RELATIVE RISK SITE EVALUATION

Toledo Express Airport, Ohio

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 Toledo Air National Guard Base (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 (e.g., Active, ANG, BRAC), scroll down the Installation List and click on Toledo Express Airport, OH then enter the AR Number 471721 in the “AR #” field for the PA. For the SI, enter the AR Number 581337 (Part 1 of 11). Then click “Search” at the bottom of the page. Click on the image of the eye 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

AFFF - Aqueous Film Forming Foam

ANG - Air National Guard

ANGB - Air National Guard Base

AST – Aboveground Storage Tank

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

CHF – Contaminant Hazard Factor

DoD - Department of Defense

EPA – US Environmental Protection

Agency FTA – Fire Training Area

HA – Health Advisory

MPF – Migration Pathway Factor

PA – Preliminary Assessment

PFAS - Per-and polyfluoroalkyl substances

PFBS – Perfluorobutanesulfonic acid

PFOS - Perfluorooctane sulfonate

PFOA - Perfluorooctanoic acid

PRL - Potential Release Location

RF – Receptor Factor

RI – Remedial Investigation

RRSE – Relative Risk Site Evaluation

SI – Site Inspection

RELATIVE RISK SITE EVALUATION, cont.

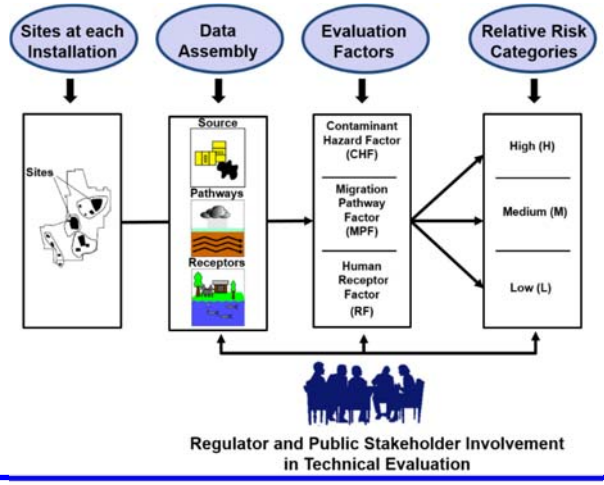
Q. What is the Relative Risk Site Evaluation (RRSE)?

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.

Relative Risk Site Evaluation Concept Summary

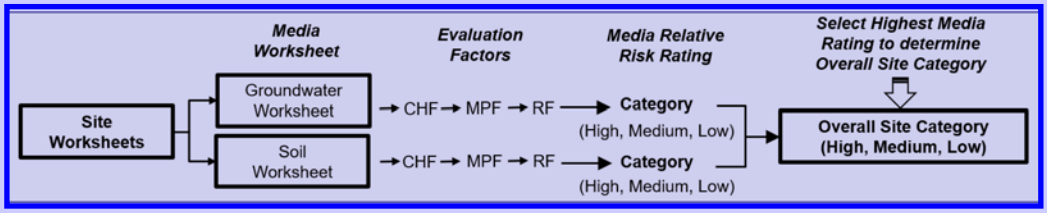


Sites at Each Installation

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.



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

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

FOR MORE INFORMATION

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

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

POINT OF CONTACT

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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?

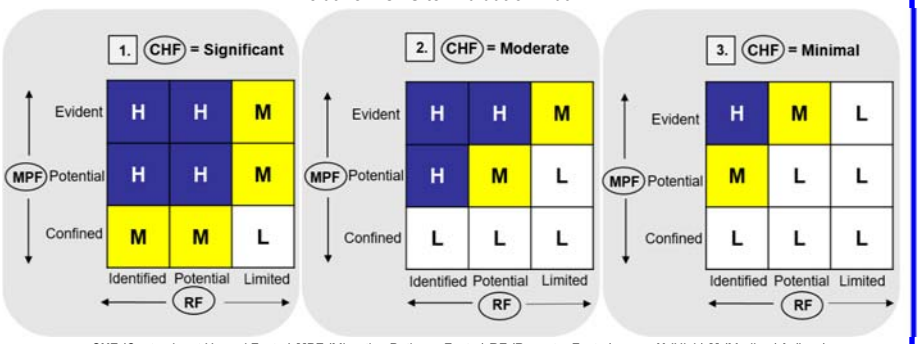
A. The **Receptor Factor (RF)** is determined by a receptor's, such as humans, potential to come into contact with contaminated media. **RFs** are designated as: identified, potential, or limited **(High, Medium, and Low). Identified** rating is given when receptors are in contact or threat of contact 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 EVALUTION, cont.

Media Relative Risk Rating

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

Relative Risk Site Evaluation Matrix



CHF (Contaminant Hazard Factor) **MPF** (Migration Pathway Factor) **RF** (Receptor Factor) **H** (High) **M** (Medium) **L** (Low)

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**.

