



RELATIVE RISK SITE EVALUATION

Des Moines Air National Guard Base, Iowa

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, Site Inspections, or SIs, were initiated 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 Des Moines Air National Guard Base (ANGB) PFAS PA and SI can be found at the Air Force Comprehensive Environmental Response, Compensation, and Liability Act (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 Des Moines Int'l Airport, IA, then enter the AR Number 474019 in the "AR #" field for the PA. For the SI, enter the AR Number 585121. Then click "Search" at the bottom of the page. Click on the spy glass to view the document.

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

Acronyms

AFFF - Aqueous Film Forming Foam	PFBS – Perfluorobutanesulfonic acid
ANGB - Air National Guard Base	PFOS - Perfluorooctane sulfonate
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act	PFOA - Perfluorooctanoic acid
CHF – Contaminant Hazard Factor	PRL - Potential Release Location
DoD - Department of Defense	RCRA – Resource Conservation and Recovery Act
EPA – US Environmental Protection Agency	RF – Receptor Factor
FTA – Fire Training Area	RI – Remedial Investigation
HA – Health Advisory	RRSE – Relative Risk Site Evaluation
MPF – Migration Pathway Factor	SI – Site Inspection
PA – Preliminary Assessment	SWMU – Solid Waste Management Unit
PFAS - Per-and polyfluoroalkyl substances	



RELATIVE RISK SITE EVALUATION, cont.

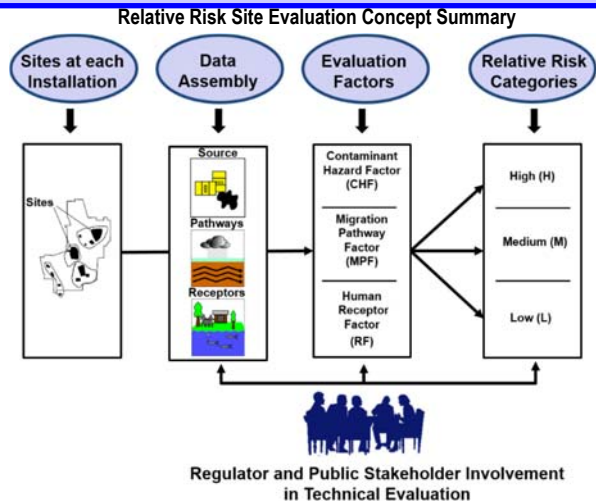


Q. What is the Relative Risk Site Evaluation (RRSE)?

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.



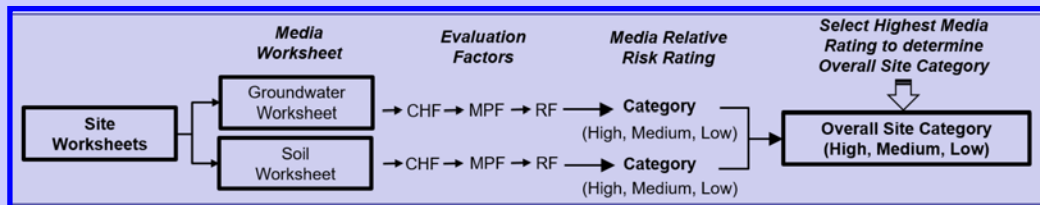
Sites at Each Installation

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

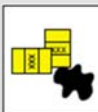


A. Restoration sites in CERCLA phases prior to remedy-in-place are evaluated in the process. Worksheets are developed for environmental media at each site. For consistency across all the Installations, only surface soil (0-1 foot deep) and groundwater media were evaluated in the RRSE.

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.

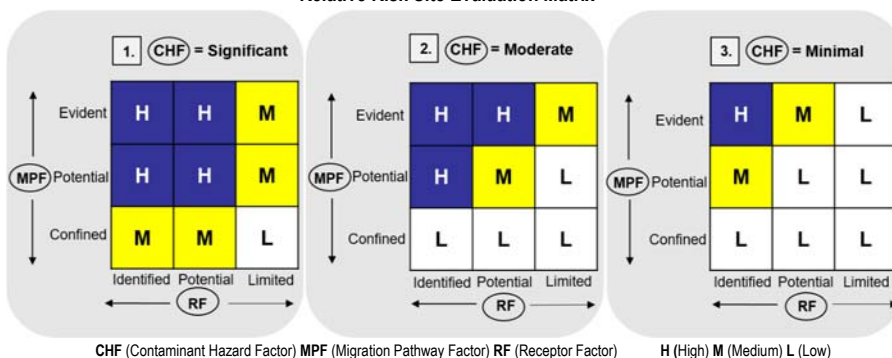
RELATIVE RISK SITE EVALUTION, cont.

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



Overall Site Category

Q. How do I determine the Overall Site Category?

A. The highest relative risk media rating becomes the **Overall Site Category** for the site. For example, if a site has a groundwater relative risk rating of **High**, and soil relative risk rating of **Low**, then the Overall Site Category rating for the site is **High**.

