

## Public Notice

### Relative Risk Site Evaluation

#### Portland Air National Guard Base, Oregon

The Air Force completed the Relative Risk Site Evaluation (RRSE) for the Portland Air National Guard Base (ANGB), Oregon, to support sequencing of environmental restoration work. When the term "Air Force" is used in this public notice, it includes the Air National Guard. The RRSE process is used to evaluate the relative risk posed by an environmental restoration site in relation to other sites. Restoration sites in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) are evaluated during the RRSE process to sequence environmental restoration work. Due to discovery of per- and polyfluoroalkyl substances (PFAS), which includes perfluorooctane sulfonic acid (PFOS), perfluorooctanoic acid (PFOA), and perfluorobutane sulfonic acid (PFBS), a RRSE was completed for the sites at this installation. 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.

This RRSE fact sheet with individual site summaries is issued in accordance with the Department of Defense (DoD) Environmental Restoration Program (ERP) and is available for public review for 30 days as of this notice. The public comment period for Portland ANGB will be from 28 APR 2023 to 28 MAY 2023. At Portland ANGB, ten (10) restoration sites were evaluated in the current RRSE. The Overall Site category scores were three "High", seven "Medium", and zero "Low" categories. Additional information on the RRSE framework and the scoring process for the sites is included in the RRSE which can be found at the Portland ANGB website located at the following link: <https://www.142wg.ang.af.mil/>

For more information or to submit written comments, please contact Aubrey Higginbotham at NGB/A4VR, 3501 Fetchet Avenue, Joint Base Andrews, MD, 20762-5157, (240) 612-8573. [aubrey.higginbotham.2@us.af.mil](mailto:aubrey.higginbotham.2@us.af.mil).



# RELATIVE RISK SITE EVALUATION

## Portland Air National Guard Base, Oregon

### 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 Portland 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 Portland International Airport, OR then enter the AR Number 473251 in the "AR #" field for the PA. For the SI, enter the AR Numbers 582039, 582040, 582142, 582041, or 582042 and for the Expanded SI (ESI) enter the AR numbers 607548, 607550, 607551, 607552, 607553, 607554, 607555, 607556, 607557, 607558, 607559, 607560, or 607561. 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

ANGB - Air National Guard Bureau

AR - Administrative Record

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

CHF - Contaminant Hazard Factor

DoD - Department of Defense

EBS - Environmental Baseline Survey

EPA - US Environmental Protection Agency

ESI - Expanded Site Inspection

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

ROD - Record of Decision

RRSE - Relative Risk Site Evaluation

SI - Site Inspection



# RELATIVE RISK SITE EVALUATION, cont.

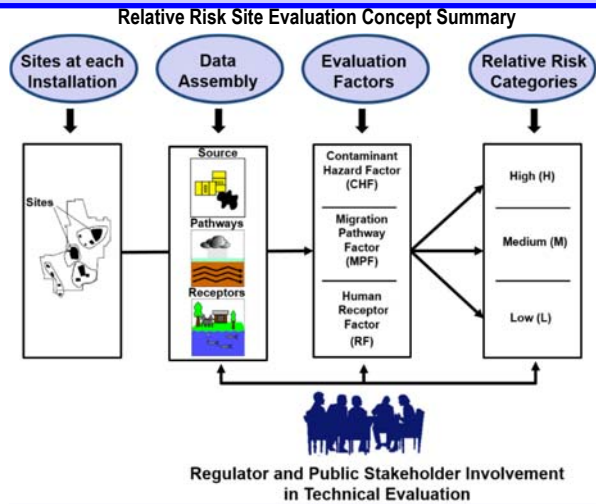


## Q. What is the Relative Risk Site Evaluation (RRSE)?

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 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.



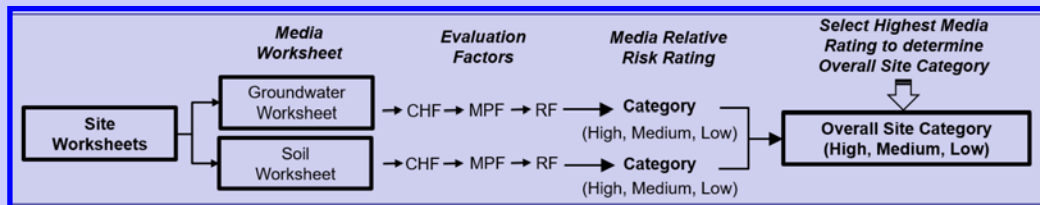
## Sites at Each Installation

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

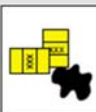


A. Restoration sites in CERCLA phases prior to remedy-in-place are evaluated in the process. Worksheets are developed for environmental media at each site. For consistency across all the Installations, only surface soil (0-1 foot deep) and groundwater media were evaluated in the RRSE.

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](http://www.afcec.af.mil)

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

POINT OF CONTACT  
Aubrey Higginbotham  
240.612.8573  
[aubrey.higginbotham.2@us.af.mil](mailto:aubrey.higginbotham.2@us.af.mil)

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

A. The movement of contamination at a site is evaluated and assigned a **Migration Pathway Factor (MPF)** rating.



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

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



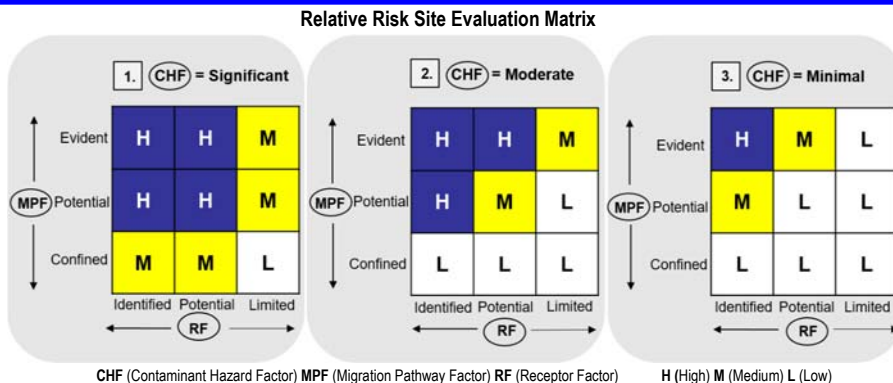
A. The **Receptor Factor (RF)** is determined by a receptor's, such as humans, potential to come into contact with contaminated media. RFs are designated as: identified, potential, or limited (**High, Medium, and Low**). **Identified** rating is given when receptors are in contact or threat of contact with contaminated media. **Potential** is given when receptor may contact contaminated media. **Limited** is given when there is little or no contact with contaminated media.

