RELATIVE RISK SITE EVALUATION

Key Field Air National Guard Base, Mississippi

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 (ANG). 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 Key Field 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 Key Field (Meridian), MS, then enter the AR Number 473382 in the “AR #” field for the PA. For the SI, enter the AR Number 581933. 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

ANG - Air National Guard

ANGB - Air National Guard Base

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

CHF – Contaminant Hazard Factor

DoD - Department of Defense

EPA – US Environmental Protection Agency

FTA – Fire Training Area

HA – Health Advisory

MPF – Migration Pathway Factor

PA – Preliminary Assessment

PFAS - Per-and polyfluoroalkyl substances

PFBS –Perfluorobutanesulfonic acid

PFOA - Perfluorooctanoic acid

PFOS - Perfluorooctane sulfonate

PRL - Potential Release Location

RF – Receptor Factor

RI – Remedial Investigation

RRSE – Relative Risk Site Evaluation

SI – Site Inspection

RELATIVE RISK SITE EVALUATION, cont.

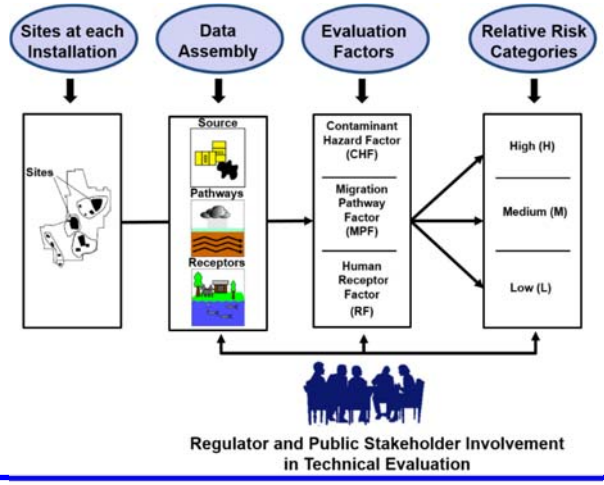
Q. What is the Relative Risk Site Evaluation (RRSE)?

A. RRSE is a methodology to sequence environmental restoration work used by the 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.

Relative Risk Site Evaluation Concept Summary

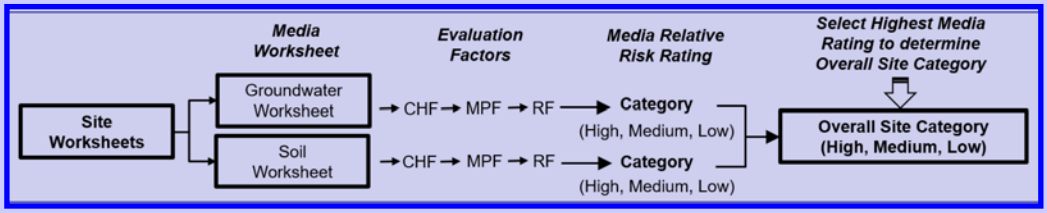


Sites at Each Installation

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

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

The figure shows the process for a media to be evaluated using the contaminant hazard factor (CHF), the migration pathway factor (MPF), and the receptor factor (RF). Each media is scored to obtain a relative risk rating of High, Medium, or Low. The highest media rating determines the Overall Site Category.



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

A. The 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 **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 **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?

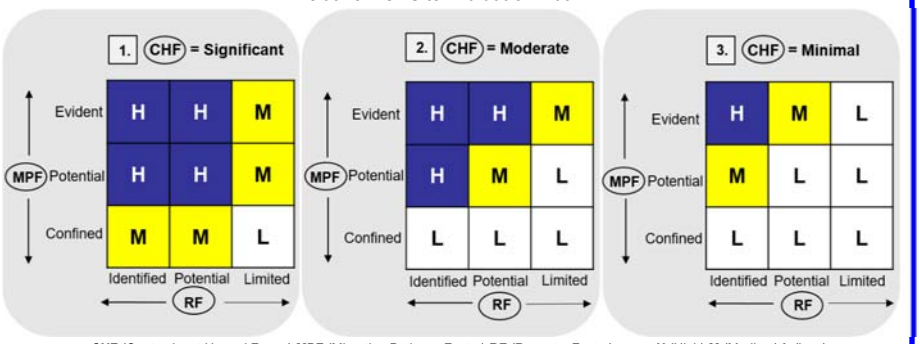
A. The **RF** is determined by a receptor's, such as humans, potential to come into contact with contaminated media. **RFs** are designated as: identified, potential, or limited **(High, Medium, and Low). Identified** rating is given when receptors are in contact or threat of contact with contaminated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

