DRAFT
Preliminary Assessment Report
Army Aviation Support Facility # 1
Nashville, Tennessee

Perfluorooctane-Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites
ARNG Installations, Nationwide

April 2019

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Acronyms and Abbreviations

°F	Fahrenheit
AASF	Army Aviation Support Facility
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
amsl	above mean sea level
ANG	Air National Guard
AOI	area of interest
ARNG	Army National Guard
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EDR	Environmental Data Resource
FTA	fire training area
HEF	high expansion foam
OWS	oil water separator
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
SI	Site Inspection
TDEC	Tennessee Department of Environment and Conservation
TNARNG	Tennessee Army National Guard
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
WWTP	waste water treatment plant

Executive Summary

The United States (US) Army Corps of Engineers (USACE) Baltimore District on behalf of the Army National Guard (ARNG)-Installations & Environment Division, Cleanup Branch contracted AECOM Technical Services, Inc. (AECOM) to perform *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide*. The ARNG is assessing potential effects on human health related to processes at facilities that used per- and poly-fluoroalkyl substances (PFAS), primarily in the form of aqueous film forming foam (AFFF) released as part of firefighting activities, although other PFAS sources are possible.

AECOM completed a PA for PFAS at Army Aviation Support Facility (AASF) #1 (co-located with the Air National Guard [ANG] Base) at Joint Base Berry Field at the Nashville International Airport in Nashville, Davidson County, Tennessee, to assess potential PFAS release areas and exposure pathways to receptors. **Figure ES-1** outlines the boundaries of AASF #1 and the ANG Base.

The performance of this PA included the following tasks:

- Reviewed data resources to obtain information relevant to suspected PFAS releases
- Conducted a 1-day site visit on 22 May 2018
- Interviewed personnel associated with AASF #1 activities during the site visit including an AASF #1 pilot and safety officer
- Interviewed adjacent facility personnel, including the Fire Chief for the Nashville Airport Authority
- Completed visual site inspections at potential PFAS release locations and documented with photographs
- Reviewed previous reports evaluating the adjacent ANG facilities, including a PFAS PA (BB&E, 2016), PFAS SI Work Plan (Leidos, 2018a) and PFAS SI (Leidos, 2018b)

AASF #1 is situated in a portion of Joint Base Berry Field previously occupied by the ANG. Based on the potential for PFAS releases in the TNARNG-leased areas, one area of interest (AOI) was identified at AASF #1, the Flight Apron. ANG PFAS PA and SI reports identified potential and known PFAS source areas outside the AASF #1 footprint, as well as the Flight Apron located within the AASF #1 footprint. No other areas within the AASF #1 footprint were identified by the ANG PA as having potential PFAS sources to be evaluated during an SI. Additionally, the ANG PA identified current and former fire training areas on the Nashville International Airport property but outside Joint Base Berry Field. During the ANG SI, exceedances of PFAS regulatory criteria were noted in soil and groundwater samples and further study was recommended.

Areas within the AASF #1 footprint were evaluated and, as summarized below, one was identified as an AOI related to potential PFAS releases. All areas are shown in **Figure ES-1**.

Area	Description	Used by	Dates of Use
Flight Apron (AOI 1)	The Flight Apron is identified as an AOI based on potential AFFF impacts from incidental releases during routine extinguisher testing/training. The ANG SI reported detected concentrations of PFAS constituents in soil, groundwater, surface water and sediment north (downgradient) of the Flight Apron,	TNARNG ANG	2015-present pre-2015

Area	Description	Used by	Dates of Use
	with concentrations in groundwater and surface water exceeding screening criteria.		
Building 757- Main Hangar	Building 757 (Main Hangar) is not identified as an AOI because the fire suppression system has exclusively contained high expansion foam (2.75% Type C Jet-X brand) since the building was constructed in 2005. System testing every two years discharges foam to floor drains where it passes through an oil water separator and conveyed to the Nashville municipal wastewater treatment plant. The Main Hangar is located at the site of former Buildings 728 and 729 that may have been equipped with AFFF fire suppression systems. The ANG PA did not reference historical storage, use or release of AFFF in this area.	TNARNG ANG	2015-present pre-2015
Building 741 - Storage Hangar	Building 741 is not identified as an AOI because AFFF contained in four out-of-service mobile carts and a 55-gallon drum is stored inside the building on a concrete floor and no indications of inadvertent spills or other releases in the building were identified. The ANG PA did not reference historical storage, use or release of AFFF in the building.	TNARNG ANG	2015-present pre-2015
Wash Rack	The Wash Rack is not identified as an AOI because AFFF has not been stored or used in this area by the TNARNG since arriving in 2015. One mobile firefighting cart (dry chemical extinguisher with Purple K) is stored in this area. The ANG PA did not reference historical storage, use or release of AFFF at the Wash Rack.	TNARNG ANG	2015-present pre-2015
Building 723	Building 723 is not identified as an AOI because the building has not been used by TNARNG since arriving in 2015. During the site visit, AASF #1 personnel reported the building was believed to have housed a former paint shop. The ANG PA noted the building was built in 1954, used as a Fire Hall until 1961, when it was gutted and renovated and the floor drains removed. After 2001 the building was reportedly used as offices. The ANG PA initially identified the building as a PFAS Potential Area of Concern; however based on timeframes of use as a fire hall until 1961, the ANG PA did not recommend further study during an SI.	TNARNG ANG	2015-present pre-2015
Fuel Truck Parking Area	The Fuel Truck Parking Area is not identified as an AOI because AFFF has not been stored or used in this area by the TNARNG since arriving in 2015. One mobile firefighting cart (dry chemical extinguisher with Purple K) is stored in this area.	TNARNG ANG	2015-present pre-2015

Area	Description	Used by	Dates of Use
	The ANG PA did not reference historical storage, use or release of AFFF at the Fuel Truck Parking Area and did not recommend further study. The ANG SI reported detected concentrations of PFAS constituents in media north and west (downgradient) of the Fuel Truck Parking Area, with concentrations in groundwater and surface water exceeding screening criteria.		

Based on the documented use and storage of potential PFAS-containing materials at the Flight Apron (AOI 1), there is potential exposure to PFAS contamination in soil, groundwater, surface water and sediment by site and construction/utility workers via inhalation of dust or ingestion. Additionally there is potential for exposure to PFAS contamination via ingestion of downgradient surface water by municipal water supply users and recreational users and via ingestion of groundwater by residents/businesses using downgradient water wells. The CSM for AASF #1 is shown on **Figure ES-2**. The ANG is currently conducting investigations that include AASF #1, AOI 1: Flight Apron, therefore, the ARNG will not be conducting an SI or additional investigations at AASF #1.

1. Introduction

1.1 Authority and Purpose

The United States (US) Army Corps of Engineers (USACE) Baltimore District on behalf of the Army National Guard (ARNG)-Installations & Environment Division, Cleanup Branch contracted AECOM Technical Services, Inc. (AECOM) to perform *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (*PFOA*) Impacted Sites at ARNG Facilities Nationwide* under Contract Number W912DR-12-D-0014, Task Order W912DR17F0192, issued 11 August 2017, and Modification 01 issued 30 September 2017. The ARNG is assessing potential effects on human health related to processes at their facilities that used per- and poly-fluoroalkyl substances (PFAS), primarily releases of aqueous film forming foam (AFFF) although other sources of PFAS are possible. In addition, the ARNG is assessing businesses or operations adjacent to the ARNG facility (not under the control of ARNG) that could potentially be responsible for a PFAS release.