# RELATIVE RISK SITE EVALUATION, cont.

## Media Relative Risk Rating

**Q. How is the media relative risk rating determined?**

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



## 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

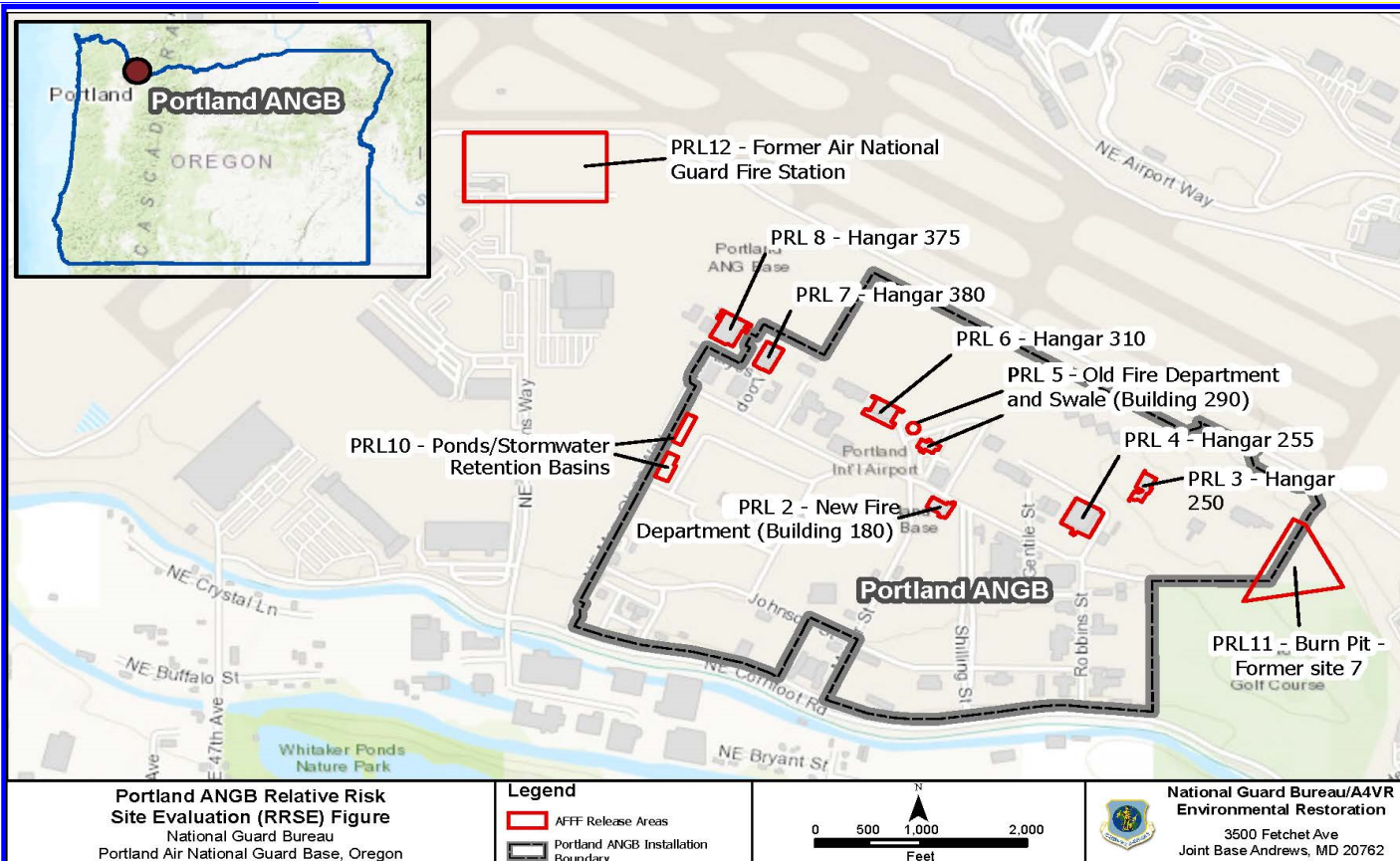
**Q. How do I participate as Stakeholder?**



**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 Portland International Airport, OR

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



### Notes:

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

Site Background Information			
Installation:	Portland Air National Guard Base (ANGB)	Date:	9/9/2021
Location (State):	Oregon	Media Evaluated:	Groundwater, Soil
Site Name and ID:	New Fire Dept Bldg 180 - PRL 2	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Aubrey Higginbotham	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	Portland Air National Guard Base (ANGB) is located immediately adjacent and south of Portland International Airport in Oregon and occupies approximately 245 acres of land leased from the Port of Portland. The new Fire Department Building 180 was constructed in 2005, and the aqueous film forming foam (AFFF) stored at this location is currently in Fire/Crash Response vehicles, including three crash trucks (two 25-gal trucks and one 250-gal truck), one fire engine (250 gal), and one foam trailer (2,000 gal). One former crash truck, awaiting disposal at the motor pool, contained 130 gallons. Fire Department personnel indicated that minor spills had occurred during filling the vehicles over the years from on-site containers (now removed) and minor leaks from the equipment. In addition, at least three occurrences of AFFF being discharged to the stormwater sewer system were documented in the Annual Stormwater Reports.
Brief Description of Pathways:	Multnomah County and Portland, Oregon are located on a topographic boundary known as the Columbia Plateau, a region marked by Eocene volcanic features and late Miocene fluvial deposits from the Cascade Mountain Range. Portland ANGB is situated on Quaternary age terrace alluvium, composed of floodplain and terraced bedded sands, silts, and clays ranging in thickness from 100 to 200 ft. The primary soil underlying most of Portland ANGB is the Pilchuck Soil Complex. The Pilchuck Soil Complex is composed of 1 ft. of silty topsoil underlain by 5 ft. of well-sorted, highly permeable, dark brown sands. According to the 2006 environmental baseline survey, the shallowest water bearing zone is a discontinuous, unconfined to semi-confined water-bearing sand unit, the top of which ranges in depth from 5.5 to 9.0 ft. below ground surface (BGS) and ranges in thickness from 3 to 19 ft. The groundwater flow direction is predominantly toward the west-northwest. Portland ANGB is located on a levee-protected floodplain of the Columbia River. Surface water flow from Portland ANGB and Portland International Airport eventually drains to the Columbia Slough. The Columbia Slough is directly south of Portland ANGB and is 18 miles long within the southern floodplain of the Columbia River. The Columbia Slough receives water from springs to the northeast of Portland International Airport and local groundwater seepage from shallow saturated zones, as well as local surface water runoff and stormwater from the Portland Int ANGB detention pond. This PRL includes the fire station. The PRL is surrounded by asphalt and a grassy strip to the southeast.
Brief Description of Receptors:	The City of Portland has a well field approximately 0.75 miles east/northeast of the Base (upgradient), which is used as a supplemental water supply for the City of Portland. In addition, information provided from the 2006 Environmental Baseline Survey (EBS) shows several additional water wells around the Base. Two water wells were identified in the EBS within a 1-mile radius of the property. However, these wells are not listed as existing wells on the State of Oregon Water Resources Department, online Well Log Query. The preliminary assessment (PA) included information on eight unregistered wells that are located between 0.75 and 1.25 miles from the Base, of which some are used for domestic consumption. The PA Report indicates 153 federal or public water wells are within a 1-mile radius of the Base and none are listed as potable wells with approximately 35 in a downgradient location (W, NNW). The Base has a perimeter fence and access is through a controlled gate. Access to the PRL would be restricted to authorized Base personnel. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