RELATIVE RISK SITE EVALUTION, cont.

Media Relative Risk Rating

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

Relative Risk Site Evaluation Matrix



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

Overall Site Category

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

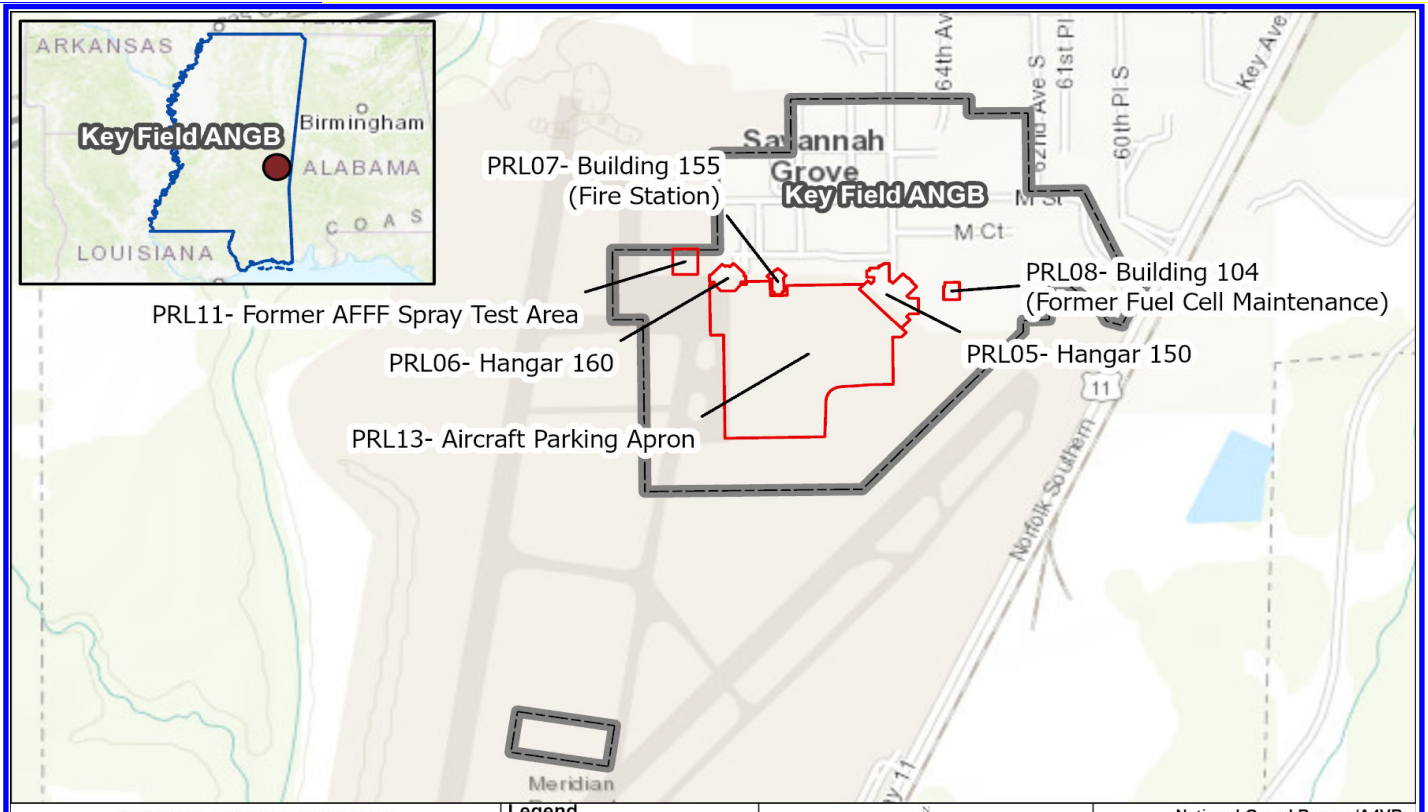
Regulatory and Stakeholder Involvement

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

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

Relative Risk Site Evaluation Summary Mississippi ANGB, MS

Overall Site Category	Site Name (Sites are shown on the map below and RRSE Worksheets are attached)
HIGH	PRL 5, PRL 7, PRL 8, PRL 11, PRL 13
MEDIUM	PRL 6
LOW	



Key Field ANGB Relative Risk Site Evaluation (RRSE) Figure
National Guard Bureau
Key Field Air National Guard Base, Mississippi

Legend
AFFF Release Areas
Key Field ANGB Installation Boundary

0 500 1,000 2,000
Feet

National Guard Bureau/A4VR Environmental Restoration
3500 Fetchet Ave
Joint Base Andrews, MD 20762

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

Site Background Information			
Installation:	Key Field (Meridian)	**Date:**	9/17/2021
Location (State):	MS	**Media Evaluated:**	Groundwater, Soil
Site Name and ID:	Hangar 150 - PRL 5	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Matt Voorhees	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	Hangar 150 is located in the central portion of Key Field. Hangar 150 was constructed in 1992 and was initially equipped with an aqueous film forming foam (AFFF) fire suppression sprinkler system. In 2007, Hangar 150 was retrofitted with a high-expansion foam (HEF) fire suppression system (FSS). The hangar is supplied with 2.75% HEF from a 700-gal aboveground storage tank (AST). In the event of a release from the FSS, foam is discharged to the hangar floor and typically washed into the hangar floor drains or is pushed out of the facility and allowed to dissipate on the pavement on the south side of the hangar. The floor drains direct flow through an oil/water separator (OWS) that then discharges into the sanitary sewer. Liquids entering the sanitary sewer system discharge to the city of Meridian wastewater treatment plant. Flow from the floor drains can also be diverted to a 10,000-gal containment tank located on the west side of Hangar 150. According to an AFFF Discharge Memorandum obtained during the site visit, the AFFF FSS for Hangar 150 was activated on July 17, 2002. It is estimated that