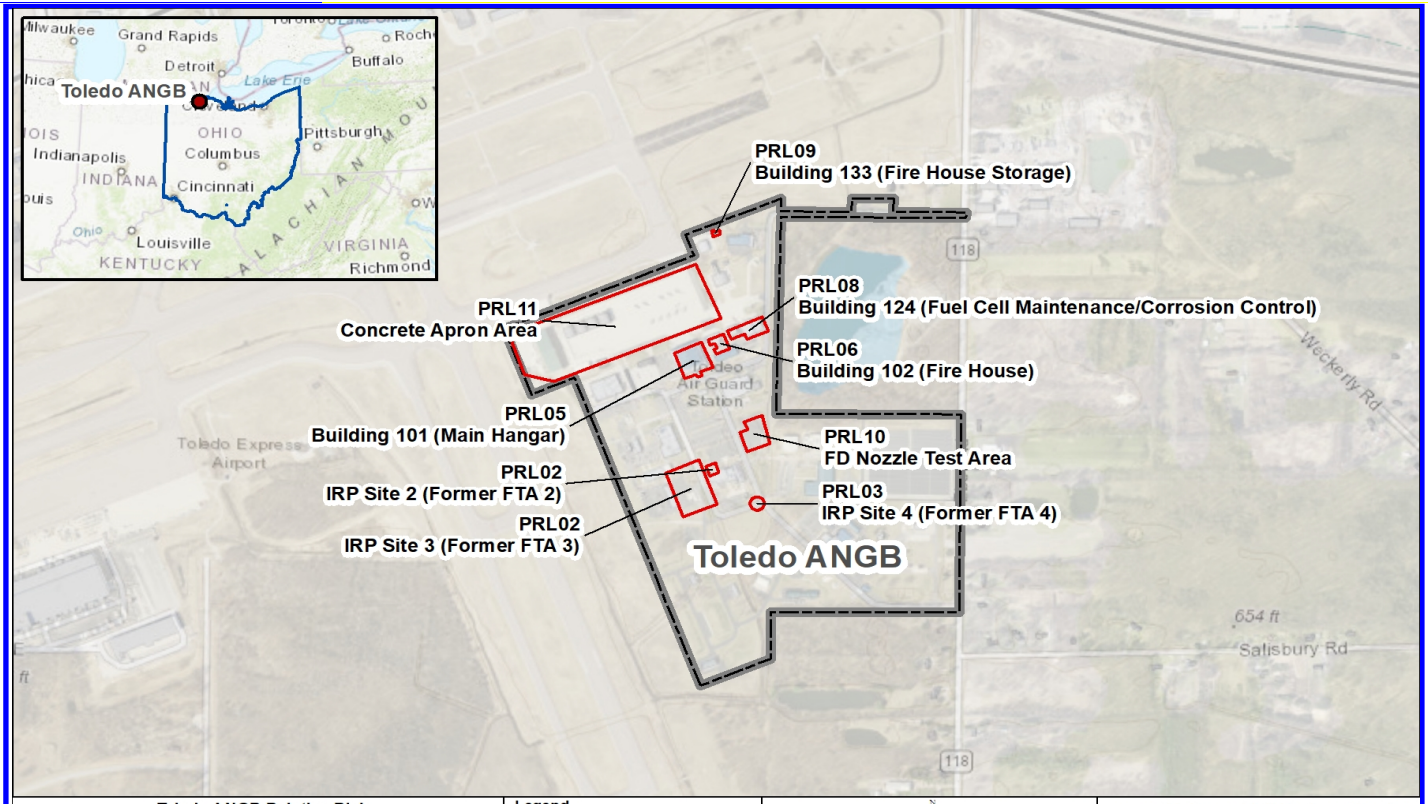
Regulatory and Stakeholder Involvement

Q. **How do I participate as Stakeholder?**

A. To offer opportunity to participate in RRSE, the Air Force announces a public comment period in your local newspaper. There is also opportunity to participate during installation Restoration Advisory Committees where active. Installation Restoration Advisory Committee meetings are also announced in your local newspaper.

Relative Risk Site Evaluation Summary Toledo ANGB, OH

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



Notes:
Aqueous Film Forming Foam (AFFF) Area is another term for Potential Release Location (PRL).