# Groundwater Worksheet

Installation: Portland ANG

Site ID: PRL 2

AFFF Release Area #: AFFF 2

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	42	0.04	1050.0	
PFOA	0.97	0.04	24.3	
PFBS	0.5	0.602	0.8	
<b>CHF Scale</b>	<b>CHF Value</b>	<b>Contamination Hazard Factor (CHF)</b>	<b>1075.1</b>	
<b>CHF &gt; 100</b>	<b>H (High)</b>	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$		
<b>100 &gt; CHF &gt; 2</b>	<b>M (Medium)</b>			
<b>2 &gt; CHF</b>	<b>L (Low)</b>			
<b>CHF Value</b>	<b>CHF VALUE</b>		<b>H</b>	
<b><u>Migratory Pathway Factor</u></b>				
<b>Evident</b>	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well)			
<b>Potential</b>	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined		M	
<b>Confined</b>	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)			
<b>Migratory Pathway Factor</b>	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<b><u>Receptor Factor</u></b>				
<b>Identified</b>	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)			
<b>Potential</b>	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)		M	
<b>Limited</b>	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III)			
<b>Receptor Factor</b>	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<b>Groundwater Category</b>			<b>HIGH</b>	

# Soil Worksheet

Installation: Portland ANG

Site ID: PRL 2

AFFF Release Area #: AFFF 2

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFOS	0.034	0.126	0.3	
PFOA	0.0012	0.126	0.0	
PFBS	0.00052	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	
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:	Portland ANGB	Date:	9/9/2021
Location (State):	Oregon	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Hangar 250 - PRL 3	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Aubrey Higginbotham	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: MEDIUM			

Site Summary	
Brief Site Description:	<p>Hangar 250 was built in 1985. AFFF is stored in fire suppression equipment in the mechanical room of this hangar. According to the label, the tank has a design capacity of 200 gal, but the net contents are 55 gal of AFFF. Minor leaks of AFFF have occurred in this room, with no reported inadvertent releases in the hangar. Currently, no AFFF is present in the hangar, although one empty 55-gal barrel is currently present. No records of spills are reported to have occurred at this location.</p>
Brief Description of Pathways:	<p>Multnomah County and Portland, Oregon are located on a topographic boundary known as the Columbia Plateau, a region marked by Eocene volcanic features and late Miocene fluvial deposits from the Cascade Mountain Range. Portland ANGB is situated on Quaternary age terrace alluvium, composed of floodplain and terraced bedded sands, silts, and clays ranging in thickness from 100 to 200 ft. The primary soil underlying most of Portland Int ANGB is the Pilchuck Soil Complex. The Pilchuck Soil Complex is composed of 1 ft. of silty topsoil underlain by 5 ft. of well-sorted, highly permeable, dark brown sands. According to the 2006 environmental baseline survey, the shallowest water bearing zone is a discontinuous, unconfined to semi-confined water-bearing sand unit, the top of which ranges in depth from 5.5 to 9.0 ft. BGS and ranges in thickness from 3 to 19 ft. The groundwater flow direction is predominantly toward the west-northwest. Portland ANGB is located on a levee-protected floodplain of the Columbia River. Surface water flow from Portland ANGB and Portland International Airport eventually drains to the Columbia Slough. The Columbia Slough is directly south of Portland ANGB and is 18 miles long within the southern floodplain of the Columbia River. The Columbia Slough receives water from springs to the northeast of Portland International Airport and local groundwater seepage from shallow saturated zones, as well as local surface water runoff and stormwater from the Portland ANGB detention pond. This PRL includes the building and is surrounded by grassy fields except for the paved entrance on the west side and a small car parking area to the east. The storm sewer system is a system of surface swales that eventually move surface water into the retention ponds.</p>
Brief Description of Receptors:	<p>The City of Portland has a well field approximately 0.75 miles east/northeast of the Base (upgradient), which is used as a supplemental water supply for the City of Portland. In addition, information provided from the 2006 EBS shows several additional water wells around the Base. Two water wells were identified in the EBS within a 1-mile radius of the property. However, these wells are not listed as existing wells on the State of Oregon Water Resources Department, online Well Log Query. The PA included information on eight unregistered wells that are located between 0.75 and 1.25 miles from the Base, of which some are used for domestic consumption. The PA Report indicates 153 federal or public water wells are within a 1-mile radius of the Base and none are listed as potable wells with approximately 35 in a downgradient location (W, NNW). The Base has a perimeter fence and access is through a controlled gate. Access to the PRL would be restricted to authorized Base personnel. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>



# Groundwater Worksheet

Installation: Portland ANG

Site ID: PRL 3

AFFF Release Area #: AFFF 3

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	0.22	0.04	5.5	
PFOA	0.053	0.04	1.3	
PFBS	0.0063	0.602	0.0	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	6.8	
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)			
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)		M	
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).		M	
Groundwater Category			MEDIUM	

# Soil Worksheet

Installation: Portland ANGB

Site ID: PRL 3

AFFF Release Area #: AFFF 3

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFOS	0.00073	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:	Portland ANGB	Date:	9/9/2021
Location (State):	Oregon	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Hangar 255 - PRL 4	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Aubrey Higginbotham	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: MEDIUM			