approximately 2,400 gal of AFFF solution was discharged inside of the hangar as a result of a ruptured pipe in the system. The Fire Department reportedly washed the foam into the OWS for Hangar 150 and into the grassy area southeast of the hangar. The discharge resulted in AFFF entering both the sanitary sewer and stormwater system. It was reported that foam traveled past Outfall 002, located west of the north-south runway, under the levee, and through a drainage ditch and into Okatibbee Creek.
Brief Description of Pathways:	The lower Wilcox Aquifer is the principle source of groundwater for industrial and public water supplies in Lauderdale County. Key Field obtains its water from the city of Meridian's public water supply system. The thickness of the Wilcox Aquifer is estimated to be about 250 ft. in the vicinity of Key Field, and it, like other aquifers in the area, conforms to the stratigraphy and structure of the Wilcox Group. The general groundwater flow direction at Key Field is west towards Stormwater Outfall 002, but groundwater flow direction ranges from southwest and south at the eastern end of the Base; to southwest in the middle portion; to a radial pattern of southwest, west, and northwest at the western end of the Base. The hangar is bordered to the north by paved parking areas followed by Buildings 105 and 308, to the east by paved parking areas followed by Building 104, and to west by restricted airfield ramps; a grassy area is located south of the hangar.
Brief Description of Receptors:	The shallow aquifer is not currently used as a potable or industrial water supply and is not likely to be used as a water supply in the future due to a low recharge rate and a high concentration of hydrogen sulfide. ANG Key Field receives its potable water from the city of Meridian, which acquires water from the Lower Wilcox Aquifer through eight public water supply (PWS) wells ranging in depth from 650 to 750 ft. Six PWS wells are located within a 4-mile radius of Key Field. All six PWS wells are located between 2.5 and 3.5 miles east-northeast (upgradient) of the Base. Several wells located between 2.4 and 3.5 miles southeast, south, and southwest (downgradient) of the Base are designated as domestic wells. The Hangar is located within the base boundary; however the grassy area with exposed soil is located within an additionally restricted area near the parking apron or is otherwise paved. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