Site Background Information			
Installation:	Toledo ANGB	**Date:**	8/27/2021
Location (State):	Ohio	**Media Evaluated:**	Groundwater, Soil
Site Name and ID:	Former Fire Training Areas 2 & 3 (Installation Restoration Program (IRP) Sites 2 & 3) - PRL 2	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Troy Sanders	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	Installation Restoration Program (IRP) Site 2 is a former Fire Training Area (FTA), located on the northwest corner of current Building 136. It was a circular bermed area with a diameter of 38 feet (ft). IRP Site 2 was used for fire training exercises approximately 18 times per year from 1966 until 1978. The use of IRP Site 2 was discontinued briefly during the early 1970s. It is unknown if Aqueous Film Forming Foam (AFFF) was used at this FTA. IRP Site 3 is a former FTA, located in the fenced area where the Motor Pool Building (Building 119) now stands. This area was used for fire training exercises once or twice during the 1970s and was then abandoned due to planned construction activities and complaints of smoke over the runway. The area was paved with asphalt in 1977. It is unknown if AFFF was used at this FTA. During the November 1998 remedial investigation (RI), completed for legacy constituents at IRP Sites 1, 2, and 3 were combined to form IRP Site 1/2/3. A Final Feasibility Study was completed in May 2001, which concluded that natural attenuation and long-term monitoring were the desired remedial method for contaminated groundwater at Site 1/2/3. The Ohio EPA concurred with an No Further Action (NFA) decision by the Air National Guard (ANG) in 2007 for contaminants not including per- and polyfluoroalkyl substances (PFAS) . The monitoring well used to evaluate groundwater down gradient of this PRL was co-located/associated with PRL 3.
Brief Description of Pathways:	The shallow aquifer underlying the Base consists of unconsolidated glacial sand associated with beach or deltaic deposition, with extensive reworking into dunes. The unconsolidated sediments in the Toledo area may locally attain thicknesses in excess of 150 ft.; however, the aquifer is locally 60 to 80 ft. thick at Toledo Air National Guard Base (ANGB). Bedrock is encountered approximately 60 and 85 ft. below Toledo ANGB. The surficial sand aquifer in Lucas County is recharged by precipitation. Historically, water levels are generally between 2 and 8 ft. below ground surface (bgs) and vary seasonally. During the site investigation (SI), groundwater was encountered at depths ranging from 1.25 to 7.75 ft. bgs; with most boreholes encountering groundwater between 2 and 4 ft. bgs. The groundwater flow direction on the Base varies locally and with seasonal fluctuations; however, the groundwater flow direction at PRL 2 is to the southeast. The surface cover at PRL 2 is a mixture of asphalt and vegetation.
Brief Description of Receptors:	The area around the airport to the north, east, and south is served by Toledo-Lucas County Water with water from Lake Erie. However, public water service stops west of Toledo Express Airport. In addition, even in the areas of public water service, there are many people on private wells even though public water is available. Within 2 miles of the Base there are 88 wells that appear to be private wells utilized for domestic use. No public water supply system wells were identified within 1 mile of Toledo ANGB. One domestic drinking water well was identified at Toledo ANGB. Documentation exists indicating use of the drinking water well was discontinued in 1994 and this well was properly abandoned in January 2015. One public drinking water well was identified at Toledo Express Airport with a minimum of six additional domestic and drinking water wells located within a 0.5-mile radius of Toledo ANGB property. Drinking water well sampling by Ohio EPA in 2016-17 documented PFAS impacts in private drinking water wells. PFAS including PFOA, PFOS, and PFBS have been detected at multiple onsite wells at varying concentrations. PRL 2 is located within the base boundaries therefore, exposure would be limited to military and civilian personnel in commercial/industrial scenarios.

Groundwater Worksheet

Installation: Toledo ANGB

Site ID: PRL-2 **AFFF Release Area #:** AFFF 2

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	6.4	0.04	160.0
PFOA	0.46	0.04	11.5
PFBS	6.86	0.602	11.4

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	182.9
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

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).	H
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).	
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H
	Groundwater Category	**HIGH**

Soil Worksheet

Installation: Toledo ANGB

Site ID: PRL-2 **AFFF Release Area #:** AFFF 2

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.4	0.126	3.2
PFOA	0.0023	0.126	0.0
PFBS	0.00022	1.9	0.0
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**3.2**
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**	**M**

Migratory Pathway Factor		
Evident	Analytical data or observable evidence that contamination is present at a point of exposure.	H
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.	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H

Receptor Factor		
Identified	Receptors identified that have access to contaminated soil.	
Potential	Potential for receptors to have access to contaminated soil.	M
Limited	No potential for receptors to have access to contaminated soil.	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M
	Soil Category	**HIGH**

