RELATIVE RISK SITE EVALUATION CERTIFICATION

Installation Name: Hector Field ANG Base

AFFF Areas: PRL 1-12

1. Migration Pathway Factor (MPF) Certification

I have reviewed site information and have recommended the Migration Pathway Factor (MPF) that best fits the site based on my expertise and evidence provided at the site level.

ADDIS.KRISTIN.L.1534429602 Digitally signed by ADDIS.KRISTIN.L.1534429602
Date: 2020.10.27 15:05:21 -07'00'

MPF Professional Signature

2. Receptor Factor (RF) Certification

I have reviewed site information and have recommended the Receptor Factor (RF) that best fits the site based on my expertise and evidence provided at the site level.

ADDIS.KRISTIN.L.1534429602 Digitally signed by ADDIS.KRISTIN.L.1534429602
Date: 2020.10.27 15:05:44 -07'00'

RF Professional Signature

3. Internal Quality Control (QC) Certification

I have reviewed the Worksheet for data entry errors, calculation errors, and grammatical errors and certify that the Worksheet has been completed accurately.

ANDERSON.MARC.DOUGLAS.1148220952 Digitally signed by ANDERSON.MARC.DOUGLAS.1148220952
Date: 2021.06.15 09:45:19 -05'00'

QC Professional Signature

4. Final Worksheet Certification

Under the direction of the Air Force, I have reviewed the Worksheet and certify that it has been completed as a Final product.

DICKERSON.MARK.1229261211 Digitally signed by DICKERSON.MARK.1229261211
Date: 2021.06.29 07:38:41 -04'00'

NGB/A4VR Restoration Project Manager Signature

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

1. SITE BACKGROUND INFORMATION

Installation Name:	Hector Field ANG	**Date Entered:**	29/Jun/20
Location (City, Cnty, State):	Fargo, Cass County, N. Dakota	**Media Evaluated:**	soil, groundwater
Site Name:	Former FTA-ERP Site 10	**Execution Phase:**	SI
Site ID:	PRL 1	**Point of Contact:**	Mark Dickerson

2. SITE SUMMARY

a. Brief site description (site type, dates of operation, mission use):

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 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 cu. yds 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 ND 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.

Three surface and three subsurface soil samples and two groundwater samples were collected. No sediment or surface water samples were collected.

b. Brief description of pathways (groundwater, soil, surface water, sediment):

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 manmade ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.

c. Brief description of receptors:

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 (NE, SSE, SE, SW, WSW, NW, E) are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes (S, SW, SW upgradient directions), one as an irrigation well (N cross gradient direction), one as an industrial well (NNW upgradient direction), one as a stock well (NE cross gradient), and one as an observation well (SE cross gradient). 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.

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

3. GROUNDWATER

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (µg/L)	Comparison Value (µg/L; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.0085	0.04	0.21
PFOS	ND	0.04	NA
PFBS	0.0041	40	0.00
			0.21

Sum of All Ratios Check One Below

Significant (>100)	☐
Moderate (2–100)	☐
Minimal (<2)	☑

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure, such as a drinking water source.*

☑ ***Potential***

- ☑ *Contamination in the groundwater has moved beyond the source,* ***OR***
- ☐ *There is insufficient information available to make a determination of Evident or Confined.*

☐ ***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;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

One monitoring well is located approximately 100 feet downgradient and the other approximately 1,150 feet of the PRL boundaries.

c. Receptor Factor (RF)

☐ ***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 IIa groundwater)* ***OR***
- ☐ *Is a source of water for other beneficial use (e.g., agricultural).*

☑ ***Limited***

- ☑ *No known water supply wells downgradient* ***OR***
- ☐ *Groundwater is not considered a potential drinking water source and is of limited beneficial use (EPA Class III).*

Brief rationale for selection:

There were no identified water supply wells within a 1-mile radius of the Base and the aquifer is characterized as very hard (high mineral content). Wells identified as other beneficial uses are either upgradient or cross gradient.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

4. SURFACE SOIL

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (mg/kg)	Comparison Value (mg/kg; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.018	0.126	0.14
PFOS	20	0.126	159
PFBS	0.044	126	0.00
			159

Sum of All Ratios Check One Below

Significant (>100)	☑
Moderate (2–100)	☐
Minimal (<2)	☐

b. Migration Pathway Factor (MPF)

☑ ***Evident***

- ☑ *Analytical data or observable evidence that contamination above the comparison value is present at a point of exposure.*

☐ ***Potential***

- ☐ *Contamination is above the detection limit but below the comparison value and has either moved beyond the source or 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 due to barriers such as buildings, maintained berms, pavement, or caps;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

As the area is a grassy field there is a small possibility for exposure.

c. Receptor Factor (RF)

☐ ***Identified***

- ☐ *Receptors with unrestricted access to contaminated soil.*

☐ ***Potential***

- ☐ *Receptors with controlled or restricted frequency of access to contaminated soil, such as commercial/industrial areas;* ***OR***
- ☐ *Insufficient data exists to make a determination of Identified or Limited.*

☑ ***Limited***

- ☑ *Receptors with limited access to contaminated soil, such as restricted access areas, fenced areas, or other controlled access areas; or migration pathway is Confined;* ***OR***
- ☐ *Surface soil samples are non-detect.*

Brief rationale for selection:

The Base is fenced and access is through a controlled gate. The site is a grassy area between the runway and the secondary fenced area.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

5. REFERENCES USED

BB&E. May 2016. Final Perfluorinated Compounds Preliminary Assessment Site Visit Report Hector Field Air National Guard Base 119th Wing Fargo, North Dakota.

Department of Defense (DOD). October 2019. Investigating Per- and Polyfluoroalkyl Substances with the Department of Defense Cleanup Program.