PFAS are classified as emerging environmental contaminants that are garnering increasing regulatory interest due to their potential risks to human health and the environment. PFAS formulations contain highly diverse mixtures of compounds. Thus, the fate of these PFAS compounds in the environment will vary. The regulatory framework at both federal and state levels continues to evolve. The U.S. Environmental Protection Agency (USEPA) issued Drinking Water Health Advisories for PFOA and PFOS in May 2016, but there are currently no promulgated national standards regulating PFAS in drinking water. The State of Tennessee has not adopted their own standards or guidelines for PFAS. .

This report presents findings of a PA for PFAS at Tennessee ARNG's Army Aviation Support Facility (AASF) #1 at Joint Base Berry Field in Nashville, Davidson County, Tennessee, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations Part 300), and USACE requirements and guidance.

This PA documents the locations where PFAS are currently stored and may have been released into the environment at AASF #1. The term PFAS will be used throughout this report to encompass all PFAS chemicals being evaluated, including PFOS and PFOA, which are key components of AFFF.

1.2 Preliminary Assessment Methods

The performance of this PA included the following tasks:

- Reviewed data resources to obtain information relevant to suspected PFAS releases
- Conducted a 1-day site visit on 22 May 2018
- Interviewed TNARNG personnel who moved from the Smyrna location to the current AASF #1 location and have knowledge of the entire time period that TNARNG has leased the facility (since 2015); interviewees included an AASF #1 pilot and safety officer
- Interviewed adjacent facility personnel, including the Fire Chief for the Nashville Airport Authority
- Completed visual site inspections at potential PFAS release locations and documented with photographs

- Reviewed previous reports evaluating the adjacent Air National Guard (ANG) facilities, including a PFAS PA (BB&E, 2016), PFAS SI Work Plan (Leidos, 2018a) and PFAS SI (Leidos, 2018b)

1.3 Report Organization

This report has been prepared in accordance with the USEPA *Guidance for Performing Preliminary Assessments under CERCLA* (USEPA, 1991). The report sections and descriptions of each are:

- **Section 1** – **Introduction:** identifies the project purpose and authority and describes the facility location, environmental setting, and methods used to complete the PA
- **Section 2** – **Fire Training Areas:** describes the potential or suspected fire training areas (FTAs) at the facility identified during the site visit
- **Section 3** – **Non-Fire Training Areas:** describes other locations of potential or suspected PFAS releases at the facility identified during the site visit
- **Section 4** – **Emergency Response Areas:** describes areas of suspected or potential AFFF release at the facility, specifically in response to emergency situations
- **Section 5** – **Adjacent Off-Site Sources:** describes sources of PFAS release adjacent to the facility that are not under the control of ARNG
- **Section 6** – **Conceptual Site Model:** describes the pathways of PFAS transport and receptors at the facility
- **Section 7** – **Conclusions:** summarizes the data findings and presents the conclusions of the PA
- **Section 8** – **References:** provides the references used to develop this document
- **Appendix A** – Data Resources
- **Appendix B** – Preliminary Assessment Documentation
- **Appendix C** – Photographic Log

1.4 Facility Location and Description

This PA is prepared for AASF #1, home to the 1st Squadron, 230th Air Calvary Regiment TNARNG in Nashville Tennessee. AASF #1 is co-located with the 118th Wing of the Nashville ANG at Joint Base Berry Field which occupies approximately 88 acres within the Nashville International Airport property in Davidson County, approximately 14 miles southeast of downtown Nashville **(Figure 1-1)**. In accordance with a 2014 National Guard License and 2014 Memorandum of Agreement, AASF #1 operations were moved in 2015 from Smyrna to Nashville to occupy a portion of Joint Base Berry Field previously occupied by the ANG. These documents are provided in **Appendix A**. The ANG continues to operate facilities immediately adjacent to (and surrounding) AASF #1. The ANG's facilities are referenced herein as the 'ANG Base'.

1.5 Facility Environmental Setting

AASF #1 lies within the Central Basin physiographic region of the state which is characterized by gently rolling to nearly level lands.

1.5.1 Geology

The site and surrounding land lie within the inner section of the Central Basin Region. The Central Basin is an elliptical depression surrounded by the Highland Rim. It was formed by the relatively rapid erosion of the Nashville Dome an area of bedrock uplifted during late Paleozoic times. The bedrock includes undifferentiated Ordovician limestone and the Nashville Group consisting of: Catheys Formation (light gray, nodular shaley limestone, fine to coarse grained); Bigby-Cannon Limestone (brownish-gray phosphatic calcarenite and light-gray to brownish-gray, cryptograined to medium- grained, even-bedded limestone with thickness ranging from 50 to 125 feet); and, Hermitage Formation (thin-bedded to laminated, sandy and argillaceous limestone with shale; nodular shaley limestone; coquina; and phosphatic calcarenite with thickness ranging from 50 to 100 feet). Shale and limestone outliers of Mississippian periods cap the many small hills around the edge of this region (Miller, 1974). Other Ordovician age formations which are found in the area are the Stones River Group and Lebanon Limestone (USGS, 2018). Sink holes and caves are characteristic features of limestone formations. Soil of the Central Basin is typically high in silt content and rich in calcium derived from the parent limestone. Thick deposits of alluvium and colluvium occur in valley floors and loess covers a small part of soil throughout the region.

1.5.2 Hydrogeology

The area lies in the Interior Low Plateaus subregion of the Appalachian Plateaus and the Valley and Ridge groundwater region of North America. The Ordovician carbonate rock aquifer or Central Basin aquifer is the major aquifer in the area. Groundwater in the aquifer generally flows through shallow vertical joints and openings in horizontal bedding planes within the bedrock. This flow is usually concentrated in valleys and near the surface. The average depth to groundwater of the area is located at approximately 25 ft below ground surface (bgs), which may be affected by seasonal fluctuations, fractured bedrock, and karst features that are characteristic of the region (Tennessee Department of Environment and Conservation [TDEC] 1964). The uppermost aquifer is unconfined and the predominant direction of groundwater flow is northeast toward McCrory Creek. Wells within the aquifer commonly yield from 5 to 20 gallons per minute. At depths greater than 1,000 feet, the Central Basin is underlain by the Knox Aquifer, whose upper formations can provide substantial quantities of water (BB&E, Inc. [BB&E], 2016). Based on the surrounding topography, shallow groundwater in the vicinity of AASF #1 is interpreted to flow to the northeast (**Figure 1-2**).

Groundwater in the vicinity of Joint Base Berry Field is not used for drinking water. The facility and surrounding metro area is supplied with potable water by the Metro Water Services of Davidson County, whose source is surface water from the Cumberland River (BB&E, 2016). A well search of a one-mile radius of the installation identified one well referenced as Vultee Aircraft Co with a reported total depth of 1,300 feet (Environmental Data Resources [EDR], 2018, **Appendix A**). The EDR Report, interviews, and research provided no additional information about the well.