Regulatory and Stakeholder Involvement

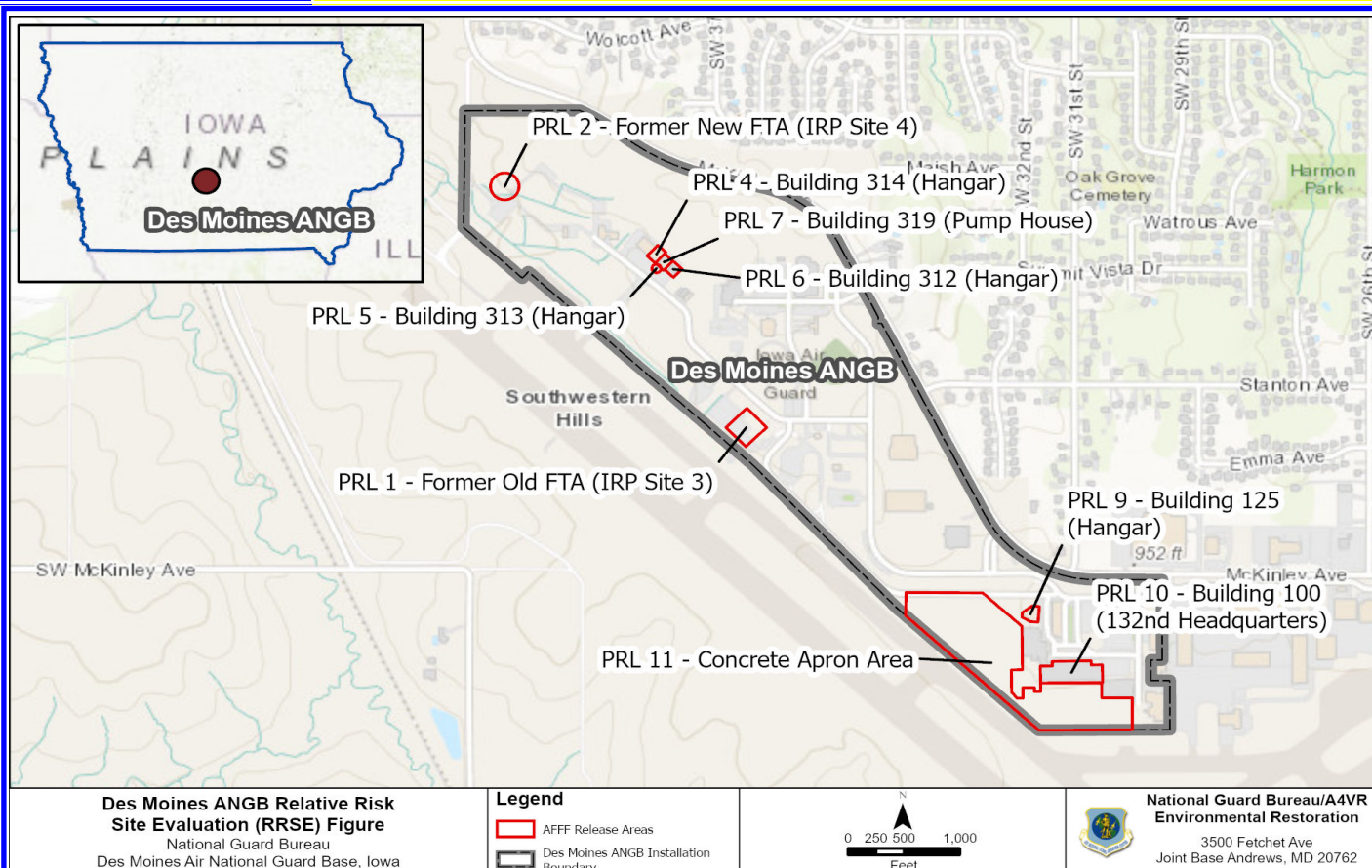
How do I participate as Stakeholder?



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

Relative Risk Site Evaluation Summary Des Moines ANGB, IA

Overall Site Category	Site Name (Sites are shown on the map below and RRSE Worksheets are attached)
HIGH	PRL 2, PRL 4, PRL 5, PRL 6, PRL 9, PRL 10
MEDIUM	
LOW	PRL 1, PRL 7, PRL 11



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

Site Background Information			
Installation:	Des Moines ANG	Date:	10/4/2021
Location (State):	Iowa	Media Evaluated:	Soil
Site Name and ID:	Former Old FTA, IRP 3 - PRL 1	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Maj Jimmy Gracia	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: LOW			