Site Background Information			
Installation:	Toledo ANGB	**Date:**	8/27/2021
Location (State):	Ohio	**Media Evaluated:**	Groundwater, Soil
Site Name and ID:	Former Fire Training Area 4 (IRP Site 4) - PRL 3	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Troy Sanders	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	IRP Site 4 is a former FTA, located immediately north of the Small Arms Firing Range. This site was used for fire training exercises for 6 months in the early 1970s, immediately after fire training exercises were discontinued at IRP Site 3. The precise location, dimensions, construction method, and total number of exercises conducted at this site are unknown. It is unknown if AFFF was used at this FTA. The site was reportedly abandoned because the sandy soil at the site would not retain water, thus the fuel could not be floated before ignition. NFA was issued in 2006 for the petroleum release. The site is located in the central portion of the base and downgradient from PRL 2.
Brief Description of Pathways:	The shallow aquifer underlying the Base consists of unconsolidated glacial sand associated with beach or deltaic deposition, with extensive reworking into dunes. The unconsolidated sediments in the Toledo area may locally attain thicknesses in excess of 150 ft.; however, the aquifer is locally 60 to 80 ft. thick at Toledo ANGB. Bedrock is encountered approximately 60 and 85 ft. below Toledo ANGB. The surficial sand aquifer in Lucas County is recharged by precipitation. Historically, water levels are generally between 2 and 8 ft. bgs and vary seasonally. During the SI, groundwater was encountered at depths ranging from 1.25 to 7.75 ft. bgs; with most boreholes encountering groundwater between 2 and 4 ft. bgs. The groundwater flow direction on the Base varies locally and from seasonal fluctuations; however, the groundwater flow direction at PRL 3 is southeast. The surface cover at PRL 3 is a mixture of vegetation and pavement.
Brief Description of Receptors:	The area around the airport to the north, east, and south is served by Toledo-Lucas County Water with water from Lake Erie. However, public water service stops west of Toledo Express Airport. In addition, even in the areas of public water service, there are many people on private wells even though public water is available. Within 2 miles of the Base there are 88 wells that appear to be private wells utilized for domestic use. No public water supply system wells were identified within 1 mile of Toledo ANGB. One domestic drinking water well was identified at Toledo ANGB. Documentation exists indicating use of the drinking water well was discontinued in 1994 and this well was properly abandoned in January 2015. One public drinking water well was identified at Toledo Express Airport with a minimum of six additional domestic and drinking water wells located within a 0.5-mile radius of Toledo ANGB property. Drinking water well sampling by Ohio EPA in 2016-17 documented PFAS impacts in private drinking water wells. PFAS including PFOA, PFOS, and PFBS have been detected at multiple onsite wells at varying concentrations. PRL 3 is located within the base boundaries therefore, exposure would be limited to military and civilian personnel in commercial/industrial scenarios.

Groundwater Worksheet

Installation: Toledo ANGB

Site ID: PRL 3 **AFFF Release Area #:** AFFF 3

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	6.4	0.04	160.0
PFOA	0.46	0.04	11.5
PFBS	6.86	0.602	11.4

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	182.9
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

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).	H
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).	
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H
	Groundwater Category	**HIGH**

Soil Worksheet

Installation: Toledo ANGB

Site ID: PRL-3 **AFFF Release Area #:** AFFF 3

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.2	0.126	1.6
PFOA	0.0012	0.126	0.0
PFBS	0.00016	1.9	0.0
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**1.6**
CHF > 100	**H (High)**		
100 > CHF > 2	**M (Medium)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
2 > CHF	**L (Low)**		
CHF Value		**CHF VALUE**	**L**

Migratory Pathway Factor		
Evident	Analytical data or observable evidence that contamination is present at a point of exposure.	H
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.	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H

Receptor Factor		
Identified	Receptors identified that have access to contaminated soil.	
Potential	Potential for receptors to have access to contaminated soil.	M
Limited	No potential for receptors to have access to contaminated soil.	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M
	Soil Category	**MEDIUM**

Site Background Information			
Installation:	Toledo ANGB	**Date:**	8/27/2021
Location (State):	Ohio	**Media Evaluated:**	Groundwater, Soil
Site Name and ID:	Building 101 (Main Hangar) - PRL-5	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Troy Sanders	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	Hangar 101 was constructed in 1958, but the AFFF fire suppression system (FSS) was not installed until 1996. This FSS consists of one, aboveground, 800-gal tank in Room 130 within the hangar; a series of aboveground pipes; and six cannons within the hangar bay for AFFF dispersion. The building is equipped with floor drains along northern and southern ends, as well as along the middle of the hangar floor. These floor drains connect to an oil/water separator (OWS) located outside the building's west side, which discharges to the Maumee River Wastewater Treatment Plant (MRWWTP). An inadvertent release of AFFF occurred in February 2001. The system discharged approximately 30 gal of AFFF before it was deactivated. The AFFF was rinsed with water into the hangar floor drain. At the time of the BB&E 2015 preliminary assessment (PA) site visit, there was a small leak from the 800-gal AFFF storage tank. A plastic container was in place to capture the leaking fluid, but some had spilled onto the concrete floor. It was unclear how much AFFF was in the tank at the time of the site visit because the fill gauge was obscured by tape. A floor drain is located immediately outside Room 130 and is assumed to be connected to the hangar's OWS. The spilled AFFF was not in the vicinity of the floor drain.
Brief Description of Pathways:	The shallow aquifer underlying the Base consists of unconsolidated glacial sand associated with beach or deltaic deposition, with extensive reworking into dunes. The unconsolidated sediments in the Toledo area may locally attain thicknesses in excess of 150 ft.; however, the aquifer is locally 60 to 80 ft. thick at Toledo ANGB. Bedrock is encountered approximately 60 and 85 ft. below Toledo ANGB. The surficial sand aquifer in Lucas County is recharged by precipitation. Historically, water levels are generally between 2 and 8 ft. bgs and vary seasonally. During the SI, groundwater was encountered at depths ranging from 1.25 to 7.75 ft. bgs; with most boreholes encountering groundwater between 2 and 4 ft. bgs. The groundwater flow direction on the Base varies locally and from seasonal fluctuations; however, the groundwater flow direction at PRL 5 is east/southeast. The surface cover at PRL 5 is primarily pavement or the building with small areas of landscaped vegetation.
Brief Description of Receptors:	The area around the airport to the north, east, and south is served by Toledo-Lucas County Water with water from Lake Erie. However, public water service stops west of Toledo Express Airport. In addition, even in the areas of public water service, there are many people on private wells even though public water is available. Within 2 miles of the Base there are 88 wells that appear to be private wells utilized for domestic use. No public water supply system wells were identified within 1 mile of Toledo ANGB. One domestic drinking water well was identified at Toledo ANGB. Documentation exists indicating use of the drinking water well was discontinued in 1994 and this well was properly abandoned in January 2015. One public drinking water well was identified at Toledo Express Airport with a minimum of six additional domestic and drinking water wells located within a 0.5-mile radius of Toledo ANGB property. Drinking water well sampling by Ohio EPA in 2016-17 documented PFAS impacts in private drinking water wells. PFAS including PFOA, PFOS, and PFBS have been detected at multiple onsite wells at varying concentrations. PRL 5 is located within the base boundaries therefore, exposure would be limited to military and civilian personnel in commercial/industrial scenarios.