Department of Defense (DoD). 1997. *Relative Risk Site Evaluation Primer, Revised Edition.* Summer.

Leidos. March 2019. Site Inspection Report for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Hector Field Air National Guard Base, Fargo, North Dakota

6. GENERAL NOTES

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

1. SITE BACKGROUND INFORMATION

Installation Name:	Hector Field ANG	**Date Entered:**	29/Jun/20
Location (City, Cnty, State):	Fargo, Cass County, N. Dakota	**Media Evaluated:**	soil, groundwater
Site Name:	Building 217- Main Hangar	**Execution Phase:**	SI
Site ID:	PRL 2 (IRP Site 11)	**Point of Contact:**	Mark Dickerson

2. SITE SUMMARY

a. Brief site description (site type, dates of operation, mission use):

The approximate 25,000-ft2 Main Hangar was originally constructed in the 1950s. An AFFF Fire Suppression System 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 PA site visit. One 700-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.

Samples collected include three groundwater and one surface and two subsurface soil samples. No sediment or surface water samples were collected.

b. Brief description of pathways (groundwater, soil, surface water, sediment):

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 manmade ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.

c. Brief description of receptors:

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 (NE, SSE, SE, SW, WSW, NW, E) are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes (S, SW, SW upgradient directions), one as an irrigation well (N cross gradient direction), one as an industrial well (NNW upgradient direction), one as a stock well (NE cross gradient), and one as an observation well (SE cross gradient). 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 the hangar and surrounded by the concrete parking apron and a small grassy strip on the west and south sides of the building.

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

3. GROUNDWATER

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (µg/L)	Comparison Value (µg/L; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	16	0.04	400
PFOS	58	0.04	1,450
PFBS	8.4	40	0.21
			1,850

Sum of All Ratios Check One Below

Significant (>100)	☑
Moderate (2–100)	☐
Minimal (<2)	☐

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure, such as a drinking water source.*

☑ ***Potential***

- ☑ *Contamination in the groundwater has moved beyond the source,* ***OR***
- ☐ *There is insufficient information available to make a determination of Evident or Confined.*

☐ ***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;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

The monitoring well with the highest concentration is approximately 75 feet south of the PRL boundaries (cross gradient). The monitoring well downgradient (~75 feet) had a PFOS concentration of 0.015 ug/L, PFOA 0.054 ug/L, and PFBS 0.051 ug/L, significantly lower concentrations.

c. Receptor Factor (RF)

☐ ***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 IIa groundwater)* ***OR***
- ☐ *Is a source of water for other beneficial use (e.g., agricultural).*

☑ ***Limited***

- ☑ *No known water supply wells downgradient* ***OR***
- ☐ *Groundwater is not considered a potential drinking water source and is of limited beneficial use (EPA Class III).*

Brief rationale for selection:

There were no identified water supply wells within a 1-mile radius of the Base and the aquifer is characterized as very hard (high mineral content). Wells identified as other beneficial uses are either upgradient or cross gradient.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

4. SURFACE SOIL

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (mg/kg)	Comparison Value (mg/kg; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.0022	0.126	0.02
PFOS	0.017	0.126	0.13
PFBS	ND	126	NA
			0.15

Sum of All Ratios Check One Below

Significant (>100)	☐
Moderate (2–100)	☐
Minimal (<2)	☑

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or observable evidence that contamination above the comparison value is present at a point of exposure.*

☑ ***Potential***

- ☑ *Contamination is above the detection limit but below the comparison value and has either moved beyond the source or 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 due to barriers such as buildings, maintained berms, pavement, or caps;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

Contamination is above the detection limit but below the comparison value.

c. Receptor Factor (RF)

☐ ***Identified***

- ☐ *Receptors with unrestricted access to contaminated soil.*

☑ ***Potential***

- ☑ *Receptors with controlled or restricted frequency of access to contaminated soil, such as commercial/industrial areas;* ***OR***
- ☐ *Insufficient data exists to make a determination of Identified or Limited.*

☐ ***Limited***

- ☐ *Receptors with limited access to contaminated soil, such as restricted access areas, fenced areas, or other controlled access areas; or migration pathway is Confined;* ***OR***
- ☐ *Surface soil samples are non-detect.*

Brief rationale for selection:

Receptors are present as this is an active area of the base that is occupied by personnel on a daily basis.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

5. REFERENCES USED

BB&E. May 2016. Final Perfluorinated Compounds Preliminary Assessment Site Visit Report Hector Field Air National Guard Base 119th Wing Fargo, North Dakota.

Department of Defense (DOD). October 2019. Investigating Per- and Polyfluoroalkyl Substances with the Department of Defense Cleanup Program.

Department of Defense (DoD). 1997. Relative Risk Site Evaluation Primer, Revised Edition. Summer.

Leidos. March 2019. Site Inspection Report for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Hector Field Air National Guard Base, Fargo, North Dakota

6. GENERAL NOTES

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

1. SITE BACKGROUND INFORMATION

Installation Name:	Hector Field ANG	**Date Entered:**	29/Jun/20
Location (City, Cnty, State):	Fargo, Cass County, N. Dakota	**Media Evaluated:**	soil
Site Name:	Bldg 215 - Former Fire Station	**Execution Phase:**	SI
Site ID:	PRL 3	**Point of Contact:**	Mark Dickerson

2. SITE SUMMARY

a. Brief site description (site type, dates of operation, mission use):

The 10,552-ft2 Building 215 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 ~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.

Samples collected include two surface and two subsurface soil samples. No groundwater, sediment or surface water samples were collected.

b. Brief description of pathways (groundwater, soil, surface water, sediment):

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 manmade ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.

c. Brief description of receptors:

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 (NE, SSE, SE, SW, WSW, NW, E) are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes (S, SW, SW upgradient directions), one as an irrigation well (N cross gradient direction), one as an industrial well (NNW upgradient direction), one as a stock well (NE cross gradient), and one as an observation well (SE cross gradient). 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 the building and it is located behind a secondary fencing area.