Site Summary	
Brief Site Description:	Des Moines ANGB is the home of the 132nd Wing in Des Moines, Iowa. Des Moines ANGB is located on the north side of the Des Moines International Airport. Des Moines ANGB occupies approximately 147 acres approximately 2 miles southwest of downtown Des Moines and has occupied the area since 1941. Installation Restoration Program (IRP) Site 3 was a former fire training area at an open bermed area, approximately 50 by 50 ft., located in the central portion of the Base, north of the main runway. Base records indicated that Fire Department training activities were conducted in this area from 1966 to 1971. Approximately 12 times per year, 200 gallons of recovered jet propulsion fuel #4 (JP-4), engine oil, and spent solvents were released into the pre-wetted, bermed area and burned. The bermed area is currently covered with concrete, and Building 228 (Hush House) covers the location of the former Fire Training Area (FTA). There were no records or personnel knowledge of AFFF use. The remediation investigation (RI) recommended No further Action (NFA) and the site was closed in 1991.
Brief Description of Pathways:	Soil borings completed as part of IRP investigations at the Base indicate surficial geology is comprised of a thin layer of fill material underlain by silty clays, silts, and fractured clays. These unconsolidated deposits are approximately 20 to 30 feet (ft) thick and have a dense silt layer near the base, which grades to weathered shale zone in the Pennsylvanian bedrock. The water table at the Base is generally encountered at depths of 5 to 7 feet below ground surface. The stormwater drainage system is directed into the storm sewer system which runs southwest off the Base and discharges into Frink Creek. Shallow groundwater flow is to the south toward Middle or Yeader Creek or west toward Frink Creek. At this PRL, groundwater flow is to the south. This PRL is covered by concrete and Building 229, however, there is a small portion that is grass covered along the northeastern side.
Brief Description of Receptors:	The Environmental Data Resources (EDR) Radius Map™ Report lists a total of 100 wells within a one-mile radius of the Base. Ninety-nine of these listed wells are classified as abandoned, monitoring, test, or heat pump (10 located downgradient). One well, located ½ mile south of the Base is listed as a public water supply well owned by the Des Moines Water Works. The City of Des Moines Water Works Department provides drinking water to the Base and the City obtains much of its public water supply from the shallow alluvial aquifer along the Raccoon River which is approximately 1 mile north of the Base. The public water supply is collected from the shallow groundwater infiltration collection gallery along the Raccoon River. There are no permitted private wells within a 1-mile radius of the Base. Access to the Base is controlled by perimeter fencing and entrance is through a controlled gate. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

Soil Worksheet

Installation Des Moines ANG

Site ID: PRL 1

AFFF Release Area #: AFFF 1

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFOS	0.013	0.126	0.1	
PFOA	0.00064	0.126	0.0	
PFBS	0.00014	1.9	0.0	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.1	
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$		
100 > CHF > 2	M (Medium)			
2 > CHF	L (Low)			
CHF Value	CHF VALUE		L	
<u>Migratory Pathway Factor</u>				
Evident	Analytical data or observable evidence that contamination is present at a point of exposure			
Potential	Contamination has moved beyond the source, could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined			
Confined	Low possibility for contamination to be present at or migrate to a point of exposure		L	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L	
<u>Receptor Factor</u>				
Identified	Receptors identified that have access to contaminated soil			
Potential	Potential for receptors to have access to contaminated soil			
Limited	No potential for receptors to have access to contaminated soil		L	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L	
Soil Category			LOW	

Site Background Information			
Installation:	Des Moines ANG	Date:	10/4/2021
Location (State):	Iowa	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Former New FTA IRP 4 - PRL 2	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Maj Jimmy Gracia	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 grass-covered area, approximately 50 by 50 ft., located near the end of Runway 12L-30R in the northwestern corner of the Base. IRP Site 4 was in use from 1971 to 1981 as an FTA. During this time interval, approximately 16 times per year, 420 gal of petroleum oil and lubricant (POL) were released to the pre-wetted area and burned. No wastes from the facility have been disposed of in association with firefighter-training activities since 1981. There were no records or personnel knowledge of AFFF use. The RI recommended NFA and the site was closed in 1991.
Brief Description of Pathways:	Soil borings completed as part of IRP investigations at the Base indicate surficial geology is comprised of a thin layer of fill material underlain by silty clays, silts, and fractured clays. These unconsolidated deposits are approximately 20 to 30 ft thick and have a dense silt layer near the base, which grades to weathered shale zone in the Pennsylvanian bedrock. The water table at the Base is generally encountered at depths of 5 to 7 ft below ground surface. The stormwater drainage system is directed into the storm sewer system which runs southwest off the Base and discharges into Frink Creek. Shallow groundwater flow is to the south toward Middle or Yeader Creek or west toward Frink Creek. This PRL is grassy with a very narrow concrete driving road (~20 feet wide) at the eastern side.
Brief Description of Receptors:	The EDR Radius Map™ Report lists a total of 100 wells within a one-mile radius of the Base. Ninety-nine of these listed wells are classified as abandoned, monitoring, test, or heat pump (10 located downgradient). One well, located ½ mile south of the Base is listed as a public water supply well owned by the Des Moines Water Works. The City of Des Moines Water Works Department provides drinking water to the Base and the City obtains much of its public water supply from the shallow alluvial aquifer along the Raccoon River which is approximately 1 mile north of the Base. The public water supply is collected from the shallow groundwater infiltration collection gallery along the Raccoon River. There are no permitted private wells within a 1-mile radius of the Base. Access to the Base is controlled by perimeter fencing and entrance is through a controlled gate. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

Groundwater Worksheet

Installation Des Moines ANG

Site ID: PRL 2

AFFF Release Area #: AFFF 2

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	3	0.04	75.0	
PFOA	1.9	0.04	47.5	
PFBS	2.3	0.602	3.8	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	126.3	
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	
<u>Migratory Pathway Factor</u>				
Evident	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well)			
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined		M	
Confined	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls)			
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<u>Receptor Factor</u>				
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater)		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 Des Moines ANG