1.5.3 Hydrology

Surface water pathways at AASF #1 drain into two watersheds: the Stones River Lower Watershed, and the Mill Creek Lower Watershed (**Figure 1-3**). The Stones River Lower watershed drains the majority of the site. The southwestern corner of the site is located within the Mill Creek Lower watershed.

AASF #1 is located at approximately 570 feet above mean sea level (amsl). Elevation decreases to the northeast toward an unnamed tributary to McCrory Creek, which is located

approximately 0.30 mile from the general site area. The unnamed tributary to McCrory Creek is located at an elevation of approximately 550 ft amsl and drains to the northeast.

Stormwater at the facility is directed through a network of ditches and in-ground conveyances which drain northward to two outfalls. Drainage Basin 001 (**Figure 1-3**) is comprised of the western side of the facility and private/commercial aviation areas. The majority of the area is paved/impervious. Stormwater Outfall 001 drains Drainage Basin 001 and is located beneath a pedestrian/golf cart bridge near the Base boundary. An emergency spill gate, which can be closed in the event of a spill, is located at this outfall. The Flight Apron drains as sheet flow to a drainage ditch and Outfall 001, northwest of the apron. Drainage Basin 002 includes the eastern portion of the facility, a portion of road right-of-way, and undeveloped Nashville Airport property. Stormwater Outfall 002 drains Drainage Basin 002 and is a ditch located beneath a pedestrian/golf cart bridge near the perimeter fence northeast of the facility. An emergency spill gate, which can be closed in the event of a spill, is located at this outfall. Drainage not collected by the storm drains may drain to adjacent shallow surface soils (BB&E, 2016).

1.5.4 Climate

Nashville has a humid subtropical climate with generally cool to moderately cold winters, and hot, humid summers. Spring and fall are generally warm but prone to severe thunderstorms, which occasionally bring tornadoes. Data from Nashville International Airport, Tennessee, indicate that the mean annual temperature between 1981 and 2010 was 59.3 degrees Fahrenheit (°F). Monthly averages range from 37.7°F in January to 79.4°F in July. Average annual precipitation of 47.85 inches was measured from 1981 to 2010. Rainfall is typically greater in November and December, and spring, while August to October are the driest months on average; average monthly precipitation ranges from 3.17 inches in August to 5.50 inches in May (National Oceanic and Atmospheric Administration [NOAA], 2018).

1.5.5 Current and Future Land Use

Land use at Joint Base Berry Field at Nashville International Airport is industrial. Activities include training, aircraft maintenance, aerospace ground equipment maintenance, ground vehicle maintenance, fuel management and facilities maintenance. The surrounding area is occupied by transportation, light industrial, commercial, and residential properties. Facility and surrounding land use is not anticipated to change in the future.

2. Fire Training Areas

During the site visit, AASF #1 personnel stated there are no designated FTAs at the facility. Current and historical FTAs in the vicinity of AASF #1 are described in **Section 5**.

3. Non-Fire Training Areas

Several non-FTAs at AASF #1 were evaluated during the PA. Based on interviews with AASF #1 personnel who have been at Joint Base Berry Field since TNARNG began operations there in 2015, known releases of high expansion foam (HEF) have occurred in one area; however, no known releases of AFFF have occurred during AASF #1's tenure at the facility. The AASF #1 non-FTAs are described below and shown on **Figure 3-1**.

3.1 Building 757 – Main Hangar

The Main Hangar (Building 757) is a large hangar on the north central portion of the facility, north of the Flight Apron. This hangar was constructed in 2005 to replace the ANG Base's former main hangar. Building 757 is used for storage and maintenance of aircraft. The building also has offices and other (non-FTA) personnel training facilities. The hangar is equipped with an HEF fire suppression system installed in 2005 which reportedly never used AFFF (BB&E, 2016). The system includes ceiling-mounted nozzles and a 700-gallon HEF storage tank (2.75% Type C Jet-X brand) located in the lower level, beneath the hangar floor.

The fire suppression system is tested annually, alternating use of water and HEF. Specifically in even numbered years water only is used and during odd numbered years (most recently in 2017) HEF is used. Prior to each test, the Nashville municipal wastewater treatment plant (WWTP) is given advance notice of the forthcoming discharge and the hangar floor grates and oil water separator (OWS) are cleaned. During testing with HEF, the hangar is fully engulfed to a depth of 3 to 4 feet which is then drained to the hangar floor grates and OWS. Such fluids are then conveyed to the airport sanitary sewer via underground piping which discharge wastes to the municipal WWTP. After the system test is completed, the piping is flushed with water and the system service contractor (Vector Fire Technology, Inc.) refills the storage tank with an estimated HEF volume of 25-gallons used during each biennial system test.

In response to a National Guard Bureau 2016 directive to prevent inadvertent activations of fire suppression systems, repairs were made to the hangar's fire suppression system in 2017. The directive and detailed scope of work for the repairs are included in **Appendix A**. Repairs included: reprogramming/reconfiguring the foam releasing panel (referenced as the Notifier panel), replacing 12 manual foam releasing stations and conduits and installing a surge protection device.

To the best of their knowledge, TNARNG staff reported that no HEF releases, spills or false discharge events have occurred since moving into the facility in 2015.

As described in ANG staff PA interview forms (included in **Appendix A**), two hangars (former Buildings 728 and 729) were demolished in 2004/2005 to construct Building 757. The hangars were reported to have had AFFF fire suppression systems. ANG staff did not have record of the former building fire suppression system decommissioning or associated AFFF disposal when the hangars were demolished. ANG personnel who had been at the facility as early as 1965 reported no historical use or releases of AFFF (testing, training, leaks/spills or incidents) occurred in or around the former or current hangars (BB&E, 2016). The geographic coordinates of the Main Hangar are 36°06'39.48"N and 86°40'31.61"W.

3.2 Flight Apron

As shown on **Figure 3-1**, the Flight Apron (concrete ramp) is located south of and adjacent to the Main Hangar (Building 757). A culvert and trench drains run beneath the northern portion of the apron; and some stormwater draining the west side of the apron flows north to a curb inlet

located between the Flight Apron and the Fuel Truck Parking Area. These structures convey stormwater to Outfall #1.

Approximately four mobile firefighting cart dry extinguishers with Purple K are situated on the Flight Apron. TNARNG staff reported that no AFFF releases, spills or false discharge events have occurred since moving into the facility in 2015. According to the ANG PA, there are no records and no ANG Base personnel accounts of historical AFFF releases on the Flight Apron. Because impacts by AFFF related to the historical presence of aircraft may exist, the Flight Apron was identified by the ANG as a PFAS Potential Area of Concern (BB&E, 2016). During the ANG 2018 SI, PFOS and PFOA were not detected in a subsurface soil sample collected between the Flight Apron and the Fuel Truck Parking Area (inside the AASF #1 boundary). However, PFOS and PFOA were detected in soil, groundwater, surface water and sediment sampled north of the Flight Apron (outside the AASF #1 boundary); exceedances of EPA screening levels were noted in surface water and groundwater sampled (Leidos, 2018b). The geographic coordinates of the Flight Apron are 36°06'34.57"N and 86°40'33.43"W.