Groundwater Worksheet

Installation: Key Field (Meridian)

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

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFBS	0.18	0.602	0.3
PFOA	0.17	0.04	4.3
PFOS	2.1	0.04	52.5

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	57.0
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)	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: Key Field (Meridian)

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

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFBS	0.00013	1.9	0.0
PFOA	0.0064	0.126	0.1
PFOS	0.03	0.126	0.2
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**0.3**
CHF > 100	**H (High)**		
100 > CHF > 2	**M (Medium)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
2 > CHF	**L (Low)**		
CHF Value		**CHF VALUE**	**L**

Migratory Pathway Factor		
Evident	Analytical data or observable evidence that contamination is present at a point of exposure	
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:	Key Field (Meridian)	**Date:**	9/17/2021
Location (State):	MS	**Media Evaluated:**	Groundwater, Soil
Site Name and ID:	Hangar 160 - PRL 6	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Matt Voorhees	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: MEDIUM			

Site Summary	
Brief Site Description:	Hangar 160 is located in the western portion of Key Field. Hangar 160 was constructed in 1994 and is equipped with an AFFF FSS that is still in use today. The system is supplied with 3% AFFF concentrate from a 1,500-gal AST that is located in the mechanical room on the north side of the hangar. The AFFF FSS consists of an overhead sprinkler system and AFFF cannons. The FSS for Hangar 160 was activated on November 6, 2013, for routine system testing. It is estimated that 180 gal of AFFF solution was discharged during the test. The FSS was in operation for approximately 1.5 minutes (min) and discharged directly into the OWS for Hangar 160. The OWS at Hangar 160 was not overfilled during the testing, resulting in no AFFF being released to the environment. In addition, an FSS Testing and Discharge Memorandum dated November 7, 2013, confirms the AFFF discharge at Hangar 160. The environmental media surrounding Hangar 160 are not likely to have been impacted by perfluorinated compounds.
Brief Description of Pathways:	The lower Wilcox Aquifer is the principle source of groundwater for industrial and public water supplies in Lauderdale County. Key Field obtains its water from the city of Meridian's public water supply system. The thickness of the Wilcox Aquifer is estimated to be about 250 ft. in the vicinity of Key Field, and it, like other aquifers in the area, conforms to the stratigraphy and structure of the Wilcox Group. The general groundwater flow direction at Key Field is west towards Stormwater Outfall 002, but groundwater flow direction ranges from southwest and south at the eastern end of the Base; to southwest in the middle portion; to a radial pattern of southwest, west, and northwest at the western end of the Base. The hangar is bordered to the north by paved parking areas followed by Building 200, to the east by paved parking areas followed by Building 155, and to the south and west by restricted airfield ramps. Exposed surface soils are located at the entrance to the Hangar.
Brief Description of Receptors:	The shallow aquifer is not currently used as a potable or industrial water supply and is not likely to be used as a water supply in the future due to a low recharge rate and a high concentration of hydrogen sulfide. ANG Key Field receives its potable water from the city of Meridian, which acquires water from the Lower Wilcox Aquifer through eight PWS wells ranging in depth from 650 to 750 ft. Six PWS wells are located within a 4-mile radius of Key Field. All six PWS wells are located between 2.5 and 3.5 miles east-northeast (upgradient) of the Base. Several wells located between 2.4 and 3.5 miles southeast, south, and southwest (downgradient) of the Base are designated as domestic wells. The hangar is within the base boundary but access to surface soils near the entrance is otherwise unrestricted. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