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

3. GROUNDWATER

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (µg/L)	Comparison Value (µg/L; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA		0.04	0.00
PFOS		0.04	0.00
PFBS		40	0.00
			0.00

Sum of All Ratios Check One Below

Significant (>100) ☐
Moderate (2–100) ☐
Minimal (<2) ☐

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure, such as a drinking water source.*

☐ ***Potential***

- ☐ *Contamination in the groundwater has moved beyond the source,* ***OR***
- ☐ *There is insufficient information available to make a determination of Evident or Confined.*

☐ ***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;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

N/A - no sample collected

c. Receptor Factor (RF)

☐ ***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 IIa groundwater)* ***OR***
- ☐ *Is a source of water for other beneficial use (e.g., agricultural).*

☐ ***Limited***

- ☐ *No known water supply wells downgradient* ***OR***
- ☐ *Groundwater is not considered a potential drinking water source and is of limited beneficial use (EPA Class III).*

Brief rationale for selection:

N/A - no sample collected

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

4. SURFACE SOIL

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (mg/kg)	Comparison Value (mg/kg; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.023	0.126	0.18
PFOS	1.2	0.126	9.52
PFBS	0.002	126	0.00
			9.71

Sum of All Ratios Check One Below

Significant (>100)	☐
Moderate (2–100)	☑
Minimal (<2)	☐

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or observable evidence that contamination above the comparison value is present at a point of exposure.*

☑ ***Potential***

- ☑ *Contamination is above the detection limit but below the comparison value and has either moved beyond the source or 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 due to barriers such as buildings, maintained berms, pavement, or caps;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

This PRL is the building which is located behind a secondary fencing area and the soil samples were collected adjacent to the apron in a grassy area.

c. Receptor Factor (RF)

☐ ***Identified***

- ☐ *Receptors with unrestricted access to contaminated soil.*

☐ ***Potential***

- ☐ *Receptors with controlled or restricted frequency of access to contaminated soil, such as commercial/industrial areas;* ***OR***
- ☐ *Insufficient data exists to make a determination of Identified or Limited.*

☑ ***Limited***

- ☑ *Receptors with limited access to contaminated soil, such as restricted access areas, fenced areas, or other controlled access areas; or migration pathway is Confined;* ***OR***
- ☐ *Surface soil samples are non-detect.*

Brief rationale for selection:

This PRL is the building and it is located behind a secondary fencing area.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

5. REFERENCES USED

BB&E. May 2016. Final Perfluorinated Compounds Preliminary Assessment Site Visit Report Hector Field Air National Guard Base 119th Wing Fargo, North Dakota.

Department of Defense (DOD). October 2019. Investigating Per- and Polyfluoroalkyl Substances with the Department of Defense Cleanup Program.

Department of Defense (DoD). 1997. Relative Risk Site Evaluation Primer, Revised Edition. Summer.

Leidos. March 2019. Site Inspection Report for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Hector Field Air National Guard Base, Fargo, North Dakota

6. GENERAL NOTES

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

1. SITE BACKGROUND INFORMATION

Installation Name:	Hector Field ANG	**Date Entered:**	29/Jun/20
Location (City, Cnty, State):	Fargo, Cass County, N. Dakota	**Media Evaluated:**	soil, groundwater
Site Name:	Nozzle Testing Area E of Bldg 340	**Execution Phase:**	SI
Site ID:	PRL 5	**Point of Contact:**	Mark Dickerson

2. SITE SUMMARY

a. Brief site description (site type, dates of operation, mission use):

Fire equipment and nozzle testing was typically conducted annually immediately east of the Current Fire Station in grassy areas off the concrete drive. 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.

Samples collected include one groundwater sample, three surface and three subsurface soil samples. No sediment or surface water samples were collected.

b. Brief description of pathways (groundwater, soil, surface water, sediment):

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 manmade ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.

c. Brief description of receptors:

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 (NE, SSE, SE, SW, WSW, NW, E) are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes (S, SW, SW upgradient directions), one as an irrigation well (N cross gradient direction), one as an industrial well (NNW upgradient direction), one as a stock well (NE cross gradient), and one as an observation well (SE cross gradient). 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 within a secondary fenced area in a grassy area that includes a drainage swale.

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

3. GROUNDWATER

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (µg/L)	Comparison Value (µg/L; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.00056	0.04	0.01
PFOS	ND	0.04	NA
PFBS	0.0012	40	0.00
			0.01

Sum of All Ratios Check One Below

Significant (>100)	☐
Moderate (2–100)	☐
Minimal (<2)	☑

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure, such as a drinking water source.*

☑ ***Potential***

- ☐ *Contamination in the groundwater has moved beyond the source,* ***OR***
- ☑ *There is insufficient information available to make a determination of Evident or Confined.*

☐ ***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;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

There is insufficient information to make a determination of evident or confined as the monitoring well is located within the PRL boundaries.

c. Receptor Factor (RF)

☐ ***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 IIa groundwater)* ***OR***
- ☐ *Is a source of water for other beneficial use (e.g., agricultural).*

☑ ***Limited***

- ☑ *No known water supply wells downgradient* ***OR***
- ☐ *Groundwater is not considered a potential drinking water source and is of limited beneficial use (EPA Class III).*

Brief rationale for selection:

There were no identified water supply wells within a 1-mile radius of the Base and the aquifer is characterized as very hard (high mineral content). Wells identified as other beneficial uses are either upgradient or cross gradient.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

4. SURFACE SOIL

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (mg/kg)	Comparison Value (mg/kg; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.00081	0.126	0.01
PFOS	0.014	0.126	0.11
PFBS	0.0083	126	0.00
			0.12