3.3 Building 741 - Storage Hangar

The Storage Hangar (Building 741) is located on the east side of the Flight Apron. This building has a concrete floor, is used solely for storage purposes and is not equipped with a fire suppression system. Approximately four of the ten AFFF mobile carts brought to the facility in 2015 are now out of service and stored in the building; a contract for their disposition is pending. A 55-gallon drum of Angus Fire's Tridol® M 3 percent AFFF also was observed as stored in the building. TNARNG staff reported that no AFFF releases, spills or false discharge events have occurred in this building since moving into the facility in 2015. The ANG PA did not reference historical storage, use or release of AFFF in this building (BB&E, 2016); therefore it was not included in the ANG SI (Leidos, 2018b). The geographic coordinates of the Storage Hangar are 36°06'31.76"N and 86°40'24.72"W.

3.4 Wash Rack

The Wash Rack is located north and west of Building 741. The Wash Rack is equipped with a drain and OWS that conveys fluids to the sanitary sewer which discharges wastes to the Nashville municipal WWTP. At least one mobile firefighting cart dry chemical extinguisher with Purple K is situated at the Wash Rack. TNARNG staff reported that no AFFF releases, spills or false discharge events have occurred at the Wash Rack since moving into the facility in 2015. The ANG PA did not reference historical storage, use or release of AFFF at the Wash Rack. It was not recommended for further study (BB&E, 2016) and not included in the ANG SI (Leidos, 2018b). The geographic coordinates of the Wash Rack are 36°06'35.49"N and 86°40'24.30"W.

3.5 Building 723 - Former Fire Hall

Building 723 has never been used by AASF #1 but is located within the AASF #1 footprint. The ANG PA referenced the building as a former fire hall and a PFAS Potential Area of Concern. However, based on timeframes of use as a fire hall up until 1961, it was recommended for No Further Action (BB&E, 2016) and was not included in the ANG SI (Leidos, 2018b).

During the site visit, AASF #1 personnel reported the building was believed to have housed a former paint shop. According to the ANG PA, the building was built in 1954, then gutted and renovated in 1961, and the floor drains were removed. As of 2001, the building was used as offices. Historical use of AFFF at Building 723 was not indicated (BB&E, 2016); therefore it was not included in the ANG SI (Leidos, 2018b). The geographic coordinates of Building 723 are 36°06'36.30"N and 86°40'26.85"W.

3.6 Fuel Truck Parking Area

The Fuel Truck Parking Area is located north of the Main Hangar (Building 757). As shown on **Figure 3-1**, trench drains flank three sides of this area. At least one mobile firefighting cart dry extinguisher with Purple K is situated on the Fuel Truck Parking Area. TNARNG staff reported that no fuel or AFFF releases, spills or false discharge events have occurred in this area since moving into the facility in 2015. Additionally, the Nashville Airport Authority Training officer confirmed AFFF is not used at fuel spills (BB&E, 2016). As described in Section 3.2, PFOS and PFOA were not detected in a subsurface soil sample collected between the Flight Apron and the Fuel Truck Parking Area (inside the AASF #1 boundary); however sampling in areas north and west of the Fuel Truck Parking Area (outside the AASF #1 boundary) detected PFOS and PFOA in all media (Leidos, 2018b). The geographic coordinates of the Fuel Truck Parking Area are 36°06'41.63"N and 86°40'37.48"W.

3.7 Landfills

No current or former landfills have been identified at AASF #1 from interview records and previous site reports. A former landfill was identified at the ANG Base and described in **Section 5**.

4. Emergency Response Areas

One potential emergency response location was identified during the PA interviews.

4.1 Commercial Jet Incident

AASF #1 personnel recalled a previous incident where a commercial jet ran off a taxiway; the date and location of the incident is unknown. Personnel recalled that foam was not used by the Airport Authority Fire Department during the incident. This incident was not confirmed in other interviews, nor was it cited in the ANG PA (BB&E, 2016). During the interview with the Airport Fire Chief (described in **Section 5.7**), he was asked about emergency responses that have occurred at the airport; however, he was not asked about this specific incident.

5. Adjacent Sources

Based on the 22 May 2018 interview of Nashville Airport Authority Fire Department personnel conducted as part of this PA and review of the ANG PFAS PA (BB&E, 2016) and SI (Leidos, 2018b), multiple PFAS sources were identified adjacent to AASF #1. These areas are described below and shown on **Figure 5-1**.

Use of AFFF began at the ANG Base in 1974 and ended in 2012, including 3% formulations of Buckeye Platinum, Aquafilm and 3M. The ANG Base transferred all bulk AFFF to the Nashville Airport Authority in 2014. No releases of AFFF, incident responses using AFFF or AFFF fire suppression systems were reported by ANG personnel. All fire training was historically conducted only with water as the ANG lacked a live-fire training exercise area and did not have proper testing equipment; additionally all AFFF was reserved for deployment purposes (BB&E, 2016).

As summarized below, the ANG PFAS SI reported detected concentrations of PFAS constituents in soil, groundwater, surface water and sediment, with concentrations in groundwater and surface water exceeding screening criteria. The ANG SI recommended an expanded SI be conducted (Leidos, 2018b). The ANG PFAS PA and SI reports are included in **Appendix A**.

5.1 ANG Former Fire Station - Building 736

Building 736 was constructed in 1953 and is approximately 21,645 square feet with a concrete foundation and concrete block with brick veneer. The southeastern portion of this building was used as the Fire Station from 1961 to 2012 and is currently unused (BB&E, 2016).

ANG staff recalled a drain inside the fire station bay that was equipped with an OWS which discharged to the sanitary sewer. As of 2001, the indoor drains were self-contained and if a discharge were to occur, the building drains would be pumped out (BB&E, 2016).

Three vehicles (Oshkosh P-series aircraft fire rescue) with AFFF storage capacities ranging from 130 to 210 gallons each were stored at this location. ANG Base personnel reported that the vehicles were refilled by pouring the 5-gallon containers of AFFF into the top-loading vehicles. The former ANG Fire Chief from 2011-2014 indicated that most of the vehicles were in like-new condition; and, he was only aware of very minor leaks on some of the older apparatus. This spilled AFFF would be wiped up with a paper shop rag and disposed as trash. These vehicles were historically washed either in the designated wash rack area equipped with OWS or occasionally outside on the concrete to the southeast of this building. Exterior drains discharge to the storm sewer (BB&E, 2016).

All AFFF at the ANG Base was reported to have been previously stored in 5-gallon containers or in the vehicles in the former fire station, with the occasional exception of storage at the hazardous materials pharmacy where some new shipments were received. After 118th Fire and Emergency Services Flight was disbanded, their firefighting vehicles and 5-gallon AFFF containers were given to the Nashville Airport Authority or other State of Tennessee firefighting units in December 2014 (BB&E, 2016).

No known releases of AFFF have occurred at Building 736; however the building was identified as an ANG PFAS Potential Area of Concern (BB&E, 2016). PFOS and PFOA were detected in soil and groundwater sampled in the vicinity of Building 736 (Leidos, 2018b).

