.8
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value	CHF VALUE		L
<u>Migratory Pathway Factor</u>			
Evident	Analytical data or observable evidence that contamination is present at a point of exposure		
Potential	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 above in the box to the right (maximum value = H).		M
<u>Receptor Factor</u>			
Identified	Receptors identified that have access to contaminated soil		
Potential	Potential for receptors to have access to contaminated soil		
Limited	No potential for receptors to have access to contaminated soil		L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
Soil Category			LOW

Site Background Information

Installation:	Hector Field ANGB	Date:	10/14/2021
Location (State):	North Dakota	Media Evaluated:	Soil
Site Name and ID:	Aircraft Parking Apron - PRL 9	Phase of Execution (e.g., RI, Record of Decision)	N/A
RPM's Name:	Mark Dickerson	Agreement Status (e.g., Federal Facility Agreement date)	N/A
OVERALL SITE CATEGORY: MEDIUM			

Site Summary

Brief Site Description:	<p>The Aircraft Parking Apron is located north of the main hangar, Building 217 and Building 215 – Former Fire Station. The Apron is used for aircraft loading and parking and may have been impacted by AFFF due to the historical presence of aircraft. Nozzle testing was performed in this area during the operation of the Former Fire Station; however, the exact dates of nozzle testing are unknown. The AFFF and water mixture was allowed to dissipate on the concrete apron. Precipitation on the apron would either drain to nearby storm drains located adjacent to the apron or sheet flow to grassy areas at the edges of the apron (apron slightly elevated from grassy areas). Storm drains located in this vicinity discharge to Outfall 002, which discharges to the county drain running west-east along the northern Base boundary. Groundwater data from co-located monitoring wells at PRL 2 were used in this evaluation.</p>
Brief Description of Pathways:	<p>The principal aquifer is the West Fargo aquifer, located to the west of the Base. It averages 60 ft thick and is categorized as hard due to calcium and magnesium content. Small isolated aquifers, which range from a few feet to 20 ft thick, are common. The water quality varies, and the available quantity from these aquifers is small. Although the depth to the water table fluctuates seasonally, the typical depth to groundwater ranges from approximately 4 to 10 ft bgs. The regional groundwater flow direction across the Base is generally towards the east. The average groundwater flow velocity is considered very slow, approximately 0.5 meters per year. The Base lies in the Red River drainage basin. There are no naturally occurring drainage systems, streams, or bodies of water on the Base. Natural drainage in the Base area and surrounding airport are not very well defined due to the flat topography. A high percentage of the active administrative and industrial areas of the installation are paved or roofed and exhibit high run-off coefficients. Surface water is carried away by a series of storm sewers, culverts, and ditches that flow to several open man-made ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.</p>
Brief Description of Receptors:	<p>There are no federal or public water supply wells are within a 1-mile radius of the Base. A review of the EDR Radius Map™ Report lists 14 water wells within a 1-mile radius of the Base. Of these wells, seven are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes, one as an irrigation well, one as an industrial well, one as a stock well, and one as an observation well. Drinking water is supplied to the Hector Field ANGB by the City of Fargo. According to Base personnel, no drinking water wells are located at the Base. The Base is fenced and access is through a controlled gate. The apron is within a secondary fenced area. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

Groundwater Worksheet

Installation: Hector Field ANGB

Site ID: PRL 9

AFFF Release Area #: AFFF 9

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFBS	8.4	0.602	14.0
PFOA	16	0.04	400.0
PFOS	58	0.04	1450.0

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	1864.0
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CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$
100 > CHF > 2	M (Medium)	
2 > CHF	L (Low)	

CHF Value	CHF VALUE	H
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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)	
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined	M
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	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M

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 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)	L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	L

Groundwater Category

MEDIUM

Soil Worksheet

Installation Hector Field ANGB

Site ID: PRL 9

AFFF Release Area #: AFFF 9

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.099	0.126	0.8
PFOA	0.0015	0.126	0.0
PFBS	0.00013	1.9	0.0
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.8
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value	CHF VALUE		L
<u>Migratory Pathway Factor</u>			
Evident	Analytical data or observable evidence that contamination is present at a point of exposure		
Potential	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 above in the box to the right (maximum value = H).		M
<u>Receptor Factor</u>			
Identified	Receptors identified that have access to contaminated soil		
Potential	Potential for receptors to have access to contaminated soil		
Limited	No potential for receptors to have access to contaminated soil		L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
Soil Category			LOW