Sum of All Ratios Check One Below

Significant (>100)	☐
Moderate (2–100)	☐
Minimal (<2)	☑

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or observable evidence that contamination above the comparison value is present at a point of exposure.*

☑ ***Potential***

- ☑ *Contamination is above the detection limit but below the comparison value and has either moved beyond the source or 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 due to barriers such as buildings, maintained berms, pavement, or caps;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

The highest soil concentrations were from the boring located approximately 300 feet south of the PRL boundary (cross gradient to the groundwater flow direction).

c. Receptor Factor (RF)

☐ ***Identified***

- ☐ *Receptors with unrestricted access to contaminated soil.*

☑ ***Potential***

- ☑ *Receptors with controlled or restricted frequency of access to contaminated soil, such as commercial/industrial areas;* ***OR***
- ☐ *Insufficient data exists to make a determination of Identified or Limited.*

☐ ***Limited***

- ☐ *Receptors with limited access to contaminated soil, such as restricted access areas, fenced areas, or other controlled access areas; or migration pathway is Confined;* ***OR***
- ☐ *Surface soil samples are non-detect.*

Brief rationale for selection:

This PRL is within a secondary fenced area in a grassy area that includes a drainage swale.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

5. REFERENCES USED

BB&E. May 2016. Final Perfluorinated Compounds Preliminary Assessment Site Visit Report Hector Field Air National Guard Base 119th Wing Fargo, North Dakota.

Department of Defense (DOD). October 2019. Investigating Per- and Polyfluoroalkyl Substances with the Department of Defense Cleanup Program.

Department of Defense (DoD). 1997. Relative Risk Site Evaluation Primer, Revised Edition. Summer.

Leidos. March 2019. Site Inspection Report for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Hector Field Air National Guard Base, Fargo, North Dakota

6. GENERAL NOTES

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

1. SITE BACKGROUND INFORMATION

Installation Name:	Hector Field ANG	**Date Entered:**	29/Jun/20
Location (City, Cnty, State):	Fargo, Cass County, N. Dakota	**Media Evaluated:**	soil, groundwater
Site Name:	Nozzle Testing Area S of Bldg 310	**Execution Phase:**	SI
Site ID:	PRL 6	**Point of Contact:**	Mark Dickerson

2. SITE SUMMARY

a. Brief site description (site type, dates of operation, mission use):

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 this location 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.

Samples collected include one groundwater and four surface and three subsurface soil samples. No sediment or surface water samples were collected.

b. Brief description of pathways (groundwater, soil, surface water, sediment):

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 manmade ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.

c. Brief description of receptors:

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 (NE, SSE, SE, SW, WSW, NW, E) are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes (S, SW, SW upgradient directions), one as an irrigation well (N cross gradient direction), one as an industrial well (NNW upgradient direction), one as a stock well (NE cross gradient), and one as an observation well (SE cross gradient). 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.

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

3. GROUNDWATER

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (µg/L)	Comparison Value (µg/L; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.0032	0.04	0.08
PFOS	0.02	0.04	0.50
PFBS	0.0039	40	0.00
			0.58

Sum of All Ratios Check One Below

Significant (>100)	☐
Moderate (2–100)	☐
Minimal (<2)	☑

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure, such as a drinking water source.*

☑ ***Potential***

- ☐ *Contamination in the groundwater has moved beyond the source,* ***OR***
- ☑ *There is insufficient information available to make a determination of Evident or Confined.*

☐ ***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;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

There is insufficient information to make a determination of evident or confined as the monitoring well is located within the PRL boundaries.

c. Receptor Factor (RF)

☐ ***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 IIa groundwater)* ***OR***
- ☐ *Is a source of water for other beneficial use (e.g., agricultural).*

☑ ***Limited***

- ☑ *No known water supply wells downgradient* ***OR***
- ☐ *Groundwater is not considered a potential drinking water source and is of limited beneficial use (EPA Class III).*

Brief rationale for selection:

There were no identified water supply wells within a 1-mile radius of the Base and the aquifer is characterized as very hard (high mineral content). Wells identified as other beneficial uses are either upgradient or cross gradient.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

4. SURFACE SOIL

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (mg/kg)	Comparison Value (mg/kg; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.0017	0.126	0.01
PFOS	0.018	0.126	0.14
PFBS	0.00017	126	0.00
			0.16

Sum of All Ratios Check One Below

Significant (>100)	☐
Moderate (2–100)	☐
Minimal (<2)	☑

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or observable evidence that contamination above the comparison value is present at a point of exposure.*

☐ ***Potential***

- ☐ *Contamination is above the detection limit but below the comparison value and has either moved beyond the source or 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 due to barriers such as buildings, maintained berms, pavement, or caps;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

The PRL boundary includes a maintained grass berm and concrete paved area.

c. Receptor Factor (RF)

☐ ***Identified***

- ☐ *Receptors with unrestricted access to contaminated soil.*

☐ ***Potential***

- ☐ *Receptors with controlled or restricted frequency of access to contaminated soil, such as commercial/industrial areas;* ***OR***
- ☐ *Insufficient data exists to make a determination of Identified or Limited.*

☑ ***Limited***

- ☑ *Receptors with limited access to contaminated soil, such as restricted access areas, fenced areas, or other controlled access areas; or migration pathway is Confined;* ***OR***
- ☐ *Surface soil samples are non-detect.*

Brief rationale for selection:

This PRL is within a secondary fenced area with a maintained grass berm.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

5. REFERENCES USED

BB&E. May 2016. Final Perfluorinated Compounds Preliminary Assessment Site Visit Report Hector Field Air National Guard Base 119th Wing Fargo, North Dakota.