5.2 ANG Fire Equipment Test Area

Annual nozzle testing with water only was conducted by ANG personnel on the concrete area to the southeast of the Former Fire Station, Building 736. The former ANG Fire Chief noted that AFFF was not used during testing of equipment as their department did not have foam refractometer or conductivity testing equipment. Aircraft rescue vehicles were also reportedly sometimes washed in this area. The ANG Fire Equipment Test Area was identified as a PFAS Potential Area of Concern and recommended for study during an ANG PFAS SI (BB&E, 2016). PFOS and PFOA were detected in soil and groundwater sampled in the vicinity of the ANG Fire Equipment Test Area (Leidos, 2018b).

5.3 ANG Stormwater Outfall 001

As initially described in Section 1.5.3, two stormwater outfalls (001 and 002) drain the ANG Base. Outfall 001 was identified as an ANG PFAS Potential Area of Concern and recommended for study during an ANG PFAS SI (BB&E, 2016). Stormwater Outfall 001 is located near the north end of the Base, and discharges to a natural open flowing stream. This outfall drains the western side of the facility, including the Flight Apron. The outfall location is located near the Security Gate beneath a pedestrian bridge near northern ANG Base boundary. An emergency spill gate, which can be closed in the event of a spill, is located adjacent to the east side of the outfall (BB&E, 2016). PFOS and PFOA were detected in surface water and sediment at Outfall 001, with exceedances of EPA screening levels noted in surface water (Leidos, 2018b).

5.4 ANG Sanitary Sewer

Sanitary sewer lines at the ANG Base convey wastewater to the Nashville municipal WWTP located approximately 8 miles northwest (BB&E, 2016). The geographic coordinates of the WWTP are 36°11'2.33"N and 86°47'24.46"W.

Foam released during odd-numbered year testing of the fire suppression system in Building 757 is washed down the hangar floor drains, therefore releases of HEF/Jet X to the municipal WWTP have occurred. The ANG PFAS PA recommended the sanitary sewer structural integrity be evaluated to assess the potential for PFAS migration (BB&E, 2016); however, the ANG PFAS SI did not reference sewer integrity testing (Leidos, 2018b).

5.5 Current Airport Authority Fire Training Area

As of 2016, the ANG uses the Airport Authority's FTA. The ANG PA reported current or previous use of AFFF at the FTA is unknown (BB&E, 2016); however, as noted above, Airport Authority Fire Department staff reported only water is used (no AFFF use) during fire training.

5.6 Former Airport Authority Fire Training Areas

Two former FTAs were reported on Nashville Airport Authority property, one under Runway 2R, and the other in an unknown location under a parking lot. The ANG PA reported both water and AFFF were used during training and the sites were investigated and cleaned up (BB&E, 2016).

5.7 Nashville Airport Authority Fire Department

The Nashville Airport Authority Training Officer was interviewed as part of this (ARNG) PA. He has worked at the Airport Authority Fire Department since 2006. He reported new hires are trained three to four times per year at the Airport's current FTA (north end of Runway 2L). During his 12-year tenure, AFFF has been used exclusively for emergency responses and not used for

training nor for nozzle testing. The Station has four trucks that are supplied with AFFF, with truck storage capacities ranging from 20 to 420 gallons. AFFF is stored in the station in 5-gallon containers which are used to refill the trucks. The Officer did not have information regarding the type of AFFF used, only that the Federal Aviation Administration specifies use of Mil Spec AFFF. He reported the Airport Authority has not disposed of AFFF, indicating it is stored until expended. When asked about AFFF use for emergency responses at the Airport, the Officer recalled a 2016 aircraft engine fire and off-airport car fires, but had no further available information about the incidents and recalled no spills, leaks or AFFF releases at the station. He confirmed AFFF is not used at the Airport for responding to fuel spills.

Review of Google Earth imagery indicates a Nashville Fire Department/EMS Station is located west of the southwest corner of the Airport. Both the Airport Authority Fire Station and the nearby Nashville Fire Department Station EMS are shown on **Figure 5-1**.

5.8 Former ANG Landfill near Buildings 803 and 806

A former ANG landfill is located near Buildings 803 and 806. The landfill is reported to have received vehicle parts, construction debris, household trash and other solid wastes. The landfill waste pile was removed during construction of Building 803 in 1989. In June 2009 soil and groundwater samples were collected and test borings were advanced. In March 2016 additional soil and groundwater sampling was conducted. Elevated volatile organic compounds, polynuclear aromatic hydrocarbons, pesticides and metals were identified at the former landfill site and further investigation was recommended. PFAS constituent sampling and analysis were not reported (URS, 2016).

Landfills are not usually a primary release area of PFAS, but materials disposed in landfills may create a secondary source of contamination. Such materials, to name a few, may include construction debris from demolition of former hangar buildings and used AFFF storage containers.

6. Conceptual Site Model

Based on the PA findings and a lack of robust institutional knowledge regarding historical activities concerning AFFF use and storage at the facility prior to 2015 (when AASF #1 began leasing the property), the Flight Apron was identified as an area of interest (AOI) at AASF #1. The AOI is shown on **Figure 6-1**. The following section and **Figure 6-2** describe the conceptual site model (CSM) components for the Flight Apron AOI. The CSM identifies three components necessary for potentially complete exposure pathways related to a site: (1) source, (2) pathway, and (3) receptor. If these elements are present, the pathway is considered potentially complete.

6.1 AOI 1 Flight Apron

Potential AFFF impacts at the Flight Apron may be related to incidental releases during routine extinguisher testing/training. The ANG SI reported detected concentrations of PFAS constituents in media downgradient of the Flight Apron, with concentrations in groundwater and surface water exceeding screening criteria (Leidos, 2018b). ANG SI data indicate a potential exposure exists for PFAS contamination in soil, groundwater, surface water and sediment by site and construction/utility workers via inhalation of dust or ingestion. Additionally there is potential for exposure to PFAS contamination via ingestion of surface water downstream by municipal water supply users and recreational users and via ingestion of groundwater by residents and businesses using downgradient water wells.

7. Conclusions

This report presents a summary of available information gathered during the PA on the use of PFAS-related activities at AASF #1. The PA findings are based on the information presented in **Appendix A** and **Appendix B**.

7.1 Findings

One AOI related to potential PFAS releases was identified at AASF #1 based on data gathered during the PA, as summarized below. **Figure 7-1** presents a summary of PA findings.