Groundwater Worksheet

Installation: Toledo ANGB

Site ID: PRL 5 **AFFF Release Area #:** AFFF 5

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	8.8	0.04	220.0
PFOA	0.17	0.04	4.3
PFBS	8.97	0.602	14.9

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	239.2
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	H

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).	H
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).	
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H
	Groundwater Category	**HIGH**

Soil Worksheet

Installation: Toledo ANGB

Site ID: PRL 5 **AFFF Release Area #:** AFFF 5

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.047	0.126	0.4
PFOA	0.00045	0.126	0.0
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**0.4**
CHF > 100	**H (High)**		
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CHF Value		**CHF VALUE**	**L**

$$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$$

Migratory Pathway Factor		
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

Receptor Factor		
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:	Toledo ANGB	**Date:**	8/27/2021
Location (State):	Ohio	**Media Evaluated:**	Groundwater, Soil
Site Name and ID:	Building 102 (Fire House) - PRL 6	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Troy Sanders	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	Building 102 was constructed in 1957 and houses the Base Fire Department. The vehicle bay is equipped with floor drains running along the northern and southern ends, which discharge to an OWS and then the MRWWTP. At the time of the 2015 PA site visit, the Fire Department had three crash trucks (56-, 71-, and 210-gal AFFF storage capacities), one water truck, and one foam trailer. The foam trailer is stored at Building 133 (PRL 9). AFFF was loaded into the vehicles by pouring the AFFF from 5-gal buckets into the vehicles' storage tank inside the vehicle bay. There are no known releases of AFFF at Building 102.
Brief Description of Pathways:	The shallow aquifer underlying the Base consists of unconsolidated glacial sand associated with beach or deltaic deposition, with extensive reworking into dunes. The unconsolidated sediments in the Toledo area may locally attain thicknesses in excess of 150 ft.; however, the aquifer is locally 60 to 80 ft. thick at Toledo ANGB. Bedrock is encountered approximately 60 and 85 ft. below Toledo ANGB. The surficial sand aquifer in Lucas County is recharged by precipitation. Historically, water levels are generally between 2 and 8 ft. bgs and vary seasonally. During the SI, groundwater was encountered at depths ranging from 1.25 to 7.75 ft. bgs; with most boreholes encountering groundwater between 2 and 4 ft. bgs. The groundwater flow direction on the Base varies locally and from seasonal fluctuations; however, groundwater flow direction at PRL 6 is to the east. The surface cover at PRL 6 is primarily pavement/building with small landscaped areas nearby.
Brief Description of Receptors:	The area around the airport to the north, east, and south is served by Toledo-Lucas County Water with water from Lake Erie. However, public water service stops west of Toledo Express Airport. In addition, even in the areas of public water service, there are many people on private wells even though public water is available. Within 2 miles of the Base there are 88 wells that appear to be private wells utilized for domestic use. No public water supply system wells were identified within 1 mile of Toledo ANGB. One domestic drinking water well was identified at Toledo ANGB. Documentation exists indicating use of the drinking water well was discontinued in 1994 and this well was properly abandoned in January 2015. One public drinking water well was identified at Toledo Express Airport with a minimum of six additional domestic and drinking water wells located within a 0.5-mile radius of Toledo ANGB property. Drinking water well sampling by Ohio EPA in 2016-17 documented PFAS impacts in private drinking water wells. PFAS including PFOA, PFOS, and PFBS have been detected at multiple onsite wells at varying concentrations. PRL 6 is located within the base boundaries therefore, exposure would be limited to military and civilian personnel in commercial/industrial scenarios.