Groundwater Worksheet

Installation: Key Field (Meridian)

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

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFBS	0.07	0.602	0.1
PFOA	0.044	0.04	1.1
PFOS	0.026	0.04	0.7

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	1.9
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		CHF VALUE	L

Migratory Pathway Factor		
Evident	Analytical data or 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	**MEDIUM**

Soil Worksheet

Installation: Key Field (Meridian)

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

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOA	0.00097	0.126	0.0
PFOS	0.0085	0.126	0.1

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.1
CHF > 100	H (High)		
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		CHF VALUE	L

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

Migratory Pathway Factor		
Evident	Analytical data or observable evidence that contamination is present at a point of exposure	
Potential	Contamination has moved beyond the source, could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined	M
Confined	Low possibility for contamination to be present at or migrate to a point of exposure	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M

Receptor Factor		
Identified	Receptors identified that have access to contaminated soil	
Potential	Potential for receptors to have access to contaminated soil	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:	Key Field (Meridian)	**Date:**	9/17/2021
Location (State):	MS	**Media Evaluated:**	Groundwater
Site Name and ID:	Fire Station - Bldg 155 - PRL 7	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Matt Voorhees	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	The Key Field Fire Station (Building 155) is located in the west-central portion of the Base. The Fire Station currently houses the following equipment containing AFFF: Two P-23 crash trucks – 500-gal capacity each; Two P-34 rapid intervention vehicles – 72-gal capacity each; P-19 truck – 130-gal capacity; Engine Number 10 – 50-gal capacity; and A foam trailer – 1,000-gal capacity. At the time of the 2015 PA, there are 2,348 gal of 3% AFFF stored in the holding tanks of the firefighting equipment at Building 155. Refilling activities for trucks and equipment are conducted in Fire Station bays, and AFFF is transferred using 5-gal buckets and/or the pump on the foam trailer. There have been no spills or releases of AFFF from the vehicles housed at the Fire Station during refilling operations. At the time of the assessment, six 55-gal drums of 3% AFFF concentrate were stored on the south side of Building 155 on spill containment pallets. Due to the concrete surface area, no groundwater or soil was collected at PRL 7. Groundwater data from monitoring wells from a co-located PRL (PRL 13) and were used in this evaluation.
Brief Description of Pathways:	The lower Wilcox Aquifer is the principle source of groundwater for industrial and public water supplies in Lauderdale County. Key Field obtains its water from the city of Meridian's public water supply system. The thickness of the Wilcox Aquifer is estimated to be about 250 ft. in the vicinity of Key Field, and it, like other aquifers in the area, conforms to the stratigraphy and structure of the Wilcox Group. The general groundwater flow direction at Key Field is west towards Stormwater Outfall 002, but groundwater flow direction ranges from southwest and south at the eastern end of the Base; to southwest in the middle portion; to a radial pattern of southwest, west, and northwest at the western end of the Base. The main area of the Fire Station (Building 155) is surrounded on the west, south, and east sides by the Aircraft Parking Apron. The doors to the Fire Station open on to the apron. There are several grassy areas located to the rear (north) of the Fire Station.
Brief Description of Receptors:	The shallow aquifer is not currently used as a potable or industrial water supply and is not likely to be used as a water supply in the future due to a low recharge rate and a high concentration of hydrogen sulfide. ANG Key Field receives its potable water from the city of Meridian, which acquires water from the Lower Wilcox Aquifer through eight PWS wells ranging in depth from 650 to 750 ft. Six PWS wells are located within a 4-mile radius of Key Field. All six PWS wells are located between 2.5 and 3.5 miles east-northeast (upgradient) of the Base. Several wells located between 2.4 and 3.5 miles southeast, south, and southwest (downgradient) of the Base are designated as domestic wells. The Fire Station is located within the base boundary and is accessible to base personnel and fire station personnel. PFAS including PFOA, PFOS, and PFBS have been detected at multiple nearby wells at varying concentrations.