Site ID: PRL 2

AFFF Release Area #: AFFF 2

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFOS	0.0034	0.126	0.0	
PFOA	0.00034	0.126	0.0	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.0	
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$		
100 > CHF > 2	M (Medium)			
2 > CHF	L (Low)			
CHF Value	CHF VALUE		L	
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:	Des Moines ANG	Date:	10/4/2021
Location (State):	Iowa	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Building 314 - Hangar - PRL 4	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Maj Jimmy Gracia	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	<p>Building 314 was constructed in 1968 and the AFFF fire suppression system (FFS) was installed in October 1996. The building was used as a hangar until September 2014 when the aircraft left the Base. Therefore, in late 2015, the AFFF FSS was abandoned. AFFF from the system was emptied into drums, and storage tanks and oscillating monitors were removed. Floor drains in Building 314 are connected to an underground system with a holding tank. At the time of the PA site visit, the 7,000-gal tank was located in the asphalt area between Buildings 314 and 313, and served Buildings 312, 313, 314, and 315. Therefore, discharges would enter this system in the event of an AFFF release and would eventually be pumped out for proper disposal. Documentation has been provided of authorization to either discharge the contents of this tank to the sanitary sewer or directly pump and haul to the Des Moines Metropolitan Wastewater Reclamation Facility. Annual FSS tests were conducted with water only, with the exception of 5-year tests when AFFF was used. Dense utilities in the area prevented soil sample collection at PRL 4. Therefore, surface soil data from PRLs 5, 6, and 7 located nearby were used in this evaluation.</p>
Brief Description of Pathways:	<p>Soil borings completed as part of IRP investigations at the Base indicate surficial geology is comprised of a thin layer of fill material underlain by silty clays, silts, and fractured clays. These unconsolidated deposits are approximately 20 to 30 ft thick and have a dense silt layer near the base, which grades to weathered shale zone in the Pennsylvanian bedrock. The water table at the Base is generally encountered at depths of 5 to 7 ft below ground surface. The stormwater drainage system is directed into the storm sewer system which runs southwest off the Base and discharges into Frink Creek. Shallow groundwater flow is to the south toward Middle or Yeader Creek or west toward Frink Creek. At this PRL, groundwater flow is to the south or west as the groundwater elevation has this location as a high elevation. This PRL is entirely Building 314 and its surrounding concrete paved areas.</p>
Brief Description of Receptors:	<p>The EDR Radius Map™ Report lists a total of 100 wells within a one-mile radius of the Base. Ninety-nine of these listed wells are classified as abandoned, monitoring, test, or heat pump (10 located downgradient). One well, located ½ mile south of the Base is listed as a public water supply well owned by the Des Moines Water Works. The City of Des Moines Water Works Department provides drinking water to the Base and the City obtains much of its public water supply from the shallow alluvial aquifer along the Raccoon River which is approximately 1 mile north of the Base. The public water supply is collected from the shallow groundwater infiltration collection gallery along the Raccoon River. There are no permitted private wells within a 1-mile radius of the Base. Access to the Base is controlled by perimeter fencing and entrance is through a controlled gate. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

Groundwater Worksheet

Installation Des Moines ANG

Site ID: PRL 4

AFFF Release Area #: AFFF 4

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	1.4	0.04	35.0	
PFOA	0.047	0.04	1.2	
PFBS	0.1	0.602	0.2	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	36.3	
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		M	
<u>Migratory Pathway Factor</u>				
Evident	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well)			
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined		M	
Confined	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls)			
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<u>Receptor Factor</u>				
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater)		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: Des Moines ANG

Site ID: PRL 4

AFFF Release Area #: AFFF 4

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFBS	0.00046	1.9	0.0	
PFOA	0.00036	0.126	0.0	
PFOS	0.17	0.126	1.3	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	1.4	
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$		
100 > CHF > 2	M (Medium)			
2 > CHF	L (Low)			
CHF Value	CHF VALUE		L	
<u>Migratory Pathway Factor</u>				
Evident	Analytical data or observable evidence that contamination is present at a point of exposure			
Potential	Contamination has moved beyond the source, could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined			
Confined	Low possibility for contamination to be present at or migrate to a point of exposure		L	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L	
<u>Receptor Factor</u>				
Identified	Receptors identified that have access to contaminated soil			
Potential	Potential for receptors to have access to contaminated soil			
Limited	No potential for receptors to have access to contaminated soil		L	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L	
Soil Category			LOW	