Site Summary	
Brief Site Description:	<p>Hangar 255 was constructed in 1956. AFFF is stored in fire suppression equipment in the mechanical room of this hangar. The placard on the tank states that it contains 600 gal of AFFF manufactured in 1994. Minor leaks of AFFF have occurred in this room, with an inadvertent release in the main hangar. On October 19, 2005, Environmental Management personnel noticed foam on the pavement near Hangar 255 and questioned the local office personnel. The investigation indicated that the AFFF system in the hangar had been tested earlier that day as part of an annual testing program and 0.5 gal of pure AFFF mixed with 49.5 gal of water overflowed the system and was rinsed off the pavement into a storm drain located on the south side of Hangar 255. The Hangar plumbing configuration was redesigned to prevent future annual AFFF testing from discharging to the storm sewer system.</p>
Brief Description of Pathways:	<p>Multnomah County and Portland, Oregon are located on a topographic boundary known as the Columbia Plateau, a region marked by Eocene volcanic features and late Miocene fluvial deposits from the Cascade Mountain Range. Portland ANGB is situated on Quaternary age terrace alluvium, composed of floodplain and terraced bedded sands, silts, and clays ranging in thickness from 100 to 200 ft. The primary soil underlying most of Portland ANGB is the Pilchuck Soil Complex. The Pilchuck Soil Complex is composed of 1 ft. of silty topsoil underlain by 5 ft. of well-sorted, highly permeable, dark brown sands. According to the 2006 environmental baseline survey, the shallowest water bearing zone is a discontinuous, unconfined to semi-confined water-bearing sand unit, the top of which ranges in depth from 5.5 to 9.0 ft. BGS and ranges in thickness from 3 to 19 ft. The groundwater flow direction is predominantly toward the west-northwest. Portland ANGB is located on a levee-protected floodplain of the Columbia River. Surface water flow from Portland ANGB and Portland International Airport eventually drains to the Columbia Slough. The Columbia Slough is directly south of Portland ANGB and is 18 miles long within the southern floodplain of the Columbia River. The Columbia Slough receives water from springs to the northeast of Portland International Airport and local groundwater seepage from shallow saturated zones, as well as local surface water runoff and stormwater from the Portland ANGB detention pond. The PRL includes the building which is surrounded by asphalt and concrete paving areas. The storm sewer system is a system of surface swales that eventually move surface water into the retention ponds.</p>
Brief Description of Receptors:	<p>The City of Portland has a well field approximately 0.75 miles east/northeast of the Base (upgradient), which is used as a supplemental water supply for the City of Portland. In addition, information provided from the 2006 EBS shows several additional water wells around the Base. Two water wells were identified in the EBS within a 1-mile radius of the property. However, these wells are not listed as existing wells on the State of Oregon Water Resources Department, online Well Log Query. The PA included information on eight unregistered wells that are located between 0.75 and 1.25 miles from the Base, of which some are used for domestic consumption. The PA Report indicates 153 federal or public water wells are within a 1-mile radius of the Base and none are listed as potable wells with approximately 35 in a downgradient location (W, NNW). This PRL is the building which is surrounded by asphalt and concrete paved areas. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

# Groundwater Worksheet

Installation: Portland ANGB

Site ID: PRL 4

AFFF Release Area #: AFFF 4

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	0.22	0.04	5.5	
PFOA	0.053	0.04	1.3	
PFBS	0.0063	0.602	0.0	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	6.8	
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)			
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)		M	
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).		M	
Groundwater Category			MEDIUM	

# Soil Worksheet

Installation: Portland ANGB

Site ID: PRL 4

AFFF Release Area #: AFFF 4

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFOS	31	0.126	246.0	
PFOA	0.00089	0.126	0.0	
PFBS	0.00073	1.9	0.0	
<b>CHF Scale</b>	<b>CHF Value</b>	<b>Contamination Hazard Factor (CHF)</b>	<b>246.0</b>	
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	
<b><u>Migratory Pathway Factor</u></b>				
<b>Evident</b>	Analytical data or observable evidence that contamination is present at a point of exposure			
<b>Potential</b>	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			
<b>Confined</b>	Low possibility for contamination to be present at or migrate to a point of exposure		L	
<b>Migratory Pathway Factor</b>	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L	
<b><u>Receptor Factor</u></b>				
<b>Identified</b>	Receptors identified that have access to contaminated soil			
<b>Potential</b>	Potential for receptors to have access to contaminated soil			
<b>Limited</b>	No potential for receptors to have access to contaminated soil		L	
<b>Receptor Factor</b>	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		L	
<b>Soil Category</b>			LOW	

Site Background Information			
Installation:	Portland ANGB	Date:	9/9/2021
Location (State):	Oregon	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Old Fire Department and Swale – Building 290 - PRL 5	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Aubrey Higginbotham	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: MEDIUM			

Site Summary	
Brief Site Description:	Building 290 was built in 1986 and housed the old Fire Department from approximately 1986 to 2005. According to personnel that have worked in this building since the late 1980s, AFFF was historically stored at this location in Fire/Crash Response vehicles. Fire Department personnel indicated that minor spills had occurred during the filling of vehicles over the years from onsite containers (now removed) and minor leaks from the equipment. In addition, personnel indicated at least one spill of AFFF of unknown quantity discharged to the drainage swale northwest of the building.
Brief Description of Pathways:	Multnomah County and Portland, Oregon are located on a topographic boundary known as the Columbia Plateau, a region marked by Eocene volcanic features and late Miocene fluvial deposits from the Cascade Mountain Range. Portland ANGB is situated on Quaternary age terrace alluvium, composed of floodplain and terraced bedded sands, silts, and clays ranging in thickness from 100 to 200 ft. The primary soil underlying most of Portland ANGB is the Pilchuck Soil Complex. The Pilchuck Soil Complex is composed of 1 ft. of silty topsoil underlain by 5 ft. of well-sorted, highly permeable, dark brown sands. According to the 2006 environmental baseline survey, the shallowest water bearing zone is a discontinuous, unconfined to semi-confined water-bearing sand unit, the top of which ranges in depth from 5.5 to 9.0 ft. BGS and ranges in thickness from 3 to 19 ft. The groundwater flow direction is predominantly toward the west-northwest. Portland ANGB is located on a levee-protected floodplain of the Columbia River. Surface water flow from Portland ANGB and Portland International Airport eventually drains to the Columbia Slough. The Columbia Slough is directly south of Portland ANGB and is 18 miles long within the southern floodplain of the Columbia River. The Columbia Slough receives water from springs to the northeast of Portland International Airport and local groundwater seepage from shallow saturated zones, as well as local surface water runoff and stormwater from the Portland ANGB detention pond. The PRL includes the building which is surrounded by asphalt parking areas, grassy areas, and swale. The storm sewer system is a system of surface swales that eventually move surface water into the retention ponds.
Brief Description of Receptors:	The City of Portland has a well field approximately 0.75 miles east/northeast of the Base (upgradient), which is used as a supplemental water supply for the City of Portland. In addition, information provided from the 2006 EBS shows several additional water wells around the Base. Two water wells were identified in the EBS within a 1-mile radius of the property. However, these wells are not listed as existing wells on the State of Oregon Water Resources Department, online Well Log Query. The PA included information on eight unregistered wells that are located between 0.75 and 1.25 miles from the Base, of which some are used for domestic consumption. The PA Report indicates 153 federal or public water wells are within a 1-mile radius of the Base and none are listed as potable wells with approximately 35 in a downgradient location (W, NNW). The Base has a perimeter fence and access is through a controlled gate. Access to the PRL would be restricted to authorized Base personnel. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