Department of Defense (DOD). October 2019. Investigating Per- and Polyfluoroalkyl Substances with the Department of Defense Cleanup Program.

Department of Defense (DoD). 1997. Relative Risk Site Evaluation Primer, Revised Edition. Summer.

Leidos. March 2019. Site Inspection Report for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Hector Field Air National Guard Base, Fargo, North Dakota

6. GENERAL NOTES

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

1. SITE BACKGROUND INFORMATION

Installation Name:	Hector Field ANG	**Date Entered:**	29/Jun/20
Location (City, Cnty, State):	Fargo, Cass County, N. Dakota	**Media Evaluated:**	soil, groundwater
Site Name:	Nozzle Testing Area - N of Apron	**Execution Phase:**	SI
Site ID:	PRL 7	**Point of Contact:**	Mark Dickerson

2. SITE SUMMARY

a. Brief site description (site type, dates of operation, mission use):

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.

Samples collected include two groundwater, three surface and three subsurface soil samples. No sediment or surface water samples were collected.

b. Brief description of pathways (groundwater, soil, surface water, sediment):

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 manmade ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.

c. Brief description of receptors:

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 (NE, SSE, SE, SW, WSW, NW, E) are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes (S, SW, SW upgradient directions), one as an irrigation well (N cross gradient direction), one as an industrial well (NNW upgradient direction), one as a stock well (NE cross gradient), and one as an observation well (SE cross gradient). 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.

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

3. GROUNDWATER

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (µg/L)	Comparison Value (µg/L; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.21	0.04	5.25
PFOS	0.0039	0.04	0.10
PFBS	0.18	40	0.00
			5.35

Sum of All Ratios Check One Below

Significant (>100)	☐
Moderate (2–100)	☑
Minimal (<2)	☐

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure, such as a drinking water source.*

☑ ***Potential***

- ☑ *Contamination in the groundwater has moved beyond the source,* ***OR***
- ☐ *There is insufficient information available to make a determination of Evident or Confined.*

☐ ***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;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

The highest PFAS concentrations were from the monitoring well immediately downgradient of the PRL (~10 feet). At the second monitoring well, only PFOA was detected at 0.00077 ug/L located approximately 1,400 feet downgradient.

c. Receptor Factor (RF)

☐ ***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 IIa groundwater)* ***OR***
- ☐ *Is a source of water for other beneficial use (e.g., agricultural).*

☑ ***Limited***

- ☑ *No known water supply wells downgradient* ***OR***
- ☐ *Groundwater is not considered a potential drinking water source and is of limited beneficial use (EPA Class III).*

Brief rationale for selection:

There were no identified water supply wells within a 1-mile radius of the Base and the aquifer is characterized as very hard (high mineral content). Wells identified as other beneficial uses are either upgradient or cross gradient.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

4. SURFACE SOIL

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (mg/kg)	Comparison Value (mg/kg; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.0037	0.126	0.03
PFOS	0.091	0.126	0.72
PFBS	0.00014	126	0.00
			0.75

Sum of All Ratios Check One Below

Significant (>100)	☐
Moderate (2–100)	☐
Minimal (<2)	☑

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or observable evidence that contamination above the comparison value is present at a point of exposure.*

☑ ***Potential***

- ☑ *Contamination is above the detection limit but below the comparison value and has either moved beyond the source or 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 due to barriers such as buildings, maintained berms, pavement, or caps;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

All soil samples were collected in the PRL and are above the detection limit but below the comparison value.

c. Receptor Factor (RF)

☐ ***Identified***

- ☐ *Receptors with unrestricted access to contaminated soil.*

☐ ***Potential***

- ☐ *Receptors with controlled or restricted frequency of access to contaminated soil, such as commercial/industrial areas;* ***OR***
- ☐ *Insufficient data exists to make a determination of Identified or Limited.*

☑ ***Limited***

- ☑ *Receptors with limited access to contaminated soil, such as restricted access areas, fenced areas, or other controlled access areas; or migration pathway is Confined;* ***OR***
- ☐ *Surface soil samples are non-detect.*

Brief rationale for selection:

his PRL is a grassy area immediately north of the apron within a secondary fenced area.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

5. REFERENCES USED

BB&E. May 2016. Final Perfluorinated Compounds Preliminary Assessment Site Visit Report Hector Field Air National Guard Base 119th Wing Fargo, North Dakota.

Department of Defense (DOD). October 2019. Investigating Per- and Polyfluoroalkyl Substances with the Department of Defense Cleanup Program.

Department of Defense (DoD). 1997. Relative Risk Site Evaluation Primer, Revised Edition. Summer.

Leidos. March 2019. Site Inspection Report for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Hector Field Air National Guard Base, Fargo, North Dakota

6. GENERAL NOTES

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

1. SITE BACKGROUND INFORMATION

Installation Name:	Hector Field ANG	**Date Entered:**	29/Jun/20
Location (City, Cnty, State):	Fargo, Cass County, N. Dakota	**Media Evaluated:**	soil
Site Name:	Aircraft Parking Apron	**Execution Phase:**	SI
Site ID:	PRL 9	**Point of Contact:**	Mark Dickerson

2. SITE SUMMARY

a. Brief site description (site type, dates of operation, mission use):

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.

Samples collected include one surface soil and one subsurface soil sample. No groundwater, surface water or sediment samples were collected.

b. Brief description of pathways (groundwater, soil, surface water, sediment):

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 manmade ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.

c. Brief description of receptors:

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 (NE, SSE, SE, SW, WSW, NW, E) are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes (S, SW, SW upgradient directions), one as an irrigation well (N cross gradient direction), one as an industrial well (NNW upgradient direction), one as a stock well (NE cross gradient), and one as an observation well (SE cross gradient). 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.