Site Background Information			
Installation:	Des Moines ANG	Date:	10/4/2021
Location (State):	Iowa	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Building 313 - Hangar - PRL 5	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Maj Jimmy Gracia	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	<p>Building 313 was constructed in 1968 and the AFFF fire suppression system was installed in October 1996. The building was used as a hangar until September 2014 when the aircraft left the Base. Therefore, in late 2015, the AFFF FSS was abandoned. AFFF from the system was emptied into drums, and storage tanks and oscillating monitors were removed. Floor drains in Building 313 are connected to an underground system with a holding tank. At the time of the PA site visit, the 7,000-gal tank was located in the asphalt area between Buildings 314 and 313, and served Buildings 312, 313, 314, and 315. Therefore, discharges would enter this system in the event of an AFFF release and would eventually be pumped out for proper disposal. Documentation has been provided of authorization to either discharge the contents of this tank to the sanitary sewer or directly pump and haul to the Des Moines Metropolitan Wastewater Reclamation Facility. Annual FSS tests were conducted with water only, with the exception of 5-year tests when AFFF was used. As noted in the 2001 EBS, a 300-gal spill of AFFF occurred that discharged to the stormwater drains and a drainage ditch. No dates or cleanup activities were provided in the report or by Base personnel.</p>
Brief Description of Pathways:	<p>Soil borings completed as part of IRP investigations at the Base indicate surficial geology is comprised of a thin layer of fill material underlain by silty clays, silts, and fractured clays. These unconsolidated deposits are approximately 20 to 30 ft thick and have a dense silt layer near the base, which grades to weathered shale zone in the Pennsylvanian bedrock. The water table at the Base is generally encountered at depths of 5 to 7 feet below ground surface. The stormwater drainage system is directed into the storm sewer system which runs southwest off the Base and discharges into Frink Creek. Shallow groundwater flow is to the south toward Middle or Yeader Creek or west toward Frink Creek. At this PRL, groundwater flow is to the south or west as the groundwater elevation has this location as a high elevation. This PRL is entirely Building 313 and its surrounding concrete paved areas.</p>
Brief Description of Receptors:	<p>The EDR Radius Map™ Report lists a total of 100 wells within a one-mile radius of the Base. Ninety-nine of these listed wells are classified as abandoned, monitoring, test, or heat pump (10 located downgradient). One well, located ½ mile south of the Base is listed as a public water supply well owned by the Des Moines Water Works. The City of Des Moines Water Works Department provides drinking water to the Base and the City obtains much of its public water supply from the shallow alluvial aquifer along the Raccoon River which is approximately 1 mile north of the Base. The public water supply is collected from the shallow groundwater infiltration collection gallery along the Raccoon River. There are no permitted private wells within a 1-mile radius of the Base. Access to the Base is controlled by perimeter fencing and entrance is through a controlled gate. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

Groundwater Worksheet

Installation Des Moines ANG

Site ID: PRL 5

AFFF Release Area #: AFFF 5

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	1.4	0.04	35.0	
PFOA	0.047	0.04	1.2	
PFBS	0.1	0.602	0.2	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	36.3	
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		M	
<u>Migratory Pathway Factor</u>				
Evident	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well)			
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined		M	
Confined	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls)			
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<u>Receptor Factor</u>				
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater)		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 Des Moines ANG

Site ID: PRL 5

AFFF Release Area #: AFFF 5

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFOS	0.034	0.126	0.3	
PFOA	0.00036	0.126	0.0	
PFBS	0.00013	1.9	0.0	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.3	
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	
<u>Migratory Pathway Factor</u>				
Evident	Analytical data or observable evidence that contamination is present at a point of exposure			
Potential	Contamination has moved beyond the source, could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined			
Confined	Low possibility for contamination to be present at or migrate to a point of exposure		L	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L	
<u>Receptor Factor</u>				
Identified	Receptors identified that have access to contaminated soil			
Potential	Potential for receptors to have access to contaminated soil			
Limited	No potential for receptors to have access to contaminated soil		L	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L	
Soil Category			LOW	

Site Background Information			
Installation:	Des Moines ANG	Date:	10/4/2021
Location (State):	Iowa	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Building 312 - Hangar - PRL 6	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Maj Jimmy Gracia	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	<p>Building 312 was constructed in 1968 and the AFFF fire suppression system was installed in October 1996. The building was used as a hangar until September 2014 when the aircraft left the Base. Therefore, in late 2015, the AFFF FSS was abandoned. AFFF from the system was emptied into drums, and storage tanks and oscillating monitors were removed. Floor drains in Building 312 are connected to an underground system with a holding tank. At the time of the PA site visit, the 7,000-gal tank was located in the asphalt area between Buildings 314 and 313, and served Buildings 312, 313, 314, and 315. Therefore, discharges would enter this system in the event of an AFFF release and would eventually be pumped out for proper disposal. Documentation has been provided of authorization to either discharge the contents of this tank to the sanitary sewer or directly pump and haul to the Des Moines Metropolitan Wastewater Reclamation Facility. Annual FSS tests were conducted with water only, with the exception of 5-year tests when AFFF was used.</p>
Brief Description of Pathways:	<p>Soil borings completed as part of IRP investigations at the Base indicate surficial geology is comprised of a thin layer of fill material underlain by silty clays, silts, and fractured clays. These unconsolidated deposits are approximately 20 to 30 ft thick and have a dense silt layer near the base, which grades to weathered shale zone in the Pennsylvanian bedrock. The water table at the Base is generally encountered at depths of 5 to 7 ft below ground surface. The stormwater drainage system is directed into the storm sewer system which runs southwest off the Base and discharges into Frink Creek. Shallow groundwater flow is to the south toward Middle or Yeader Creek or west toward Frink Creek. At this PRL, groundwater flow is to the south and the groundwater elevation has this location as a high elevation where groundwater flows either south or west. This PRL is entirely Building 312 and its surrounding concrete paved areas.</p>
Brief Description of Receptors:	<p>The EDR Radius Map™ Report lists a total of 100 wells within a one-mile radius of the Base. Ninety-nine of these listed wells are classified as abandoned, monitoring, test, or heat pump (10 located downgradient). One well, located ½ mile south of the Base is listed as a public water supply well owned by the Des Moines Water Works. The City of Des Moines Water Works Department provides drinking water to the Base and the City obtains much of its public water supply from the shallow alluvial aquifer along the Raccoon River which is approximately 1 mile north of the Base. The public water supply is collected from the shallow groundwater infiltration collection gallery along the Raccoon River. There are no permitted private wells within a 1-mile radius of the Base. Access to the Base is controlled by perimeter fencing and entrance is through a controlled gate. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