# Groundwater Worksheet

Installation: Portland ANGB

Site ID: PRL 5

AFFF Release Area #: AFFF 5

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	3	0.04	75.0	
PFOA	0.053	0.04	1.3	
PFBS	0.069	0.602	0.1	
<b>CHF Scale</b>	<b>CHF Value</b>	<b>Contamination Hazard Factor (CHF)</b>	<b>76.4</b>	
<b>CHF &gt; 100</b>	<b>H (High)</b>	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$		
<b>100 &gt; CHF &gt; 2</b>	<b>M (Medium)</b>			
<b>2 &gt; CHF</b>	<b>L (Low)</b>			
<b>CHF Value</b>	<b>CHF VALUE</b>		<b>M</b>	
<b><u>Migratory Pathway Factor</u></b>				
<b>Evident</b>	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well)			
<b>Potential</b>	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined		M	
<b>Confined</b>	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)			
<b>Migratory Pathway Factor</b>	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<b><u>Receptor Factor</u></b>				
<b>Identified</b>	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)			
<b>Potential</b>	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)		M	
<b>Limited</b>	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III)			
<b>Receptor Factor</b>	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<b>Groundwater Category</b>			<b>MEDIUM</b>	



# Soil Worksheet

Installation: Portland ANGB

Site ID: PRL 5

AFFF Release Area #: AFFF 5

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFOS	2.7	0.126	21.4	
PFOA	0.00045	0.126	0.0	
PFBS	0.00062	1.9	0.0	
<b>CHF Scale</b>	<b>CHF Value</b>	<b>Contamination Hazard Factor (CHF)</b>	<b>21.4</b>	
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	
<b><u>Migratory Pathway Factor</u></b>				
<b>Evident</b>	Analytical data or observable evidence that contamination is present at a point of exposure			
<b>Potential</b>	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	
<b>Confined</b>	Low possibility for contamination to be present at or migrate to a point of exposure			
<b>Migratory Pathway Factor</b>	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<b><u>Receptor Factor</u></b>				
<b>Identified</b>	Receptors identified that have access to contaminated soil			
<b>Potential</b>	Potential for receptors to have access to contaminated soil		M	
<b>Limited</b>	No potential for receptors to have access to contaminated soil			
<b>Receptor Factor</b>	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<b>Soil Category</b>			<b>MEDIUM</b>	

Site Background Information			
Installation:	Portland ANGB	Date:	9/9/2021
Location (State):	Oregon	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Hangar 310 - PRL 6	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Aubrey Higginbotham	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: MEDIUM			

Site Summary	
Brief Site Description:	<p>Hangar 310 was built in 1988. AFFF is stored in fire suppression equipment in the mechanical room of this building. Three tanks are located in the room, which are very similar in size to the tanks in Hangar 375, although no volumes were listed on the tanks. It is presumed that two of the tanks contain 800 gal and one contains 600 gal. The date of manufacture listed on the tanks is 1987. Minor leaks of AFFF have occurred in the room, with an inadvertent release in the main hangar. Most of the inadvertent release of AFFF likely was hosed off into the floor drain within the hangar, which is connected to the sanitary sewer system. Some of the AFFF also would have likely made its way onto the ramp to the north of Hangar 310 and then into the storm sewer system.</p>
Brief Description of Pathways:	<p>Multnomah County and Portland, Oregon are located on a topographic boundary known as the Columbia Plateau, a region marked by Eocene volcanic features and late Miocene fluvial deposits from the Cascade Mountain Range. Portland ANGB is situated on Quaternary age terrace alluvium, composed of floodplain and terraced bedded sands, silts, and clays ranging in thickness from 100 to 200 ft. The primary soil underlying most of Portland ANGB is the Pilchuck Soil Complex. The Pilchuck Soil Complex is composed of 1 ft. of silty topsoil underlain by 5 ft. of well-sorted, highly permeable, dark brown sands. According to the 2006 environmental baseline survey, the shallowest water bearing zone is a discontinuous, unconfined to semi-confined water-bearing sand unit, the top of which ranges in depth from 5.5 to 9.0 ft. BGS and ranges in thickness from 3 to 19 ft. The groundwater flow direction is predominantly toward the west-northwest. Portland ANGB is located on a levee-protected floodplain of the Columbia River. Surface water flow from Portland ANGB and Portland International Airport eventually drains to the Columbia Slough. The Columbia Slough is directly south of Portland ANGB and is 18 miles long within the southern floodplain of the Columbia River. The Columbia Slough receives water from springs to the northeast of Portland International Airport and local groundwater seepage from shallow saturated zones, as well as local surface water runoff and stormwater from the Portland ANGB detention pond. The PRL includes the building which is surrounded by asphalt and a grassy strip. The storm sewer system is a system of surface swales that eventually move surface water into the retention ponds.</p>
Brief Description of Receptors:	<p>The City of Portland has a well field approximately 0.75 miles east/northeast of the Base (upgradient), which is used as a supplemental water supply for the City of Portland. In addition, information provided from the 2006 EBS shows several additional water wells around the Base. Two water wells were identified in the EBS within a 1-mile radius of the property. However, these wells are not listed as existing wells on the State of Oregon Water Resources Department, online Well Log Query. The PA included information on eight unregistered wells that are located between 0.75 and 1.25 miles from the Base, of which some are used for domestic consumption. The PA Report indicates 153 federal or public water wells are within a 1-mile radius of the Base and none are listed as potable wells with approximately 35 in a downgradient location (W, NNW). The Base has a perimeter fence and access is through a controlled gate. Access to the PRL would be restricted to authorized Base personnel. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.</p>

# Groundwater Worksheet

Installation: Portland ANGB

Site ID: PRL 6

AFFF Release Area #: AFFF 6

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	0.69	0.04	17.2	
PFOA	0.03	0.04	0.7	
PFBS	0.035	0.602	0.1	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	18.0	
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		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)			
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)		M	
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).		M	
Groundwater Category			MEDIUM	

# Soil Worksheet

Installation: Portland ANGB

Site ID: PRL 6

AFFF Release Area #: AFFF 6

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFOS	0.011	0.126	0.1	
PFOA	0.00014	0.126	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	
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:	Portland ANGB	Date:	9/9/2021
Location (State):	Oregon	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Hangar 380 - PRL 7	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Aubrey Higginbotham	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: MEDIUM			