Groundwater Worksheet

Installation: Toledo ANGB

Site ID: PRL 6 **AFFF Release Area #:** AFFF 6

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	9.6	0.04	240.0
PFOA	0.45	0.04	11.2
PFBS	0.026	0.602	0.0

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	251.3
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

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).	H
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).	
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H
	Groundwater Category	**HIGH**

Soil Worksheet

Installation: Toledo ANGB

Site ID: PRL 6 **AFFF Release Area #:** AFFF 6

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.3	0.126	2.4
PFOA	0.015	0.126	0.1
PFBS	0.00016	1.9	0.0

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	2.5
CHF > 100	H (High)		
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		CHF VALUE	M

$$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$$

Migratory Pathway Factor

Evident	Analytical data or observable evidence that contamination is present at a point of exposure.	H
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.	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H

Receptor Factor

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:	Toledo ANGB	**Date:**	8/27/2021
Location (State):	Ohio	**Media Evaluated:**	Groundwater, Soil
Site Name and ID:	Building 124 (Fuel Cell Maintenance) - PRL 8	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Troy Sanders	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	Building 124 was constructed in 1978 and was equipped with an AFFF FSS in 1994. The FSS consists of one, aboveground, 300-gal tank in Room 112; a series of aboveground pipes; and several cannons for AFFF dispersion within the bay areas of the building. Both the east and west bays have two AFFF cannons and floor drains, which discharge to an OWS and then the MRWWTP. In August 2014, there was an accidental release of AFFF in the east side of the building (the fuel cell maintenance side) during an FSS malfunction. Approximately 75 gal of AFFF was released inside the building. Most of it was allowed to naturally dissipate, and the remaining amounts were washed into the floor drains. The 300-gal vertical tank of AFFF in Room 112 appeared to be less than one-half full at the time of the BB&E 2015 PA site visit. In December 2009, there was a leak of unknown quantity of AFFF from the piping that entered the floor drain. Some of the AFFF foam entered the storm drain in the parking lot at the back of Building 124, which ultimately discharges to the drainage ditch that runs along the northeastern side of the Base and Outfall SD-005. A 12,000-gal underground tank is located outside Building 124, which receives drainage via floor drains inside Building 124 and is designed to contain any AFFF releases; however, Base personnel are doubtful of its functionality. There are no known releases of AFFF on the west side of Building 124.
Brief Description of Pathways:	The shallow aquifer underlying the Base consists of unconsolidated glacial sand associated with beach or deltaic deposition, with extensive reworking into dunes. The unconsolidated sediments in the Toledo area may locally attain thicknesses in excess of 150 ft.; however, the aquifer is locally 60 to 80 ft. thick at Toledo ANGB. Bedrock is encountered approximately 60 and 85 ft. below Toledo ANGB. The surficial sand aquifer in Lucas County is recharged by precipitation. Historically, water levels are generally between 2 and 8 ft. bgs and vary seasonally. During the SI, groundwater was encountered at depths ranging from 1.25 to 7.75 ft. bgs; with most boreholes encountering groundwater between 2 and 4 ft. bgs. The groundwater flow direction on the Base varies locally and from seasonal fluctuations; however, the groundwater flow direction at PRL 8 is to the east/northeast. The surface cover at PRL 8 is primarily pavement/asphalt with small landscaped extents. An on-base stormwater retention pond is located east of PRL 8.
Brief Description of Receptors:	The area around the airport to the north, east, and south is served by Toledo-Lucas County Water with water from Lake Erie. However, public water service stops west of Toledo Express Airport. In addition, even in the areas of public water service, there are many people on private wells even though public water is available. Within 2 miles of the Base there are 88 wells that appear to be private wells utilized for domestic use. No public water supply system wells were identified within 1 mile of Toledo ANGB. One domestic drinking water well was identified at Toledo ANGB. Documentation exists indicating use of the drinking water well was discontinued in 1994 and this well was properly abandoned in January 2015. One public drinking water well was identified at Toledo Express Airport with a minimum of six additional domestic and drinking water wells located within a 0.5-mile radius of Toledo ANGB property. Drinking water well sampling by Ohio EPA in 2016-17 documented PFAS impacts in private drinking water wells. PFAS including PFOA, PFOS, and PFBS have been detected at multiple onsite wells at varying concentrations. PRL 8 is located within the base boundaries therefore, exposure would be limited to military and civilian personnel in commercial/industrial scenarios.

Groundwater Worksheet

Installation: Toledo ANGB

Site ID: PRL-8 **AFFF Release Area #:** AFFF 8

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	7.2	0.04	180.0
PFOA	0.26	0.04	6.5
PFBS	0.083	0.602	0.1

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	186.6
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	H

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).	H
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).	
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H
	Groundwater Category	**HIGH**

Soil Worksheet

Installation: Toledo ANGB

Site ID: PRL 8 **AFFF Release Area #:** AFFF 8

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.11	0.126	0.9
PFOA	0.0017	0.126	0.0
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**0.9**
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**	**L**

Migratory Pathway Factor		
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

Receptor Factor		
Identified	Receptors identified that have access to contaminated soil.	
Potential	Potential for receptors to have access to contaminated soil.	M
Limited	No potential for receptors to have access to contaminated soil.	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M
	Soil Category	**LOW**