Groundwater Worksheet

Installation: Key Field (Meridian)

Site ID: PRL 7 **AFFF Release Area #:** AFFF 7

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFBS	0.15	0.602	0.2
PFOA	0.098	0.04	2.4
PFOS	0.24	0.04	6.0

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	8.7
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		CHF VALUE	M

Migratory Pathway Factor

Evident	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well)	
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined	M
Confined	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls)	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M

Receptor Factor

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

Site Background Information			
Installation:	Key Field (Meridian)	**Date:**	9/17/2021
Location (State):	MS	**Media Evaluated:**	Groundwater, Soil
Site Name and ID:	Former Fuel Cell Maintenance - PRL 8	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Matt Voorhees	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	Building 104 (the Former Fuel Cell Maintenance Building) is located in the east-central portion of Key Field. Building 104 is surrounded by asphalt and/or concrete. Building 104 was likely constructed sometime in the 1960s or 1970s. This building was initially equipped with an AFFF FSS. The date in which the AFFF system was installed is unknown; however, in 1992, the AFFF suppression system was removed from Building 104, leaving a deluge (water only) suppression system in place. Interviews with personnel familiar with the long-term history of Building 104 indicated that there have been no reported releases of AFFF at Building 104. As a result, it is unlikely that PFAS have been released to the environment at this location.
Brief Description of Pathways:	The lower Wilcox Aquifer is the principle source of groundwater for industrial and public water supplies in Lauderdale County. Key Field obtains its water from the city of Meridian's public water supply system. The thickness of the Wilcox Aquifer is estimated to be about 250 ft. in the vicinity of Key Field, and it, like other aquifers in the area, conforms to the stratigraphy and structure of the Wilcox Group. The general groundwater flow direction at Key Field is west towards Stormwater Outfall 002, but groundwater flow direction ranges from southwest and south at the eastern end of the Base; to southwest in the middle portion; to a radial pattern of southwest, west, and northwest at the western end of the Base. Building 104 (the Former Fuel Cell Maintenance Building) is located in the east-central portion of Key Field. Building 104 is surrounded by asphalt and/or concrete. Soil samples were collected from exposed soils downgradient of the PRL.
Brief Description of Receptors:	The shallow aquifer is not currently used as a potable or industrial water supply and is not likely to be used as a water supply in the future due to a low recharge rate and a high concentration of hydrogen sulfide. ANG Key Field receives its potable water from the city of Meridian, which acquires water from the Lower Wilcox Aquifer through eight PWS wells ranging in depth from 650 to 750 ft. Six PWS wells are located within a 4-mile radius of Key Field. All six PWS wells are located between 2.5 and 3.5 miles east-northeast (upgradient) of the Base. Several wells located between 2.4 and 3.5 miles southeast, south, and southwest (downgradient) of the Base are designated as domestic wells. PRL-8 is located wtihin the base boundary but access is otherwise unrestricted. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

Groundwater Worksheet

Installation: Key Field (Meridian)

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

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFBS	0.2	0.602	0.3
PFOA	0.1	0.04	2.5
PFOS	0.35	0.04	8.7

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	11.6
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		CHF VALUE	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: Key Field (Meridian)

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

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOA	0.00047	0.126	0.0
PFOS	0.019	0.126	0.2

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	0.2
CHF > 100	H (High)		
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		CHF VALUE	L

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

Migratory Pathway Factor		
Evident	Analytical data or observable evidence that contamination is present at a point of exposure	
Potential	Contamination has moved beyond the source, could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined	M
Confined	Low possibility for contamination to be present at or migrate to a point of exposure	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M