Area	Description	Used by	Dates of Use
Flight Apron (AOI 1)	The Flight Apron is identified as an AOI based on potential AFFF impacts from incidental releases during routine extinguisher testing/training. The ANG SI reported detected concentrations of PFAS constituents in soil, groundwater, surface water and sediment north (downgradient) of the Flight Apron, with concentrations in groundwater and surface water exceeding screening criteria.	TNARNG ANG	2015-present pre-2015
Building 757-Main Hangar	Building 757 (Main Hangar) is not identified as an AOI because the fire suppression system has exclusively contained high expansion foam (2.75% Type C Jet-X brand) since the building was constructed in 2005. System testing every two years discharges foam to floor drains where it passes through an oil water separator and conveyed to the Nashville municipal wastewater treatment plant. The Main Hangar is located at the site of former Buildings 728 and 729 that may have been equipped with AFFF fire suppression systems. The ANG PA did not reference historical storage, use or release of AFFF in this area.	TNARNG ANG	2015-present pre-2015
Building 741 - Storage Hangar	Building 741 is not identified as an AOI because AFFF contained in four out-of-service mobile carts and a 55-gallon drum is stored inside the building on a concrete floor and no indications of inadvertent spills or other releases in the building were identified. The ANG PA did not reference historical storage, use or release of AFFF in the building.	TNARNG ANG	2015-present pre-2015
Wash Rack	The Wash Rack is not identified as an AOI because AFFF has not been stored or used in this area by the TNARNG since arriving in 2015. One mobile firefighting cart (dry chemical extinguisher with Purple K) is stored in this area. The ANG PA did not reference historical storage, use or release of AFFF at the Wash Rack.	TNARNG ANG	2015-present pre-2015
Building 723	Building 723 is not identified as an AOI because the building has not been used by TNARNG since	TNARNG	2015-present

Area	Description	Used by	Dates of Use
	arriving in 2015. During the site visit, AASF #1 personnel reported the building was believed to have housed a former paint shop. The ANG PA noted the building was built in 1954, used as a Fire Hall until 1961, when it was gutted and renovated and the floor drains removed. After 2001 the building was reportedly used as offices. The ANG PA initially identified the building as a PFAS Potential Area of Concern; however based on timeframes of use as a fire hall until 1961, the ANG PA did not recommend further study during an SI.	ANG	pre-2015
Fuel Truck Parking Area	The Fuel Truck Parking Area is not identified as an AOI because AFFF has not been stored or used in this area by the TNARNG since arriving in 2015. One mobile firefighting cart (dry chemical extinguisher with Purple K) is stored in this area. The ANG PA did not reference historical storage, use or release of AFFF at the Fuel Truck Parking Area and did not recommend further study. The ANG SI reported detected concentrations of PFAS constituents in media north and west (downgradient) of the Fuel Truck Parking Area, with concentrations in groundwater and surface water exceeding screening criteria.	TNARNG ANG	2015-present pre-2015

Off-facility PFAS sources associated with adjacent ANG facilities and the Nashville International Airport (**Figure 7-1**) were identified through interviews, review of available reports, independent research, and the EDR. The ANG completed an SI at their facility adjacent to AASF #1. PFOS and PFOA were detected in soil, groundwater, surface water and sediment samples, with surface water and groundwater concentrations exceeding EPA screening levels (Leidos, 2018b).

Based on these PA findings and the ANG PFAS SI findings (Leidos, 2018b), there is potential exposure to PFAS contamination in soil, groundwater, surface water and sediment by site and construction/utility workers via inhalation of dust or ingestion. Additionally, potential exposure to PFAS contamination exists via ingestion of surface water downstream by municipal water supply users and recreational users and via ingestion of groundwater by residents and businesses using downgradient water wells.

7.2 Uncertainty

A number of information sources were investigated during this PA to determine the potential for PFAS-containing materials to have been present, used, or released at the facility. Historically, documentation of PFAS use was not required because PFAS were considered benign. Therefore, records were not typically kept by the facility or available during the PA on the use of PFAS in training, firefighting, other non-traditional activities, or on its disposition.

The conclusions of this PA are predominantly based on the information provided during interviews with personnel who had direct knowledge of PFAS use at the facility and on available reports for the adjacent ANG facility. Sometimes the provided information is vague or conflicts with other sources. Gathered information has a degree of uncertainty due to the absence of

written documentation, the limited number of personnel with direct knowledge due to staffing changes, the time passed since PFAS was first used (early 1970s), and a reliance on personal recollection. Inaccuracies may arise in potential PFAS release locations, dates of release, volume of releases, and the concentration of AFFF used. There is also a possibility the PA has missed a potential source of PFAS, as the science of how PFAS may enter the environment continually evolves.

In order to minimize the level of uncertainty, readily available data regarding the use and potential storage of PFAS were reviewed and available personnel were interviewed and the facility was visually inspected.

The following summarizes the uncertainties associated with the PA.

Location	Source of Uncertainty
AOI 1 – Flight Apron	Limited institutional knowledge was available during the PA regarding historical activities and potential use of AFFF, including incidental AFFF releases during routine extinguisher testing/training, on the Flight Apron prior to 2015 when the ARNG moved to the facility,
Main Hangar – Building 757	Limited institutional knowledge was available during the PA regarding historical activities and potential use of AFFF, in the Main Hangar prior to 2015 when the ARNG moved to the facility and in former Buildings 728 and 729, which were demolished in 2004/2005 to accommodate the 2005 construction of the Main Hangar.
Storage Hangar – Building 741	Limited institutional knowledge was available during the PA regarding historical activities and potential use of AFFF in the Storage Hangar prior to 2015 when the ARNG moved to the facility. While no release was indicated during the PA, uncertainty is related to the ARNG's storage of AFFF (in out-of-service extinguishers and a drum) on the concrete floor inside the building.

7.3 Potential Future Actions

Based on the documented absence of the release of PFAS-containing materials during TNARNG's tenure (2015 to present) at AASF #1 facilities (Building 757, Building 741, Building 723, Wash Rack and Fuel Truck Parking Area), evidence does not indicate that current or former AASF #1 activities contributed PFAS contamination to soil, groundwater, surface water, or sediment at these facilities. These facilities will not move forward in the CERCLA process.

Interviews conducted during the PA (covering 2015 to present) and findings of the ANG PFAS PA (BB&E, 2016) and ANG PFAS SI (Leidos, 2018b) indicate that former ANG activities at the Flight Apron and areas outside the AASF #1 footprint may have resulted in PFAS releases at Joint Base Berry Field. Based on the CSM developed for the Flight Apron (AOI 1), there is potential for receptors to be exposed to PFAS contamination in soil and groundwater at the AOI and surface water and sediment downgradient of the AOI. **Table 7-1** summarizes the rationale used to determine if the AOI should be considered for further investigation under the CERCLA process and undergo a Site Inspection (SI).

The need for an SI at AASF #1, AOI 1: Flight Apron is indicated based on the presence of a PFAS release, possible receptors, and the migration potential of PFAS contamination to

receptors. The ANG is currently conducting investigations that include AOI 1: Flight Apron, therefore, the ARNG will not be conducting an SI or additional investigations at AASF #1

Table 7-1 PA Findings Summary

Area of Interest	AOI Location	Rationale	Potential Future Action
AOI 1: Flight Apron	36°06'34.57"N and 86°40'33.43"W	The Flight Apron is identified as an AOI based on potential AFFF impacts from incidental releases during routine extinguisher testing/training and the ANG SI findings of detected concentrations of PFAS constituents in soil, groundwater, surface water and sediment north (downgradient) of the Flight Apron, with concentrations in groundwater and surface water exceeding screening criteria.	The ANG SI, which included the Flight Apron, recommended an expanded SI be conducted.

8. References

BB&E, Inc. (BB&E), 2016. *Perfluorinated Compounds Preliminary Assessment Site Visit Report 118th Wing Tennessee Air National Guard Nashville International Airport Air National Guard Base, Nashville, Tennessee,* May 2016.

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Leidos, 2018a, *Work Plan for Fiscal Year 2017 Phase IV Regional Site Inspections for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Nashville International Airport, TN*, February 2018.