Site Background Information			
Installation:	Toledo ANGB	**Date:**	8/27/2021
Location (State):	Ohio	**Media Evaluated:**	Groundwater
Site Name and ID:	Building 133 (Fire House Storage) - PRL 9	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Troy Sanders	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	Building 133 was constructed in 1971. At the time of the 2015 site visit, the Fire Department's 600-gal foam truck was stored in this building along with approximately 250 gal of AFFF in 5-gal buckets. During the 2015 PA site visit, all AFFF was properly stored and the building was in good condition. There were no floor drains in the concrete floor. No known releases of AFFF have occurred in Building 133. No soil samples were collected.
Brief Description of Pathways:	The shallow aquifer underlying the Base consists of unconsolidated glacial sand associated with beach or deltaic deposition, with extensive reworking into dunes. The unconsolidated sediments in the Toledo area may locally attain thicknesses in excess of 150 ft.; however, the aquifer is locally 60 to 80 ft. thick at Toledo ANGB. Bedrock is encountered approximately 60 and 85 ft. below Toledo ANGB. The surficial sand aquifer in Lucas County is recharged by precipitation. Historically, water levels are generally between 2 and 8 ft. bgs and vary seasonally. During the SI, groundwater was encountered at depths ranging from 1.25 to 7.75 ft. bgs; with most boreholes encountering groundwater between 2 and 4 ft. bgs. The groundwater flow direction on the Base varies locally and from seasonal fluctuations; however, the groundwater flow direction at PRL 9 is to the north/northeast. The surface cover at PRL 9 is primarily pavement/building with small and large landscaped areas present along the boundaries. An on-base stormwater retention pond is located southeast of PRL 9.
Brief Description of Receptors:	The area around the airport to the north, east, and south is served by Toledo-Lucas County Water with water from Lake Erie. However, public water service stops west of Toledo Express Airport. In addition, even in the areas of public water service, there are many people on private wells even though public water is available. Within 2 miles of the Base there are 88 wells that appear to be private wells utilized for domestic use. No public water supply system wells were identified within 1 mile of Toledo ANGB. One domestic drinking water well was identified at Toledo ANGB. Documentation exists indicating use of the drinking water well was discontinued in 1994 and this well was properly abandoned in January 2015. One public drinking water well was identified at Toledo Express Airport with a minimum of six additional domestic and drinking water wells located within a 0.5-mile radius of Toledo ANGB property. Drinking water well sampling by Ohio EPA in 2016-17 documented PFAS impacts in private drinking water wells. PFAS including PFOA, PFOS, and PFBS have been detected at multiple onsite wells at varying concentrations. PRL 9 is located within the base boundaries therefore, exposure would be limited to military and civilian personnel in commercial/industrial scenarios.

Groundwater Worksheet

Installation: Toledo ANGB

Site ID: PRL 9 **AFFF Release Area #:** AFFF 9

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	47	0.04	1175.0
PFOA	0.69	0.04	17.2
PFBS	0.79	0.602	1.3

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	1193.6
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	H

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).	H
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).	
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H
	Groundwater Category	**HIGH**

Site Background Information			
Installation:	Toledo ANGB	**Date:**	8/27/2021
Location (State):	Ohio	**Media Evaluated:**	Groundwater, Soil
Site Name and ID:	Fire Department Nozzle Test Area - PRL 10	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Troy Sanders	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	The Fire Department conducted annual foam tests from approximately 1993 until 2015. These tests would use approximately 5 gal of AFFF that would be dispersed onto the asphalt area to the northeast of Building 136. The foam would be allowed to naturally dissipate to adjacent grassy areas and/or the asphalt was washed down with water to convey the foam to adjacent grassy areas. Drainage from PRL 10 either enters a storm drain in the parking area or flows to the drainage ditch east of PRL 10. The drainage ditch flows north towards Storm water Outfall SDO-005 and continues north/ northeast to Stormwater Outfall SDO-004.
Brief Description of Pathways:	The shallow aquifer underlying the Base consists of unconsolidated glacial sand associated with beach or deltaic deposition, with extensive reworking into dunes. The unconsolidated sediments in the Toledo area may locally attain thicknesses in excess of 150 ft.; however, the aquifer is locally 60 to 80 ft. thick at Toledo ANGB. Bedrock is encountered approximately 60 and 85 ft. below Toledo ANGB. The surficial sand aquifer in Lucas County is recharged by precipitation. Historically, water levels are generally between 2 and 8 ft. bgs and vary seasonally. During the SI, groundwater was encountered at depths ranging from 1.25 to 7.75 ft. bgs; with most boreholes encountering groundwater between 2 and 4 ft. bgs. The groundwater flow direction on the Base varies locally and from seasonal fluctuations; however, the groundwater flow direction at PRL 10 is to the southeast. The surface cover at PRL 10 is primarily asphalt. The area is surrounded by vegetation with a pond located to the northeast.
Brief Description of Receptors:	The area around the airport to the north, east, and south is served by Toledo-Lucas County Water with water from Lake Erie. However, public water service stops west of Toledo Express Airport. In addition, even in the areas of public water service, there are many people on private wells even though public water is available. Within 2 miles of the Base there are 88 wells that appear to be private wells utilized for domestic use. No public water supply system wells were identified within 1 mile of Toledo ANGB. One domestic drinking water well was identified at Toledo ANGB. Documentation exists indicating use of the drinking water well was discontinued in 1994 and this well was properly abandoned in January 2015. One public drinking water well was identified at Toledo Express Airport with a minimum of six additional domestic and drinking water wells located within a 0.5-mile radius of Toledo ANGB property. Drinking water well sampling by Ohio EPA in 2016-17 documented PFAS impacts in private drinking water wells. PFAS including PFOA, PFOS, and PFBS have been detected at multiple onsite wells at varying concentrations. PRL 10 is located within the base boundaries therefore, exposure would be limited to military and civilian personnel in commercial/industrial scenarios.