Receptor Factor		
Identified	Receptors identified that have access to contaminated soil	
Potential	Potential for receptors to have access to contaminated soil	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:	Key Field (Meridian)	**Date:**	9/17/2021
Location (State):	MS	**Media Evaluated:**	Groundwater, Soil
Site Name and ID:	Former AFFF Spray Test Area - PRL 11	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Matt Voorhees	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	The Former AFFF Spray Test Area is a concrete pad approximately 13,000 square feet (ft^2) in size located on the western edge of Key Field, approximately 150 ft. west of Hangar 160. Annual testing of fire equipment foam spray systems was conducted at this location on an annual basis until 2014 when it was discontinued. The tests consisted of spraying AFFF and determining the density of foam at measured distances and spray angles from the equipment. These tests were conducted to certify that the spray systems met minimum performance standards. Approximately 5 to 10 gal of AFFF were used per test on an annual basis. The total amount of AFFF used at this location is unknown. The AFFF used during the spray test was left on the pavement to dissipate and/or was washed into the grassy areas surrounding the pavement. Groundwater data from monitoring wells from a downgradient PRL (PRL 13) were used in this evaluation.
Brief Description of Pathways:	The lower Wilcox Aquifer is the principle source of groundwater for industrial and public water supplies in Lauderdale County. Key Field obtains its water from the city of Meridian's public water supply system. The thickness of the Wilcox Aquifer is estimated to be about 250 ft. in the vicinity of Key Field, and it, like other aquifers in the area, conforms to the stratigraphy and structure of the Wilcox Group. The general groundwater flow direction at Key Field is west towards Stormwater Outfall 002, but groundwater flow direction ranges from southwest and south at the eastern end of the Base; to southwest in the middle portion; to a radial pattern of southwest, west, and northwest at the western end of the Base. The Former AFFF Spray Test Area is bordered to the north by the northern property boundary, to the east by fire training area (FTA) 1 followed by Hangar 160, to the south by restricted airfield ramps, and to the west by a grassy area followed by the western property boundary.
Brief Description of Receptors:	The shallow aquifer is not currently used as a potable or industrial water supply and is not likely to be used as a water supply in the future due to a low recharge rate and a high concentration of hydrogen sulfide. ANG Key Field receives its potable water from the city of Meridian, which acquires water from the Lower Wilcox Aquifer through eight PWS wells ranging in depth from 650 to 750 ft. Six PWS wells are located within a 4-mile radius of Key Field. All six PWS wells are located between 2.5 and 3.5 miles east-northeast (upgradient) of the Base. Several wells located between 2.4 and 3.5 miles southeast, south, and southwest (downgradient) of the Base are designated as domestic wells. Soils samples were collected from areas adjacent to the aircraft parking apron and active taxiway. Access is restricted. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

Groundwater Worksheet

Installation: Key Field (Meridian)

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

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFBS	3.7	0.602	6.1
PFOA	4.1	0.04	102.5
PFOS	67	0.04	1675.0

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	1783.6
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		CHF VALUE	H

Migratory Pathway Factor

Evident	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well)	
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined	M
Confined	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls)	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M

Receptor Factor

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

Soil Worksheet

Installation: Key Field (Meridian)

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

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFBS	0.00064	1.9	0.0
PFOA	0.001	0.126	0.0
PFOS	0.35	0.126	2.8
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**2.8**
CHF > 100	**H (High)**		
100 > CHF > 2	**M (Medium)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
2 > CHF	**L (Low)**		
CHF Value		**CHF VALUE**	**M**

Migratory Pathway Factor		
Evident	Analytical data or observable evidence that contamination is present at a point of exposure	H
Potential	Contamination has moved beyond the source, could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined	
Confined	Low possibility for contamination to be present at or migrate to a point of exposure	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H

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

Site Background Information			
Installation:	Key Field (Meridian)	**Date:**	9/17/2021
Location (State):	MS	**Media Evaluated:**	Groundwater, Soil
Site Name and ID:	Aircraft Parking Apron - PRL 13	**Phase of Execution (e.g., RI, Record of Decision (ROD)):**	N/A
RPM's Name:	Matt Voorhees	**Agreement Status (e.g., Federal Facility Agreement date signed):**	N/A
OVERALL SITE CATEGORY: HIGH			