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

3. GROUNDWATER

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (µg/L)	Comparison Value (µg/L; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA		0.04	0.00
PFOS		0.04	0.00
PFBS		40	0.00
			0.00

Sum of All Ratios Check One Below

Significant (>100) ☐
Moderate (2–100) ☐
Minimal (<2) ☐

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure, such as a drinking water source.*

☐ ***Potential***

- ☐ *Contamination in the groundwater has moved beyond the source,* ***OR***
- ☐ *There is insufficient information available to make a determination of Evident or Confined.*

☐ ***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;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

N/A - no sample collected.

c. Receptor Factor (RF)

☐ ***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 IIa groundwater)* ***OR***
- ☐ *Is a source of water for other beneficial use (e.g., agricultural).*

☐ ***Limited***

- ☐ *No known water supply wells downgradient* ***OR***
- ☐ *Groundwater is not considered a potential drinking water source and is of limited beneficial use (EPA Class III).*

Brief rationale for selection:

N/A - no sample collected.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

4. SURFACE SOIL

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (mg/kg)	Comparison Value (mg/kg; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.0015	0.126	0.01
PFOS	0.099	0.126	0.79
PFBS	0.00013	126	0.00
			0.80

Sum of All Ratios Check One Below

Significant (>100)	☐
Moderate (2–100)	☐
Minimal (<2)	☑

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or observable evidence that contamination above the comparison value is present at a point of exposure.*

☑ ***Potential***

- ☑ *Contamination is above the detection limit but below the comparison value and has either moved beyond the source or 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 due to barriers such as buildings, maintained berms, pavement, or caps;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

Soil sample concentrations were above the detection limit but below the comparison value; the sample was collected immediately adjacent to the apron (~10 feet).

c. Receptor Factor (RF)

☐ ***Identified***

- ☐ *Receptors with unrestricted access to contaminated soil.*

☐ ***Potential***

- ☐ *Receptors with controlled or restricted frequency of access to contaminated soil, such as commercial/industrial areas;* ***OR***
- ☐ *Insufficient data exists to make a determination of Identified or Limited.*

☑ ***Limited***

- ☑ *Receptors with limited access to contaminated soil, such as restricted access areas, fenced areas, or other controlled access areas; or migration pathway is Confined;* ***OR***
- ☐ *Surface soil samples are non-detect.*

Brief rationale for selection:

The apron is within a secondary fenced area.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

5. REFERENCES USED

BB&E. May 2016. Final Perfluorinated Compounds Preliminary Assessment Site Visit Report Hector Field Air National Guard Base 119th Wing Fargo, North Dakota.

Department of Defense (DOD). October 2019. Investigating Per- and Polyfluoroalkyl Substances with the Department of Defense Cleanup Program.

Department of Defense (DoD). 1997. Relative Risk Site Evaluation Primer, Revised Edition. Summer.

Leidos. March 2019. Site Inspection Report for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Hector Field Air National Guard Base, Fargo, North Dakota

6. GENERAL NOTES

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

1. SITE BACKGROUND INFORMATION

Installation Name:	Hector Field ANG	**Date Entered:**	29/Jun/20
Location (City, Cnty, State):	Fargo, Cass County, N. Dakota	**Media Evaluated:**	none
Site Name:	Stormwater Outfall 0002	**Execution Phase:**	SI
Site ID:	PRL 10	**Point of Contact:**	Mark Dickerson

2. SITE SUMMARY

a. Brief site description (site type, dates of operation, mission use):

This storm drain discharge point in the north-central portion of the Base drains areas of the Base that likely had AFFF released to the ground surface, including the main aircraft apron, nozzle testing areas north of the apron, and the Former FTA – ERP Site 10. Outfall 002 discharges to the county drain that flows in a general west to east direction parallel to the northern Base boundary. The precast concrete outfall is physically located off Base, just north of the Base boundary. Standing water was present at the outfall's discharge point and within the county drain at the time of the PA site visit. Evaluation of this outfall included a sample of one accessible locations within the ANGB boundary upstream of the actual outfall location to ensure only ANG stormwater is evaluated.

One surface water sample was collected from a manhole upstream of Outfall 002. No soil, sediment, or groundwater samples were collected.

b. Brief description of pathways (groundwater, soil, surface water, sediment):

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 manmade ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.

c. Brief description of receptors:

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 (NE, SSE, SE, SW, WSW, NW, E) are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes (S, SW, SW upgradient directions), one as an irrigation well (N cross gradient direction), one as an industrial well (NNW upgradient direction), one as a stock well (NE cross gradient), and one as an observation well (SE cross gradient). 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 PRL is the outfall discharge structure which is located off Base on the public airfield due east of the main runway.

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

3. GROUNDWATER

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (µg/L)	Comparison Value (µg/L; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA		0.04	0.00
PFOS		0.04	0.00
PFBS		40	0.00
			0.00

Sum of All Ratios Check One Below

Significant (>100) ☐
Moderate (2–100) ☐
Minimal (<2) ☐

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure, such as a drinking water source.*

☐ ***Potential***

- ☐ *Contamination in the groundwater has moved beyond the source,* ***OR***
- ☐ *There is insufficient information available to make a determination of Evident or Confined.*

☐ ***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;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

N/A - no sample collected

c. Receptor Factor (RF)

☐ ***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 IIa groundwater)* ***OR***
- ☐ *Is a source of water for other beneficial use (e.g., agricultural).*

☐ ***Limited***

- ☐ *No known water supply wells downgradient* ***OR***
- ☐ *Groundwater is not considered a potential drinking water source and is of limited beneficial use (EPA Class III).*

Brief rationale for selection:

N/A - no sample collected

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

4. SURFACE SOIL

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (mg/kg)	Comparison Value (mg/kg; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA		0.126	0.00
PFOS		0.126	0.00
PFBS		126	0.00
			0.00