Leidos, 2018b. *Final Site Inspection Report for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Nashville International Airport, Nashville, TN.* August 2018.

Miller, R.A. 1974. The Geological History of Tennessee. Bulletin 74. Tennessee Department of Conservation, Division of Geology, Nashville, Tennessee.

National Oceanic and Atmospheric Administration (NOAA), 2018. 1981-2010 Climate Normals for Nashville International Airport, TN US. http://www.ncdc.noaa.gov/cdo-web/datatools/normals. Accessed 15 June 2018.

Tennessee Department of Environment and Conservation (TDEC). 1964. Geologic Map, Antioch Quadrangle, Tennessee. 1:24,000. TDEC Division of Geology.

United States Geological Survey (USGS), 2018. Tennessee geologic map data, https://mrdata.usgs.gov/geology/state/state.php?state=TN. Accessed 20 June 2018.

URS, 2016. *Final Regional Compliance Restoration Program Preliminary Assessment/Site Inspection Nashville International Airport Air National Guard Base, Nashville TN*. July 2016.

USEPA, 1991. *Guidance for Performing Preliminary Assessments under CERCLA*. EPA/540/G-91/013. September 1991.

Appendix A
Data Resources

Data resources will be provided separately on CD. Data resources for Army Aviation Support Facility #1 include:

AASF #1 Permits and Lease Information

- 2014 TNARNG License
- 2014 Berry Field Support Memorandum of Agreement

Previous Investigations Completed at Nashville International Airport ANG Base

- 2016 Final Perfluorinated Compounds Preliminary Assessment Site Visit Report , 118th Wing, Tennessee Air National Guard, Nashville International Airport Air National Guard Base (BB&E, 2016)
- 2016 Final Regional Compliance Restoration Program PA/SI, Nashville International Airport Air National Guard Base (AECOM, 2016)
- 2018 Final Work Plan for Fiscal Year 2017 Phase IV Regional Site Inspections for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Nashville International Airport, (Leidos, 2018a)
- 2018 Final Site Inspection Report for Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Nashville International Airport, Nashville, TN. (Leidos, 2018b)

AASF #1 Hangar Fire Suppression System Upgrades – Inadvertent Activation Avoidance

- 2016 NGB Memorandum directing system upgrades
- 2017 Statement of Work for system upgrades
- 2018 Risk Assessment Worksheet demonstrating benefit of system upgrades

AASF #1 Photos of Hangar Drain Strainers

- Photos (by AASF #1 staff) of floor drain strainers cleaned before and after annual fire suppression system testing.

AASF #1 Environmental Data Resources Report

- 2018 AASF #1 EDR Report

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

[redacted]

PA Interview Questionnaire - Environmental Manager

Facility: Nashville AASF #1
Interviewer: [redacted]
Date/Time: 5/22/18

Interviewee: [redacted] **Title:** Pilot, Safety officer **Phone Number:** [redacted] **Email:**	Can your name/role be used in the PA Report? Y or N Can you recommend anyone we can interview? Y or N

1. Roles or activities with the Facility/years working at the Facility.

Safety officer, Instructor Pilot, A/C maintenance ttt

2. Where can I find previous facility ownership information?

April 2015 ~~ANG~~ ARNG took possession of Nash. facilities

3. What can you tell us about the history of PFAS including aqueous film forming foam (AFFF) at the Facility? Was it used for any of the following activities, circle all that apply and indicate years of active use, if known? Identify these locations on a facility map.

Maintenance ✓
Fire Training Areas ✗ Airport further. had large FTAs (see map A)
Firefighting (Active Fire) ✗
Crash ✗ SW Airlines ran off taxi way - foam not engaged ✓
Fire Suppression Systems (Hangers/Dining Facilities) ✓ maintained by ANG
Fire Protection at Fueling Stations . rolling cart all to brought, 6 now 4 out of service & contract for disposal pending
Non-Technical/Recreational/ Pest Management ✗
Metals Plating Facility ✓
Waterproofing Uniforms (Laundry Facilities) ✗
Other

4. Fill out CSM Information worksheet with the Environmental Manager.

5. Are any current buildings constructed with AFFF dispensing systems or fire suppression systems? What are the AFFF/suppression system test requirements? What is the frequency of testing the AFFF/suppression system? Do you have "As Built" drawings for the buildings?

ANG maintained. they purchase & maintain systems (except carts)

UL ~~162~~ AFF in variety of manufacturers - low cost
MIL F24385 New AFFF ~~to be used~~ FAA recommended

Federal procurement 3M's NOVEC "Non PFAS/PFOA" proprietary will be buying

[redacted] 2.16

PA Interview Questionnaire - Environmental Manager

Facility: _____
Interviewer: _____
Date/Time: _____

6. Are fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam? If retrofitted, when was that done?

High Expansion Foam System currently in ~~AFFF~~ hangar system

7. How is AFFF procured? Do you have an inventory/procurement system that tracks use?

8. What type of AFFF has been/is being used (3%, 6%, Mil Spec Mil-F-24385, High Expansion)? Manufacturer (3M, Dupont, Ansul, National Foam, Angus, Chemguard, Buckeye, Fire Service Plus)?

variety

9. Where is the AFFF stored? How is it stored (tanks, 55-gallon drums, 5-gallon buckets)? What size are the storage tanks? Is the AFFF stored as a mixed solution (3% or 6%) or concentrated material?

Spill kits available for leaks
No carts used No refill needed - contract refill, use out-of-date until gone.

10. How many FTAs are/were on this facility and where are they? Locate on a map. How many FTAs are active and inactive? For inactive FTAs, when was the last time that fire training using AFFF was conducted at them?

see ANG PA

ANG NO FTAs

PA Interview Questionnaire - Environmental Manager [redacted] 3:6

Facility: Nashua AASF #1
Interviewer: [redacted]
Date/Time: [redacted]

11. When a release of AFFF occurs during a fire training exercise, now and in the past, how is the AFFF cleaned and disposed of? Were retention ponds built to store discharged AFFF? Was the AFFF trickled to the sanitary sewer or left in the pond to infiltrate?

N/A

12. Can you recall specific times when city, county, and/or state personnel came on-post for training? If so, please state which state/county agency or military entity? Do you have any records, including photographs to share with us?

No

13. Did military routinely or occasionally fire train off-post? List the units that you can recall used/trained at various areas.

ARNG No

14. Did individual units come with their own safety personnel, did they also bring their own AFFF? Was training with AFFF part of these exercises? How were emergencies handled under these circumstances?

No visiting units

15. Are there specific emergency response incident reports (i.e., aircraft or vehicle crash sites and fires)? If so, may we please copy these reports? Who (entity) was the responder?

No

[redacted] 4:6

PA Interview Questionnaire - Environmental Manager

Facility: _____
Interviewer: _____
Date/Time: _____

16. Do you have records of fuel spill logs? Was it common practice to wash away fuel spills with AFFF? Is/was AFFF used as a precaution in response to fuel releases or emergency runway landings to prevent fires?

None

17. Was AFFF used for forest fires or fire management on-post/off-post? If so, please describe what happened and who was involved?

No

18. Are there mutual aid/use agreements between county, city, and local fire department? Please list, even if informal. If formalized, may we have a copy of the agreement?