Site Summary	
Brief Site Description:	Hangar 380 was built in 1986. AFFF was stored in fire suppression equipment in the mechanical room of this building. No tanks are currently in the room. The tanks reportedly were removed in 2005. Personnel interviewed did not know of any discharges in the room or in the main hangar.
Brief Description of Pathways:	Multnomah County and Portland, Oregon are located on a topographic boundary known as the Columbia Plateau, a region marked by Eocene volcanic features and late Miocene fluvial deposits from the Cascade Mountain Range. Portland ANGB is situated on Quaternary age terrace alluvium, composed of floodplain and terraced bedded sands, silts, and clays ranging in thickness from 100 to 200 ft. The primary soil underlying most of Portland ANGB is the Pilchuck Soil Complex. The Pilchuck Soil Complex is composed of 1 ft. of silty topsoil underlain by 5 ft. of well-sorted, highly permeable, dark brown sands. According to the 2006 environmental baseline survey, the shallowest water bearing zone is a discontinuous, unconfined to semi-confined water-bearing sand unit, the top of which ranges in depth from 5.5 to 9.0 ft. BGS and ranges in thickness from 3 to 19 ft. The groundwater flow direction is predominantly toward the west-northwest. Portland ANGB is located on a levee-protected floodplain of the Columbia River. Surface water flow from Portland ANGB and Portland International Airport eventually drains to the Columbia Slough. The Columbia Slough is directly south of Portland ANGB and is 18 miles long within the southern floodplain of the Columbia River. The Columbia Slough receives water from springs to the northeast of Portland International Airport and local groundwater seepage from shallow saturated zones, as well as local surface water runoff and stormwater from the Portland ANGB detention pond. The PRL includes the building which is surrounded by asphalt and a grassy strip to the southeast. Hangar 380 is located near paved apron/parking areas or grassy fields and is adjacent to Hangar 375. The storm sewer system is a system of surface swales that eventually move surface water into the retention ponds.
Brief Description of Receptors:	The City of Portland has a well field approximately 0.75 miles east/northeast of the Base (upgradient), which is used as a supplemental water supply for the City of Portland. In addition, information provided from the 2006 EBS shows several additional water wells around the Base. Two water wells were identified in the EBS within a 1-mile radius of the property. However, these wells are not listed as existing wells on the State of Oregon Water Resources Department, online Well Log Query. The PA included information on eight unregistered wells that are located between 0.75 and 1.25 miles from the Base, of which some are used for domestic consumption. The PA Report indicates 153 federal or public water wells are within a 1-mile radius of the Base and none are listed as potable wells with approximately 35 in a downgradient location (W, NNW). The Base has a perimeter fence and access is through a controlled gate. Access to the PRL would be restricted to authorized Base personnel. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

# Groundwater Worksheet

Installation: Portland ANGB

Site ID: PRL 7

AFFF Release Area #: AFFF 7

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	0.31	0.04	7.8	
PFOA	0.049	0.04	1.2	
PFBS	0.0088	0.602	0.0	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	9.0	
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		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)			
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)		M	
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).		M	
Groundwater Category			MEDIUM	

# Soil Worksheet

Installation: Portland ANGB

Site ID: PRL 7

AFFF Release Area #: AFFF 7

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.007	0.126	0.1
PFOA	0.00018	0.126	0.0
PFBS	0.00063	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
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:	Portland ANGB	Date:	9/9/2021
Location (State):	Oregon	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Hangar 375 - PRL 8	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Aubrey Higginbotham	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: MEDIUM			

Site Summary	
Brief Site Description:	Hangar 375 was built in 1988 and is located outside the Portland ANGB boundary. AFFF was stored in fire suppression equipment in the mechanical room of this building. Three tanks are in the room with no labels listing their volumes. Two of the tanks presumably contain 800 gal and one contains 600 gal. Minor leaks of AFFF have occurred in the room, and an inadvertent release had occurred in the main hangar. Most of the inadvertent release of AFFF likely was hosed off into the floor drain within the hangar, which is connected to the sanitary sewer system. Some of the AFFF would have likely made its way onto the ramp to the north of Hangar 375 and then into the storm sewer system.
Brief Description of Pathways:	Multnomah County and Portland, Oregon are located on a topographic boundary known as the Columbia Plateau, a region marked by Eocene volcanic features and late Miocene fluvial deposits from the Cascade Mountain Range. Portland ANGB is situated on Quaternary age terrace alluvium, composed of floodplain and terraced bedded sands, silts, and clays ranging in thickness from 100 to 200 ft. The primary soil underlying most of Portland ANGB is the Pilchuck Soil Complex. The Pilchuck Soil Complex is composed of 1 ft. of silty topsoil underlain by 5 ft. of well-sorted, highly permeable, dark brown sands. According to the 2006 environmental baseline survey, the shallowest water bearing zone is a discontinuous, unconfined to semi-confined water-bearing sand unit, the top of which ranges in depth from 5.5 to 9.0 ft. BGS and ranges in thickness from 3 to 19 ft. The groundwater flow direction is predominantly toward the west-northwest. Portland ANGB is located on a levee-protected floodplain of the Columbia River. Surface water flow from Portland ANGB and Portland International Airport eventually drains to the Columbia Slough. The Columbia Slough is directly south of Portland ANGB and is 18 miles long within the southern floodplain of the Columbia River. The Columbia Slough receives water from springs to the northeast of Portland International Airport and local groundwater seepage from shallow saturated zones, as well as local surface water runoff and stormwater from the Portland ANGB detention pond. The PRL includes the building which is surrounded by asphalt and a grassy strip. Hangar 375 is located inside an interior perimeter fence. The storm sewer system is a system of surface swales that eventually move surface water into the retention ponds.
Brief Description of Receptors:	The City of Portland has a well field approximately 0.75 miles east/northeast of the Base (upgradient), which is used as a supplemental water supply for the City of Portland. In addition, information provided from the 2006 EBS shows several additional water wells around the Base. Two water wells were identified in the EBS within a 1-mile radius of the property. However, these wells are not listed as existing wells on the State of Oregon Water Resources Department, online Well Log Query. The PA included information on eight unregistered wells that are located between 0.75 and 1.25 miles from the Base, of which some are used for domestic consumption. The PA Report indicates 153 federal or public water wells are within a 1-mile radius of the Base and none are listed as potable wells with approximately 35 in a downgradient location (W, NNW). The Base has a perimeter fence and access is through a controlled gate. Access to the PRL would be restricted to authorized personnel. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

# Groundwater Worksheet

Installation: Portland

ANGB Site ID: PRL 8

AFFF Release Area #: AFFF 8

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	0.37	0.04	9.3	
PFOA	0.18	0.04	4.5	
PFBS	0.019	0.602	0.0	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	13.8	
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)			
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)		M	
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).		M	
Groundwater Category			MEDIUM	