Sum of All Ratios Check One Below

Significant (>100) ☐
Moderate (2–100) ☐
Minimal (<2) ☐

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or observable evidence that contamination above the comparison value is present at a point of exposure.*

☐ ***Potential***

- ☐ *Contamination is above the detection limit but below the comparison value and has either moved beyond the source or 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 due to barriers such as buildings, maintained berms, pavement, or caps;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

N/A - no sample collected

c. Receptor Factor (RF)

☐ ***Identified***

- ☐ *Receptors with unrestricted access to contaminated soil.*

☐ ***Potential***

- ☐ *Receptors with controlled or restricted frequency of access to contaminated soil, such as commercial/industrial areas;* ***OR***
- ☐ *Insufficient data exists to make a determination of Identified or Limited.*

☐ ***Limited***

- ☐ *Receptors with limited access to contaminated soil, such as restricted access areas, fenced areas, or other controlled access areas; or migration pathway is Confined;* ***OR***
- ☐ *Surface soil samples are non-detect.*

Brief rationale for selection:

N/A - no sample collected

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

5. REFERENCES USED

BB&E. May 2016. Final Perfluorinated Compounds Preliminary Assessment Site Visit Report Hector Field Air National Guard Base 119th Wing Fargo, North Dakota.

Department of Defense (DOD). October 2019. Investigating Per- and Polyfluoroalkyl Substances with the Department of Defense Cleanup Program.

Department of Defense (DoD). 1997. Relative Risk Site Evaluation Primer, Revised Edition. Summer.

Leidos. March 2019. Site Inspection Report for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Hector Field Air National Guard Base, Fargo, North Dakota

6. GENERAL NOTES

A surface water sample was collected and the concentrations were PFOS 3.8 ug/L, PFOA 0.52 ug/L, and PFBS 0.25 ug/L.

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

1. SITE BACKGROUND INFORMATION

Installation Name:	Hector Field ANG	**Date Entered:**	29/Jun/20
Location (City, Cnty, State):	Fargo, Cass County, N. Dakota	**Media Evaluated:**	none
Site Name:	Stormwater Outfall 003	**Execution Phase:**	SI
Site ID:	PRL 11	**Point of Contact:**	Mark Dickerson

2. SITE SUMMARY

a. Brief site description (site type, dates of operation, mission use):

This storm drain discharge point in the northwest portion of the Base drains areas of the Base that likely had AFFF released to the ground surface, including the Nozzle Testing Area – South of Building 310 and possibly areas surrounding Building 340 – Current Fire Station. Outfall 003 discharges to the county drain that flows in a general west to east direction parallel to the northern Base boundary. The outfall is physically located off Base, just north of the Base boundary. Evaluation of this outfall included sampling of accessible locations within the ANGB boundary upstream of the actual outfall location to ensure only ANG stormwater resources are evaluated.

One surface water sample was collected from a manhole upstream of outfall 003 inside the Base boundaries. No soil, groundwater, or sediment samples were collected.

b. Brief description of pathways (groundwater, soil, surface water, sediment):

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 manmade ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.

c. Brief description of receptors:

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 (NE, SSE, SE, SW, WSW, NW, E) are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes (S, SW, SW upgradient directions), one as an irrigation well (N cross gradient direction), one as an industrial well (NNW upgradient direction), one as a stock well (NE cross gradient), and one as an observation well (SE cross gradient). 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 PRL is the outfall discharge structure which is located off Base on the public airfield due east of the main runway.

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

3. GROUNDWATER

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (µg/L)	Comparison Value (µg/L; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA		0.04	0.00
PFOS		0.04	0.00
PFBS		40	0.00
			0.00

Sum of All Ratios Check One Below

Significant (>100) ☐
Moderate (2–100) ☐
Minimal (<2) ☐

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure, such as a drinking water source.*

☐ ***Potential***

- ☐ *Contamination in the groundwater has moved beyond the source,* ***OR***
- ☐ *There is insufficient information available to make a determination of Evident or Confined.*

☐ ***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;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

N/A - no sample collected

c. Receptor Factor (RF)

☐ ***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 IIa groundwater)* ***OR***
- ☐ *Is a source of water for other beneficial use (e.g., agricultural).*

☐ ***Limited***

- ☐ *No known water supply wells downgradient* ***OR***
- ☐ *Groundwater is not considered a potential drinking water source and is of limited beneficial use (EPA Class III).*

Brief rationale for selection:

N/A - no sample collected

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

4. SURFACE SOIL

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (mg/kg)	Comparison Value (mg/kg; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA		0.126	0.00
PFOS		0.126	0.00
PFBS		126	0.00
			0.00

Sum of All Ratios Check One Below

Significant (>100) ☐
Moderate (2–100) ☐
Minimal (<2) ☐

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or observable evidence that contamination above the comparison value is present at a point of exposure.*

☐ ***Potential***

- ☐ *Contamination is above the detection limit but below the comparison value and has either moved beyond the source or 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 due to barriers such as buildings, maintained berms, pavement, or caps;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

N/A - no sample collected

c. Receptor Factor (RF)

☐ ***Identified***

- ☐ *Receptors with unrestricted access to contaminated soil.*

☐ ***Potential***

- ☐ *Receptors with controlled or restricted frequency of access to contaminated soil, such as commercial/industrial areas;* ***OR***
- ☐ *Insufficient data exists to make a determination of Identified or Limited.*

☐ ***Limited***

- ☐ *Receptors with limited access to contaminated soil, such as restricted access areas, fenced areas, or other controlled access areas; or migration pathway is Confined;* ***OR***
- ☐ *Surface soil samples are non-detect.*

Brief rationale for selection:

N/A - no sample collected

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

5. REFERENCES USED

BB&E. May 2016. Final Perfluorinated Compounds Preliminary Assessment Site Visit Report Hector Field Air National Guard Base 119th Wing Fargo, North Dakota.