Groundwater Worksheet

Installation Des Moines ANG

Site ID: PRL 6

AFFF Release Area #: AFFF 6

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	3.2	0.04	80.0	
PFOA	0.28	0.04	7.0	
PFBS	0.18	0.602	0.3	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	87.3	
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		M	
<u>Migratory Pathway Factor</u>				
Evident	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well)			
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined		M	
Confined	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls)			
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<u>Receptor Factor</u>				
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater)		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 Des Moines ANG

Site ID:PRL 6

AFFF Release Area #: AFFF 6

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.033	0.126	0.3
PFOA	0.00035	0.126	0.0
PFBS	0.00011	1.9	0.0
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.3
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
<u>Migratory Pathway Factor</u>			
Evident	Analytical data or observable evidence that contamination is present at a point of exposure		
Potential	Contamination has moved beyond the source, could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined		
Confined	Low possibility for contamination to be present at or migrate to a point of exposure		L
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
<u>Receptor Factor</u>			
Identified	Receptors identified that have access to contaminated soil		
Potential	Potential for receptors to have access to contaminated soil		
Limited	No potential for receptors to have access to contaminated soil		L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
Soil Category			LOW

Site Background Information			
Installation:	Des Moines ANG	Date:	10/4/2021
Location (State):	Iowa	Media Evaluated:	Soil
Site Name and ID:	Building 319 - Pump House - PRL 7	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Maj Jimmy Gracia	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: LOW			

Site Summary	
Brief Site Description:	Building 319 was constructed in 1997 and contained the AFFF aboveground storage tank for the FSS in Buildings 312, 313, 314, and 315. The 400-gal tank was installed in 1999 and removed in 2014. The building is equipped with a concrete floor with no floor drains. One accidental discharge of AFFF in Building 319 was documented and occurred in July 1998. As noted in the EDR Report in the PA, the pipe from the FSS split due to a manufacturer defect, resulting in a foam release inside the building and some enterin through a storm drain to the storm sewer. According to Base personnel, visible foam was observed in the stormwater ditch nearby Building 320 which is located northwest of the PRL.
Brief Description of Pathways:	Soil borings completed as part of IRP investigations at the Base indicate surficial geology is comprised of a thin layer of fill material underlain by silty clays, silts, and fractured clays. These unconsolidated deposits are approximately 20 to 30 ft thick and have a dense silt layer near the base, which grades to weathered shale zone in the Pennsylvanian bedrock. The water table at the Base is generally encountered at depths of 5 to 7 ft below ground surface. The stormwater drainage system is directed into the storm sewer system which runs southwest off the Base and discharges into Frink Creek. Shallow groundwater flow is to the south toward Middle or Yeader Creek or west toward Frink Creek. At this PRL, groundwater flow is to the south or west as the groundwater elevation has this location as a high elevation where groundwater flows either south or west. This PRL is entirely Building 319 and its surrounding concrete paved areas.
Brief Description of Receptors:	The EDR Radius Map™ Report lists a total of 100 wells within a one-mile radius of the Base. Ninety-nine of these listed wells are classified as abandoned, monitoring, test, or heat pump (10 located downgradient). One well, located ½ mile south of the Base is listed as a public water supply well owned by the Des Moines Water Works. The City of Des Moines Water Works Department provides drinking water to the Base and the City obtains much of its public water supply from the shallow alluvial aquifer along the Raccoon River which is approximately 1 mile north of the Base. The public water supply is collected from the shallow groundwater infiltration collection gallery along the Raccoon River. There are no permitted private wells within a 1-mile radius of the Base. Access to the Base is controlled by perimeter fencing and entrance is through a controlled gate. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

Groundwater Worksheet

Installation Des Moines ANG

Site ID: PRL 7

AFFF Release Area #: AFFF 7

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	No Data
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	NA
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		
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).		
Receptor Factor			
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater)		
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural)		
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III)		
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		
Groundwater Category			NA