Site Summary	
Brief Site Description:	The Aircraft Parking Apron was not identified as a PRL by HydroGeoLogic. BB&E recommended initiating an site investigation, with focus on soil and groundwater on the downgradient edges of the apron. The Aircraft Parking Apron is constructed with a series of storm drain catch basins that capture stormwater runoff and divert it to the storm sewer system where it is piped to Stormwater Outfall 002 outside the western end of the Base. Based on surface elevations of the apron surface noted in Google Earth, there is no evidence of any runoff to grassy areas south of the Apron; however, catch basins are located in the two oval grassy areas on the western end of the Aircraft Parking Apron.
Brief Description of Pathways:	The lower Wilcox Aquifer is the principle source of groundwater for industrial and public water supplies in Lauderdale County. Key Field obtains its water from the city of Meridian's public water supply system. The thickness of the Wilcox Aquifer is estimated to be about 250 ft. in the vicinity of Key Field, and it, like other aquifers in the area, conforms to the stratigraphy and structure of the Wilcox Group. The general groundwater flow direction at Key Field is west towards Stormwater Outfall 002, but groundwater flow direction ranges from southwest and south at the eastern end of the Base; to southwest in the middle portion; to a radial pattern of southwest, west, and northwest at the western end of the Base. Soil samples were collected from grassy areas adjacent to the Parking Apron.
Brief Description of Receptors:	The shallow aquifer is not currently used as a potable or industrial water supply and is not likely to be used as a water supply in the future due to a low recharge rate and a high concentration of hydrogen sulfide. ANG Key Field receives its potable water from the city of Meridian, which acquires water from the Lower Wilcox Aquifer through eight PWS wells ranging in depth from 650 to 750 ft. Six PWS wells are located within a 4-mile radius of Key Field. All six PWS wells are located between 2.5 and 3.5 miles east-northeast (upgradient) of the Base. Several wells located between 2.4 and 3.5 miles southeast, south, and southwest (downgradient) of the Base are designated as domestic wells. Soils samples were collected from areas adjacent to the aircraft parking apron and active taxiway. Access is restricted. PFAS including PFOA, PFOS, and PFBS have been detected at multiple on-site wells at varying concentrations.

Groundwater Worksheet

Installation: Key Field (Meridian)

Site ID: PRL 13 **AFFF Release Area #:** AFFF 13

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
PFBS	3.7	0.602	6.1
PFOA	4.1	0.04	102.5
PFOS	67	0.04	1675.0

CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	1783.6
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		CHF VALUE	H

Migratory Pathway Factor

Evident	Analytical data or direct observation indicates that contamination in the groundwater has moved to a point of exposure (e.g., well)	
Potential	Contamination in the groundwater has moved beyond the source or insufficient information available to make a determination of Evident or Confined	M
Confined	Analytical data or direct observation indicates that the potential for contaminant migration from the source via groundwater is limited (possibly due to geological structures or physical controls)	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	M

Receptor Factor

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

Soil Worksheet

Installation: Key Field (Meridian)

Site ID: PRL 13 **AFFF Release Area #:** AFFF 13

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
PFOA	0.00066	0.126	0.0
PFOS	0.27	0.126	2.1
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**2.1**
CHF > 100	**H (High)**		
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CHF Value		**CHF VALUE**	**M**

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

Migratory Pathway Factor		
Evident	Analytical data or observable evidence that contamination is present at a point of exposure	H
Potential	Contamination has moved beyond the source, could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined	
Confined	Low possibility for contamination to be present at or migrate to a point of exposure	
Migratory Pathway Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	H
Receptor Factor		
Identified	Receptors identified that have access to contaminated soil	
Potential	Potential for receptors to have access to contaminated soil	
Limited	No potential for receptors to have access to contaminated soil	L
Receptor Factor	DIRECTIONS: Record the single highest value from above in the box to the right (maximum value = H).	L
	Soil Category	**MEDIUM**