Department of Defense (DOD). October 2019. Investigating Per- and Polyfluoroalkyl Substances with the Department of Defense Cleanup Program.

Department of Defense (DoD). 1997. Relative Risk Site Evaluation Primer, Revised Edition. Summer.

Leidos. March 2019. Site Inspection Report for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Hector Field Air National Guard Base, Fargo, North Dakota

6. GENERAL NOTES

A surface water sample was collected and the concentrations were PFOS 0.41 ug/L, PFOA 0.02 ug/L, and PFBS 0.039 ug/L.

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

1. SITE BACKGROUND INFORMATION

Installation Name:	Hector Field ANG	**Date Entered:**	29/Jun/20
Location (City, Cnty, State):	Fargo, Cass County, N. Dakota	**Media Evaluated:**	soil, groundwater
Site Name:	Soil Stockpile Area	**Execution Phase:**	SI
Site ID:	PRL 12	**Point of Contact:**	Mark Dickerson

2. SITE SUMMARY

a. Brief site description (site type, dates of operation, mission use):

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 UST 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.

Samples collected include two groundwater and three surface and three subsurface soil samples. No sediment or surface water samples were collected.

b. Brief description of pathways (groundwater, soil, surface water, sediment):

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 manmade ditches; these in turn flow north and east to the Red River, which lies about two miles east of the Base.

c. Brief description of receptors:

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 (NE, SSE, SE, SW, WSW, NW, E) are listed in the Federal U.S. Geological Survey database. The remaining seven wells are - three are listed as test holes (S, SW, SW upgradient directions), one as an irrigation well (N cross gradient direction), one as an industrial well (NNW upgradient direction), one as a stock well (NE cross gradient), and one as an observation well (SE cross gradient). 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.

RELATIVE RISK SITE EVALUATION WORKSHEET

Human Endpoint

3. GROUNDWATER

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (µg/L)	Comparison Value (µg/L; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.35	0.04	8.75
PFOS	0.68	0.04	17.0
PFBS	1.6	40	0.04
			25.8

Sum of All Ratios Check One Below

Significant (>100)	☐
Moderate (2–100)	☑
Minimal (<2)	☐

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure, such as a drinking water source.*

☑ ***Potential***

- ☐ *Contamination in the groundwater has moved beyond the source,* ***OR***
- ☑ *There is insufficient information available to make a determination of Evident or Confined.*

☐ ***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;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

The monitoring well within the PRL boundaries had the highest concentrations and the downgradient well results were all ND. Therefore there is insufficient information to make a determination of evident or confined.

c. Receptor Factor (RF)

☐ ***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 IIa groundwater)* ***OR***
- ☐ *Is a source of water for other beneficial use (e.g., agricultural).*

☑ ***Limited***

- ☑ *No known water supply wells downgradient* ***OR***
- ☐ *Groundwater is not considered a potential drinking water source and is of limited beneficial use (EPA Class III).*

Brief rationale for selection:

There were no identified water supply wells within a 1-mile radius of the Base and the aquifer is characterized as very hard (high mineral content). Wells identified as other beneficial uses are either upgradient or cross gradient.

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

4. SURFACE SOIL

a. Contaminant Hazard Factor (CHF)

Contaminant	Maximum Conc. (mg/kg)	Comparison Value (mg/kg; DOD 2019)	Ratio Maximum Conc./ Comparison Value
PFOA	0.0032	0.126	0.03
PFOS	0.047	0.126	0.37
PFBS	0.0022	126	0.00
			0.40

Sum of All Ratios Check One Below

Significant (>100)	☐
Moderate (2–100)	☐
Minimal (<2)	☑

b. Migration Pathway Factor (MPF)

☐ ***Evident***

- ☐ *Analytical data or observable evidence that contamination above the comparison value is present at a point of exposure.*

☑ ***Potential***

- ☑ *Contamination is above the detection limit but below the comparison value and has either moved beyond the source or 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 due to barriers such as buildings, maintained berms, pavement, or caps;* ***OR***
- ☐ *Is non-detect.*

Brief rationale for selection:

The ground is sloped towards the drainage ditch towards the east (based on Google Earth image). Soil contamination is above the detection limit but below the comparison value.

c. Receptor Factor (RF)

☐ ***Identified***

- ☐ *Receptors with unrestricted access to contaminated soil.*

☑ ***Potential***

- ☑ *Receptors with controlled or restricted frequency of access to contaminated soil, such as commercial/industrial areas;* ***OR***
- ☐ *Insufficient data exists to make a determination of Identified or Limited.*

☐ ***Limited***

- ☐ *Receptors with limited access to contaminated soil, such as restricted access areas, fenced areas, or other controlled access areas; or migration pathway is Confined;* ***OR***
- ☐ *Surface soil samples are non-detect.*

Brief rationale for selection:

A review of Google Earth historical imagery shows earth moving activities at the PRL starting at least from 1991 (earliest photo) and continuing through 2018 (last photo).

RELATIVE RISK SITE EVALUATION WORKSHEET
Human Endpoint

5. REFERENCES USED

BB&E. May 2016. Final Perfluorinated Compounds Preliminary Assessment Site Visit Report Hector Field Air National Guard Base 119th Wing Fargo, North Dakota.

Department of Defense (DOD). October 2019. Investigating Per- and Polyfluoroalkyl Substances with the Department of Defense Cleanup Program.

Department of Defense (DoD). 1997. Relative Risk Site Evaluation Primer, Revised Edition. Summer.

Leidos. March 2019. Site Inspection Report for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Hector Field Air National Guard Base, Fargo, North Dakota

6. GENERAL NOTES