Soil Worksheet

Installation Des Moines ANG

Site ID: PRL 7

AFFF Release Area #: AFFF 7

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFOS	0.17	0.126	1.3	
PFOA	0.00023	0.126	0.0	
PFBS	0.00046	1.9	0.0	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	1.4	
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$		
100 > CHF > 2	M (Medium)			
2 > CHF	L (Low)			
CHF Value	CHF VALUE		L	
<u>Migratory Pathway Factor</u>				
Evident	Analytical data or observable evidence that contamination is present at a point of exposure		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	
<u>Receptor Factor</u>				
Identified	Receptors identified that have access to contaminated soil			
Potential	Potential for receptors to have access to contaminated soil			
Limited	No potential for receptors to have access to contaminated soil		L	
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L	
Soil Category			LOW	

Site Background Information			
Installation:	Des Moines ANG	Date:	10/4/2021
Location (State):	Iowa	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Building 125 - Hangar - PRL 9	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Maj Jimmy Gracia	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	Building 125 was constructed in 1995 with an AFFF FSS. The building was used as a hangar until September 2014, when the aircraft left the Base. Therefore, the AFFF from the FSS was emptied into drums and sent to the Sioux City ANGB in November 2014. The AFFF storage tanks and oscillating monitors were not removed. The AFFF tanks, located in a storage room on the building's northern side, were still present at the time of the PA site visit in 2016. They both appeared empty according to their gauges. One was a 150-gal tank; the other appeared to be a 200- to 250-gal capacity tank. Two 55-gal drums of AFFF were in the storage room. As noted in the PA, floor drains in Building 125 are connected to an underground system with a holding tank (unknown capacity). Therefore, in the event of an AFFF release, the discharged liquids would enter this system, which will eventually be pumped out for proper disposal. According to Base personnel, an inadvertent discharge of AFFF occurred at Building 125 in December 1995. Approximately 200 gallons of AFFF were discharged. Base personnel recount that half went to the sanitary sewer and half went on the aircraft parking apron and the stormwater sewer, likely discharged through Outfall 002.
Brief Description of Pathways:	Soil borings completed as part of IRP investigations at the Base indicate surficial geology is comprised of a thin layer of fill material underlain by silty clays, silts, and fractured clays. These unconsolidated deposits are approximately 20 to 30 ft thick and have a dense silt layer near the base, which grades to weathered shale zone in the Pennsylvanian bedrock. The water table at the Base is generally encountered at depths of 5 to 7 ft below ground surface. The stormwater drainage system is directed into the storm sewer system which runs southwest off the Base and discharges into Frink Creek. Shallow groundwater flow is to the south toward Middle or Yeader Creek or west toward Frink Creek. At this PRL, groundwater flow is to the west. This PRL is surrounded by concrete paved areas and buildings except for a small grassy area north of the Building 125.
Brief Description of Receptors:	The EDR Radius Map™ Report lists a total of 100 wells within a one-mile radius of the Base. Ninety-nine of these listed wells are classified as abandoned, monitoring, test, or heat pump (10 located downgradient). One well, located ½ mile south of the Base is listed as a public water supply well owned by the Des Moines Water Works. The City of Des Moines Water Works Department provides drinking water to the Base and the City obtains much of its public water supply from the shallow alluvial aquifer along the Racoon River which is approximately 1 mile north of the Base. The public water supply is collected from the shallow groundwater infiltration collection gallery along the Racoon River. There are no permitted private wells within a 1-mile radius of the Base. Access to the Base is controlled by perimeter fencing and entrance is through a controlled gate. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

Groundwater Worksheet

Installation Des Moines ANG

Site ID: PRL 9

AFFF Release Area #: AFFF 9

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	13	0.04	325.0	
PFOA	0.49	0.04	12.3	
PFBS	1	0.602	1.7	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	338.9	
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$		
100 > CHF > 2	M (Medium)			
2 > CHF	L (Low)			
CHF Value	CHF VALUE		H	
<u>Migratory Pathway Factor</u>				
Evident	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well)			
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined		M	
Confined	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls)			
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<u>Receptor Factor</u>				
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater)		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 Des Moines ANG