# Soil Worksheet

Installation: Portland ANGB

Site ID: PRL 8

AFFF Release Area #: AFFF 8

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios	
PFOS	0.0061	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:	Portland ANGB	Date:	9/9/2021
Location (State):	Oregon	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Ponds/SW Retention Basins - PRL 10	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Aubrey Higginbotham	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: MEDIUM			

Site Summary	
Brief Site Description:	Two man-made, shallow ponds are located in the west-central portion of the Base that receive 95% of the Base's stormwater discharge. The drainage ditch footprint occupies approximately 1.8 acres and consists of two branches. The main branch is approximately 2,800 ft. long, and the north branch extends approximately 1,700 ft. The two branches converge at the point of discharge to the stormwater ponds. The outfall from the upper pond can be closed allowing the pond to be used as a containment area. Stormwater is discharged from the upper pond to the lower pond, then it is conveyed to the airport's detention pond, and eventually to Columbia Slough. All of the releases to the storm sewer system eventually make their way to these two ponds. The ponds are located near the western boundary of the Base.
Brief Description of Pathways:	Multnomah County and Portland, Oregon are located on a topographic boundary known as the Columbia Plateau, a region marked by Eocene volcanic features and late Miocene fluvial deposits from the Cascade Mountain Range. Portland ANGB is situated on Quaternary age terrace alluvium, composed of floodplain and terraced bedded sands, silts, and clays ranging in thickness from 100 to 200 ft. The primary soil underlying most of Portland ANGB is the Pilchuck Soil Complex. The Pilchuck Soil Complex is composed of 1 ft. of silty topsoil underlain by 5 ft. of well-sorted, highly permeable, dark brown sands. According to the 2006 environmental baseline survey, the shallowest water bearing zone is a discontinuous, unconfined to semi-confined water-bearing sand unit, the top of which ranges in depth from 5.5 to 9.0 ft. BGS and ranges in thickness from 3 to 19 ft. The groundwater flow direction is predominantly toward the west-northwest. Portland ANGB is located on a levee-protected floodplain of the Columbia River. Surface water flow from Portland ANGB and Portland International Airport eventually drains to the Columbia Slough. The Columbia Slough is directly south of Portland ANGB and is 18 miles long within the southern floodplain of the Columbia River. The Columbia Slough receives water from springs to the northeast of Portland International Airport and local groundwater seepage from shallow saturated zones, as well as local surface water runoff and stormwater from the Portland ANGB detention pond. The PRL includes the stormwater/retention ponds. Both stormwater detention basins are adjacent to the Installation boundary and are surrounded by grassy fields. The storm sewer system is a system of surface swales that eventually move surface water into these retention pond.
Brief Description of Receptors:	The City of Portland has a well field approximately 0.75 miles east/northeast of the Base (upgradient), which is used as a supplemental water supply for the City of Portland. In addition, information provided from the 2006 EBS shows several additional water wells around the Base. Two water wells were identified in the EBS within a 1-mile radius of the property. However, these wells are not listed as existing wells on the State of Oregon Water Resources Department, online Well Log Query. The PA included information on eight unregistered wells that are located between 0.75 and 1.25 miles from the Base, of which some are used for domestic consumption. The PA Report indicates 153 federal or public water wells are within a 1-mile radius of the Base and none are listed as potable wells with approximately 35 in a downgradient location (W, NNW). The site is within the base boundary and access to the PRL would be restricted to authorized Base personnel. PFAS have been detected at multiple onsite wells at varying concentrations. Fish tissue samples have been reported with positive results for PFAS in this area. The RI Risk Assessment will evaluate risk for all potential receptors at that time.

# Groundwater Worksheet

Installation: Portland ANGB

Site ID: PRL 10

AFFF Release Area #: AFFF 10

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	0.23	0.04	5.8	
PFOA	0.012	0.04	0.3	
PFBS	0.042	0.602	0.1	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	6.2	
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 direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well)			
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined		M	
Confined	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls)			
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
Receptor Factor				
Identified	Impacted drinking water well with detected contaminants or existing downgradient water supply well within 4 miles and groundwater is current source of drinking water (EPA Class I or IIA groundwater)			
Potential	Existing downgradient drinking water well beyond 4 miles with no contaminant detection(s) or no known drinking water wells downgradient and groundwater is currently or potentially usable for drinking water (i.e., EPA Class I or II groundwater) or other beneficial use (e.g., agricultural)		M	
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).		M	
Groundwater Category			MEDIUM	

# Soil Worksheet

Installation: Portland ANGB

Site ID: PRL 10

AFFF Release Area #: AFFF 10

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	0.0068	0.126	0.1
PFOA	0.00014	0.126	0.0
PFBS	0.000077	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
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:	Portland ANGB	Date:	9/9/2021
Location (State):	Oregon	Media Evaluated:	Groundwater, Soil
Site Name and ID:	Burn Pit Former IRP Site 7 - PRL 11	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Aubrey Higginbotham	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	No Fire Training Areas are located on Portland ANGB property; however, during the September 2017 Installation site visit, the stakeholders agreed to include the former Installation Restoration Program (IRP) Site 7 Burn Pit (PRL 11) in the SI despite the site's location off Base as the site was historically located on property occupied by ANG/USAF. The former burn pit area is southeast of Buildings 210 and 215 and is outside of the Portland ANGB boundary to the east of the Base. The majority of the former IRP Site 7 Burn Pit lies on Port of Portland property. Immediately north of the former burn pit is the McBride Slough. The burn pit was used for fire training exercises between 1957 and 1978. Several thousand gallons of flammable liquids, including waste oil, jet propulsion fuel No. 4 jet fuel, and solvents, reportedly were burned each year in the pit. The former burn pit area has since been filled with gravel and compacted and is being used for vehicle parking.
Brief Description of Pathways:	Multnomah County and Portland, Oregon are located on a topographic boundary known as the Columbia Plateau, a region marked by Eocene volcanic features and late Miocene fluvial deposits from the Cascade Mountain Range. Portland ANGB is situated on Quaternary age terrace alluvium, composed of floodplain and terraced bedded sands, silts, and clays ranging in thickness from 100 to 200 ft. The primary soil underlying most of Portland ANGB is the Pilchuck Soil Complex. The Pilchuck Soil Complex is composed of 1 ft. of silty topsoil underlain by 5 ft. of well-sorted, highly permeable, dark brown sands. According to the 2006 environmental baseline survey, the shallowest water bearing zone is a discontinuous, unconfined to semi-confined water-bearing sand unit, the top of which ranges in depth from 5.5 to 9.0 ft. BGS and ranges in thickness from 3 to 19 ft. The groundwater flow direction is predominantly toward the west-northwest. Portland ANGB is located on a levee-protected floodplain of the Columbia River. Surface water flow from Portland ANGB and Portland International Airport eventually drains to the Columbia Slough. The Columbia Slough is directly south of Portland ANGB and is 18 miles long within the southern floodplain of the Columbia River. The Columbia Slough receives water from springs to the northeast of Portland International Airport and local groundwater seepage from shallow saturated zones, as well as local surface water runoff and stormwater from the Portland ANGB detention pond. The Burn Pit (Former IRP Site 7) is located just outside the fenced Installation boundary. There is no vegetation in the burn pit and it was filled with compacted gravel. The storm sewer system is a system of surface swales that eventually move surface water into the retention ponds.
Brief Description of Receptors:	The City of Portland has a well field approximately 0.75 miles east/northeast of the Base (upgradient), which is used as a supplemental water supply for the City of Portland. In addition, information provided from the 2006 EBS shows several additional water wells around the Base. Two water wells were identified in the EBS within a 1-mile radius of the property. However, these wells are not listed as existing wells on the State of Oregon Water Resources Department, online Well Log Query. The PA included information on eight unregistered wells that are located between 0.75 and 1.25 miles from the Base, of which some are used for domestic consumption. The PA Report indicates 153 federal or public water wells are within a 1-mile radius of the Base and none are listed as potable wells with approximately 35 in a downgradient location (W, NNW). Fish tissue samples have been reported with positive results for PFAS in this area. The RI Risk Assessment will evaluate risk for all potential receptors at that time.