Site Background Information

Installation:	Hector Field ANGB	Date:	10/14/2021
Location (State):	North Dakota	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Soil Stockpile Area - PRL 12	Phase of Execution (e.g., RI, Record of Decision)	N/A
RPM's Name:	Mark Dickerson	Agreement Status (e.g., Federal Facility Agreement date)	N/A
OVERALL SITE CATEGORY: LOW			

Site Summary

Brief Site Description:	<p>At the time of the PA site visit, this location served as a general Base soils stockpile area and heavy equipment training location. It was dirt and grass covered. Precipitation in this area either infiltrates into shallow soils or drains to the county drain located immediately south and east of this location. No specific storm drains or outfalls are associated with this area. This area served as a temporary soil treatment land farm for soils removed from the PRL 1 (Former FTA – ERP Site 10) and soils removed from other Base underground storage tank removal and closure projects. Soils removed from the Former FTA – ERP Site 10 are most likely present at this location, and previous land farming biological treatment would likely not have degraded any potential Perfluorinated compounds in the soils transported to this location.</p>
Brief Description of Pathways:	<p>The principal aquifer is the West Fargo aquifer, located to the west of the Base. It averages 60 ft thick and is categorized as hard due to calcium and magnesium content. Small isolated aquifers, which range from a few feet to 20 ft thick, are common. The water quality varies, and the available quantity from these aquifers is small. Although the depth to the water table fluctuates seasonally, the typical depth to groundwater ranges from approximately 4 to 10 ft bgs. The regional groundwater flow direction across the Base is generally towards the east. The average groundwater flow velocity is considered very slow, approximately 0.5 meters per year. The Base lies in the Red River drainage basin. There are no naturally occurring drainage systems, streams, or bodies of water on the Base. Natural drainage in the Base area and surrounding airport are not very well defined due to the flat topography. A high percentage of the active administrative and industrial areas of the installation are paved or roofed and exhibit high run-off coefficients. Surface water is carried away by a series of storm sewers, culverts, and ditches that flow to several open man-made ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.</p>
Brief Description of Receptors:	<p>There are no federal or public water supply wells are within a 1-mile radius of the Base. A review of the EDR Radius Map™ Report lists 14 water wells within a 1-mile radius of the Base. Of these wells, seven are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes, one as an irrigation well, one as an industrial well, one as a stock well, and one as an observation well. Drinking water is supplied to the Hector Field ANGB by the City of Fargo. According to Base personnel, no drinking water wells are located at the Base. The Base is fenced and access is through a controlled gate. This PRL is located within a fenced area without public access and is bounded on the east by the drainage ditch. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

Groundwater Worksheet

Installation Hector Field ANGB

Site ID: PRL 12

AFFF Release Area #: AFFF 12

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	0.68	0.04	17.0
PFOA	0.35	0.04	8.7
PFBS	1.6	0.602	2.7

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	28.4
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CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$
100 > CHF > 2	M (Medium)	
2 > CHF	L (Low)	

CHF Value	CHF VALUE	M
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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)	
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined	M
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	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M

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 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)	L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	L

Groundwater Category

LOW

Soil Worksheet

Installation: Hector Field ANG=

Site ID: PRL 12

AFFF Release Area #: AFFF 12

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.047	0.126	0.4
PFOA	0.0032	0.126	0.0
PFBS	0.0022	1.9	0.0
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.4
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value	CHF VALUE		L
<u>Migratory Pathway Factor</u>			
Evident	Analytical data or observable evidence that contamination is present at a point of exposure		
Potential	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 above in the box to the right (maximum value = H).		M
<u>Receptor Factor</u>			
Identified	Receptors identified that have access to contaminated soil		
Potential	Potential for receptors to have access to contaminated soil		
Limited	No potential for receptors to have access to contaminated soil		L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
Soil Category			LOW