Site ID: PRL 9

AFFF Release Area #: AFFF 9

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.12	0.126	1.0
PFOA	0.0039	0.126	0.0
PFBS	0.003	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		
Confined	Low possibility for contamination to be present at or migrate to a point of exposure		L
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L
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:	Des Moines ANG	Date:	10/4/2021
Location (State):	Iowa	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Building 100 - 132nd Headquarters - PRL 10	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Maj Jimmy Gracia	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	Building 100 was constructed in 1941 and underwent several renovations. During a renovation in October 1996, the AFFF FSS was installed. The hangar bays currently serve as the FD's vehicle bay area. The FD used to be located at Building 170 on Des Moines International Airport property, just east of Building 180. The FD relocated to Building 100 after September 2014. As noted in the PA, Building 100 is the only Building on Base that has an active AFFF FSS in place. The storage room for the AFFF tank contains a 400-gal aboveground storage tank. This room has a floor drain that leads to the sanitary sewer. Five FD trucks were stored at this Building during the PA. Their AFFF capacities include: Truck #6 (P-34) – 56 gal, Truck #7 (P-4) – 210 gal, Truck #9 (P-34) – 56 gal, Truck #11 (P-32) – 130 gal, and Truck #16 (P-4) – 130 gal. The bay area had floor drains that lead to an AFFF underground storage system similar to the other hangars on Base. This underground system has a 10,000-gal containment tank that was pumped out in the event of an AFFF release.
Brief Description of Pathways:	Soil borings completed as part of IRP investigations at the Base indicate surficial geology is comprised of a thin layer of fill material underlain by silty clays, silts, and fractured clays. These unconsolidated deposits are approximately 20 to 30 ft thick and have a dense silt layer near the base, which grades to weathered shale zone in the Pennsylvanian bedrock. The water table at the Base is generally encountered at depths of 5 to 7 ft below ground surface. The stormwater drainage system is directed into the storm sewer system which runs southwest off the Base and discharges into Frink Creek. Shallow groundwater flow is to the south toward Middle or Yeader Creek or west toward Frink Creek. At this PRL, groundwater flow is to the southeast. This PRL is only for the building and does not include the grassy area to the west.
Brief Description of Receptors:	The EDR Radius Map™ Report lists a total of 100 wells within a one-mile radius of the Base. Ninety-nine of these listed wells are classified as abandoned, monitoring, test, or heat pump (10 located downgradient). One well, located ½ mile south of the Base is listed as a public water supply well owned by the Des Moines Water Works. The City of Des Moines Water Works Department provides drinking water to the Base and the City obtains much of its public water supply from the shallow alluvial aquifer along the Racoon River which is approximately 1 mile north of the Base. The public water supply is collected from the shallow groundwater infiltration collection gallery along the Racoon River. There are no permitted private wells within a 1-mile radius of the Base. Access to the Base is controlled by perimeter fencing and entrance is through a controlled gate. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

Groundwater Worksheet

Installation Des Moines ANG

Site ID: PRL 10

AFFF Release Area #: AFFF 10

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	0.047	0.04	1.2	
PFOA	0.042	0.04	1.0	
PFBS	0.031	0.602	0.1	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	2.3	
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		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 Des Moines ANG

Site ID: PRL 10

AFFF Release Area #: AFFF 10

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFOS	0.0053	0.126	0.0	
PFBS	0.00019	1.9	0.0	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.0	
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$		
100 > CHF > 2	M (Medium)			
2 > CHF	L (Low)			
CHF Value	CHF VALUE		L	
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:	Des Moines ANG	Date:	10/4/2021
Location (State):	Iowa	Media Evaluated:	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:	Maj Jimmy Gracia	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: LOW			

Site Summary	
Brief Site Description:	Although no records exist of AFFF usage on the Concrete Apron and ramp area adjacent to Buildings 100 and 125 in the southeastern portion of the Base, one discharge of AFFF onto the ramp area was documented in December 1995 from Building 125. In addition, this area may have been impacted by AFFF when aircraft were present prior to 2014. Stormwater in this area is routed to Outfalls 001 and 002 through stormwater catch basins.
Brief Description of Pathways:	Soil borings completed as part of IRP investigations at the Base indicate surficial geology is comprised of a thin layer of fill material underlain by silty clays, silts, and fractured clays. These unconsolidated deposits are approximately 20 to 30 ft thick and have a dense silt layer near the base, which grades to weathered shale zone in the Pennsylvanian bedrock. The water table at the Base is generally encountered at depths of 5 to 7 ft below ground surface. The stormwater drainage system is directed into the storm sewer system which runs southwest off the Base and discharges into Frink Creek. Shallow groundwater flow is to the south toward Middle or Yeader Creek or west toward Frink Creek. At this PRL, groundwater flow is to the south or west and the highest groundwater elevation is centered at MW-DES09-01 at Building 125 (one monitoring was placed at the southern and western edge of the apron). This PRL is the concrete apron and does not include any grassy areas adjacent to the apron.
Brief Description of Receptors:	The EDR Radius Map™ Report lists a total of 100 wells within a one-mile radius of the Base. Ninety-nine of these listed wells are classified as abandoned, monitoring, test, or heat pump (10 located downgradient). One well, located ½ mile south of the Base is listed as a public water supply well owned by the Des Moines Water Works. The City of Des Moines Water Works Department provides drinking water to the Base and the City obtains much of its public water supply from the shallow alluvial aquifer along the Raccoon River which is approximately 1 mile north of the Base. The public water supply is collected from the shallow groundwater infiltration collection gallery along the Raccoon River. There are no permitted private wells within a 1-mile radius of the Base. Access to the Base is controlled by perimeter fencing and entrance is through a controlled gate. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

Groundwater Worksheet

Installation Des Moines ANG

Site ID: PRL

AFFF Release Area #: AFFF 11

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	No Data
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	NA
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		
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).		
Receptor Factor			
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater)		
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural)		
Limited	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III)		
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		
Groundwater Category			NA

Soil Worksheet

Installation Des Moines ANG

Site ID: PRL

AFFF Release Area #: AFFF 11

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFOS	0.0036	0.126	0.0	
PFOA	0.00022	0.126	0.0	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.0	
CHF > 100	H (High)	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$		
100 > CHF > 2	M (Medium)			
2 > CHF	L (Low)			
CHF Value	CHF VALUE		L	
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	