# Groundwater Worksheet

Installation: Portland ANGB

Site ID: PRL 11

AFFF Release Area #: AFFF 11

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	7.8	0.04	195.0	
PFOA	24	0.04	600.0	
PFBS	0.3	0.602	0.5	
<b>CHF Scale</b>	<b>CHF Value</b>	<b>Contamination Hazard Factor (CHF)</b>	<b>795.5</b>	
<b>CHF &gt; 100</b>	<b>H (High)</b>	$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant}]}{[\text{Comparison Value for Contaminant}]}$		
<b>100 &gt; CHF &gt; 2</b>	<b>M (Medium)</b>			
<b>2 &gt; CHF</b>	<b>L (Low)</b>			
<b>CHF Value</b>	<b>CHF VALUE</b>		<b>H</b>	
<b><u>Migratory Pathway Factor</u></b>				
<b>Evident</b>	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well)			
<b>Potential</b>	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined		M	
<b>Confined</b>	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)			
<b>Migratory Pathway Factor</b>	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<b><u>Receptor Factor</u></b>				
<b>Identified</b>	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)			
<b>Potential</b>	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)		M	
<b>Limited</b>	No known water supply wells downgradient and groundwater is not considered potential drinking water source and is of limited beneficial use (Class III)			
<b>Receptor Factor</b>	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M	
<b>Groundwater Category</b>			<b>HIGH</b>	

# Soil Worksheet

Installation: Portland ANGB

Site ID: PRL 11

AFFF Release Area #: AFFF 11

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOS	570	0.126	4523.8
PFOA	70	0.126	555.6
PFBS	0.00087	1.9	0.0
<b>CHF Scale</b>	<b>CHF Value</b>	<b>Contamination Hazard Factor (CHF)</b>	<b>5079.4</b>
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
<b><u>Migratory Pathway Factor</u></b>			
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		
<b>Migratory Pathway Factor</b>	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		H
<b><u>Receptor Factor</u></b>			
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		
<b>Receptor Factor</b>	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).		M
<b>Soil Category</b>			HIGH

Site Background Information			
Installation:	Portland ANGB	Date:	9/9/2021
Location (State):	Oregon	Media Evaluated:	Groundwater
Site Name and ID:	Former ANG Fire Station - PRL 12	Phase of Execution (e.g., RI, Record of Decision (ROD)):	N/A
RPM's Name:	Aubrey Higginbotham	Agreement Status (e.g., Federal Facility Agreement date signed):	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	The Former ANG Fire Station is located off base, just northwest of the installation boundary. The site appears relatively flat. The Site is partially covered concrete and and grassy vegetation.
Brief Description of Pathways:	Multnomah County and Portland, Oregon are located on a topographic boundary known as the Columbia Plateau, a region marked by Eocene volcanic features and late Miocene fluvial deposits from the Cascade Mountain Range. Portland ANGB is situated on Quaternary age terrace alluvium, composed of floodplain and terraced bedded sands, silts, and clays ranging in thickness from 100 to 200 ft. The primary soil underlying most of Portland ANGB is the Pilchuck Soil Complex. The Pilchuck Soil Complex is composed of 1 ft. of silty topsoil underlain by 5 ft. of well-sorted, highly permeable, dark brown sands. According to the 2006 environmental baseline survey, the shallowest water bearing zone is a discontinuous, unconfined to semi-confined water-bearing sand unit, the top of which ranges in depth from 5.5 to 9.0 ft. BGS and ranges in thickness from 3 to 19 ft. The groundwater flow direction is predominantly toward the west-northwest. Portland ANGB is located on a levee-protected floodplain of the Columbia River. Surface water flow from Portland ANGB and Portland International Airport eventually drains to the Columbia Slough. The Columbia Slough is directly south of Portland ANGB and is 18 miles long within the southern floodplain of the Columbia River. The Columbia Slough receives water from springs to the northeast of Portland International Airport and local groundwater seepage from shallow saturated zones, as well as local surface water runoff and stormwater from the Portland ANGB detention pond.
Brief Description of Receptors:	The City of Portland has a well field approximately 0.75 miles east/northeast of the Base (upgradient), which is used as a supplemental water supply for the City of Portland. In addition, information provided from the 2006 EBS shows several additional water wells around the Base. Two water wells were identified in the EBS within a 1-mile radius of the property. However, these wells are not listed as existing wells on the State of Oregon Water Resources Department, online Well Log Query. The PA included information on eight unregistered wells that are located between 0.75 and 1.25 miles from the Base, of which some are used for domestic consumption. The PA Report indicates 153 federal or public water wells are within a 1-mile radius of the Base and none are listed as potable wells with approximately 35 in a downgradient location (W, NNW). PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

# Groundwater Worksheet

Installation: Portland ANGB

Site ID: PRL 12

AFFF Release Area #: AFFF 12

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios	
PFOS	0.11	0.04	2.7	
PFOA	0.2	0.04	5.0	
PFBS	0.0043	0.602	0.0	
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	7.8	
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	