Groundwater Worksheet

Installation: Toledo ANGB

Site ID: PRL 10 **AFFF Release Area #:** AFFF 10

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	0.098	0.04	2.4
PFOA	0.014	0.04	0.4
PFBS	0.024	0.602	0.0

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	2.8
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	M

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).	H
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).	
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H
	Groundwater Category	**HIGH**

Soil Worksheet

Installation: Toledo ANGB

Site ID: PRL 10 **AFFF Release Area #:** AFFF 10

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.16	0.126	1.3
PFOA	0.00047	0.126	0.0
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**1.3**
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**

Migratory Pathway Factor		
Evident	Analytical data or observable evidence that contamination is present at a point of exposure.	H
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.	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H

Receptor Factor		
Identified	Receptors identified that have access to contaminated soil.	
Potential	Potential for receptors to have access to contaminated soil.	M
Limited	No potential for receptors to have access to contaminated soil.	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M
	Soil Category	**MEDIUM**

Site Background Information			
Installation:	Toledo ANGB	**Date:**	8/27/2021
Location (State):	Ohio	**Media Evaluated:**	Groundwater, Soil
Site Name and ID:	Concrete Apron Area - PRL 11	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Troy Sanders	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	Although there are no records of AFFF usage on the Concrete Apron and Ramp area to the north of the Main Hangar, the area could potentially have been impacted if AFFF was used on parked aircraft. Stormwater in this area is routed to Stormwater Outfall SD-003 through stormwater catch basins.
Brief Description of Pathways:	The shallow aquifer underlying the Base consists of unconsolidated glacial sand associated with beach or deltaic deposition, with extensive reworking into dunes. The unconsolidated sediments in the Toledo area may locally attain thicknesses in excess of 150 ft.; however, the aquifer is locally 60 to 80 ft. thick at Toledo ANGB. Bedrock is encountered approximately 60 and 85 ft. below Toledo ANGB. The surficial sand aquifer in Lucas County is recharged by precipitation. Historically, water levels are generally between 2 and 8 ft. bgs and vary seasonally. During the SI, groundwater was encountered at depths ranging from 1.25 to 7.75 ft. bgs; with most boreholes encountering groundwater between 2 and 4 ft. bgs. The groundwater flow direction on the Base varies locally and from seasonal fluctuations; however, the groundwater flow direction at PRL 11 is to the north/northeast. The surface cover at PRL 11 is pavement. The surrounding areas are vegetated.
Brief Description of Receptors:	The area around the airport to the north, east, and south is served by Toledo-Lucas County Water with water from Lake Erie. However, public water service stops west of Toledo Express Airport. In addition, even in the areas of public water service, there are many people on private wells even though public water is available. Within 2 miles of the Base there are 88 wells that appear to be private wells utilized for domestic use. No public water supply system wells were identified within 1 mile of Toledo ANGB. One domestic drinking water well was identified at Toledo ANGB. Documentation exists indicating use of the drinking water well was discontinued in 1994 and this well was properly abandoned in January 2015. One public drinking water well was identified at Toledo Express Airport with a minimum of six additional domestic and drinking water wells located within a 0.5-mile radius of Toledo ANGB property. Drinking water well sampling by Ohio EPA in 2016-17 documented PFAS impacts in private drinking water wells. PFAS including PFOA, PFOS, and PFBS have been detected at multiple onsite wells at varying concentrations. PRL 11 is located within the base boundaries therefore, exposure would be limited to military and civilian personnel in commercial/industrial scenarios.

Groundwater Worksheet

Installation: Toledo ANGB

Site ID: PRL 11 **AFFF Release Area #:** AFFF 11

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFOS	0.61	0.04	15.3
PFOA	0.024	0.04	0.6
PFBS	0.011	0.602	0.0

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	15.9
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	M

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).	H
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural).	
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III).	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H
	Groundwater Category	**HIGH**

Soil Worksheet

Installation: Toledo ANGB

Site ID: PRL 11 **AFFF Release Area #:** AFFF 11

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.12	0.126	1.0
PFOA	0.002	0.126	0.0
PFBS	0.000075	1.9	0.0
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**1.0**
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**

Migratory Pathway Factor		
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

Receptor Factor		
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**