ANG base

19. Can you provide any other locations where AFFF has been stored, released, or used (i.e. hangars, buildings, fire stations, firefighting equipment testing and maintenance areas, emergency response sites, storm water/surface water, waste treatment plants, and AFFF ponds)?

only carts and ANG systems

20. Are you aware of any other creative uses of AFFF? If so, how was AFFF used? What entities were involved?

No

[redacted] 5:6

PA Interview Questionnaire - Environmental Manager

Facility: Nesho AAFB #1
Interviewer: [redacted]
Date/Time: 5/22/18

21. Are there past studies you are aware of with environmental information on plants/animals/ groundwater/soil types, etc., such as Integrated Cultural Resources Management Plans or Integrated Natural Resources Management Plans?

No

22. What other records might be helpful to us (environmental compliance, investigation records, admin record) and where can we find them?

No

23. Do you have or did you have a chrome plating shop on base? What were/are the years of operation of that chrome plating shop?

No

24. Do you know whether the shop has/had a foam blanket mist suppression system or used a fume hood for emissions control? If foam blanket mist suppression was used, where was the foam stored, mixed, applied, etc.?

No
they do NDI testing dye penetrating x-ray
1-2x/year only on suspect parts

25. How is off-spec AFFF disposed (used for training, turned in, or given to a local Fire Station)? If applicable, do you know the name of the vendor that removes off-spec AFFF? Do you have copies of the manifest or B/L?

No. Asconnected out currently
disposal pending

[redacted] 6/6

PA Interview Questionnaire - Environmental Manager

Facility:_____
Interviewer:_____
Date/Time:_____

26. Do you recommend anyone else we can interview? If so, do you have contact information for them?

Max Klauck civ. ANG

PA Interview Questionnaire – Fire Station

Facility: Nashville AASF #1
Interviewer: St[redacted]
Date/Time: 5/2/16

Interviewee: SGT [redacted] **Title:** Nashville Airport Auth. Training officer **Phone Number:** **Email:**	Can your name/role be used in the PA Report? Y or N Can you recommend anyone we can interview? Y or N

1. Roles or activities with the Facility/years working at the Facility.

12 years here @ airport

2. What can you tell us about the history of AFFF at the Facility? Was it used for any of the following activities, circle all that apply and indicate years of active use, if known? Identify these locations on a facility map.

- Maintenance (e.g., ramp washing)
- Fire Training Areas
- Firefighting (Active Fire)
- Crash
- Fire Suppression Systems (Hangers/Dining Facilities)
- Fire Protection at Fueling Stations
- Non-Technical/Recreational/ Pest Management

area North end of 20L
new hires, 3-4x/year try Not to use foam, only on incidents
No Nozzle testing
4 trucks have AFFF mil spec:
- 420 gal
- 420 "
- 210 "
- 40 "

class A – 72 oz mixed w/water
believed to have least env. impact

3. Are any current buildings constructed with AFFF dispensing systems or fire suppression systems? What are the AFFF/suppression system test requirements? What is the frequency of testing at the AFFF/suppression systems?

4. Are fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam?

5. How is AFFF procured? Do you have an inventory/procurement system that tracks use?

PA Interview Questionnaire – Fire Station

Facility:_____
Interviewer:_____
Date/Time:_____

6. What type of AFFF has been/is being used (3%, 6%, Mil Spec Mil-F-24385, High Expansion)? Manufacturer (3M, Dupont, Ansul, National Foam, Angus, Chemguard, Buckeye, Fire Service Plus)?

Mil Spec

7. Is AFFF formulated on base? If so, where is the solution mixed, contained, transferred, etc.?

—

8. Where is the AFFF stored? How is it stored (tanks, 55-gallon drums, 5-gallon buckets)? What size are the storage tanks? Is the AFFF stored as a mixed solution (3% or 6%) or concentrated material?

in station / trucks

9. How is the AFFF transferred to emergency response vehicles, suppression systems, flightline extinguishers? Is/was there a specified area on the facility where vehicles are filled with AFFF and does this area have secondary containment in case of spills? How and where are vehicles storing AFFF cleaned/decontaminated?

in station

10. Provide a list of vehicles that carried AFFF, now and in the past, and where are/were they located?

4 trucks (see p. 1)

11. Any vehicles have a history of leaking AFFF? Do you/did you test the vehicles spray patterns to make sure equipment is working properly? How often are/were these spray tests performed and can you provide the locations of these tests, now and in the past?

No

SGT [redacted] p. 2 AASF#1

PA Interview Questionnaire – Fire Station

Facility: Nashville Airport Author
Interviewer: [redacted]
Date/Time: [redacted]

12. How many FTAs are/were on this facility and where are they? Locate on a map. How many FTAs are active and inactive? For inactive FTAs, when was the last time that fire training using AFFF was conducted at them?

2 see map A

13. What types of fuels/flammables were used at the FTAs?

all foam in station (storage)

14. What was the frequency of AFFF use at each location? When a release of AFFF occurs during a fire training exercise, now and in the past, how is/was the AFFF cleaned and disposed of? Were retention ponds built to store discharged AFFF? Was the AFFF trickled to the sanitary sewer or left in the pond to infiltrate?

(car fire + off airport) and engine fire 2016 runway

10 gallon use - recent refill 5 gal - 10

15. Are there mutual aid/use agreements between county, city, local fire department? Please list, even if informal. If formalized, may we have a copy of the agreement? Can you recall specific times when city, county, state personnel came on-post for training? If so, please state which state/county agency, military entity? Do you have any records, including photographs to share with us?

unknown

16. Did individual units come on-post with their own safety personnel, did they also bring their own AFFF? Was training with AFFF part of these exercises? How were emergencies handled under these circumstances?

unknown

PA Interview Questionnaire – Fire Station

Facility:_____
Interviewer:_____
Date/Time:_____

17. Did military routinely or occasionally fire train off-post? List units that you can recall used/trained at various areas.

—

18. Are there specific emergency response incident reports (i.e., aircraft or vehicle crash sites and fires)? If so, may we please copy these reports? Who (entity) was the responder?

19. Do you have records of fuel spill logs? Was it common practice to wash away fuel spills with AFFF? Is/was AFFF used as a precaution in response to fuel releases or emergency runway landings to prevent fires?

No foam - used at fuel spills

20. Was AFFF used for forest fires or fire management on-post/off-post? If so, please describe what happened and who was involved?

21. Can you provide any other locations where AFFF has been stored, released, or used (i.e. hangars, buildings, fire stations, firefighting equipment testing and maintenance areas, emergency response sites, storm water/surface water, waste water treatment plants, and AFFF ponds)?

SGT [redacted] p. 3

PA Interview Questionnaire – Fire Station

Facility: AASF #1 / Washington Airport Auth.
Interviewer: [redacted]
Date/Time: 5/22/10

22. Are you aware of any other creative uses of AFFF? If so, how was AFFF used? What entities were involved? No
23. How is off-spec AFFF disposed (used for training, turned in, or given to a local Fire Station)? If applicable, do you know the name of the vendor that removes off-spec AFFF? Do you have copies of the manifest or B/L? use until expended
24. Do you recommend anyone else we can interview? If so, do you have contact information for them?

MAP A

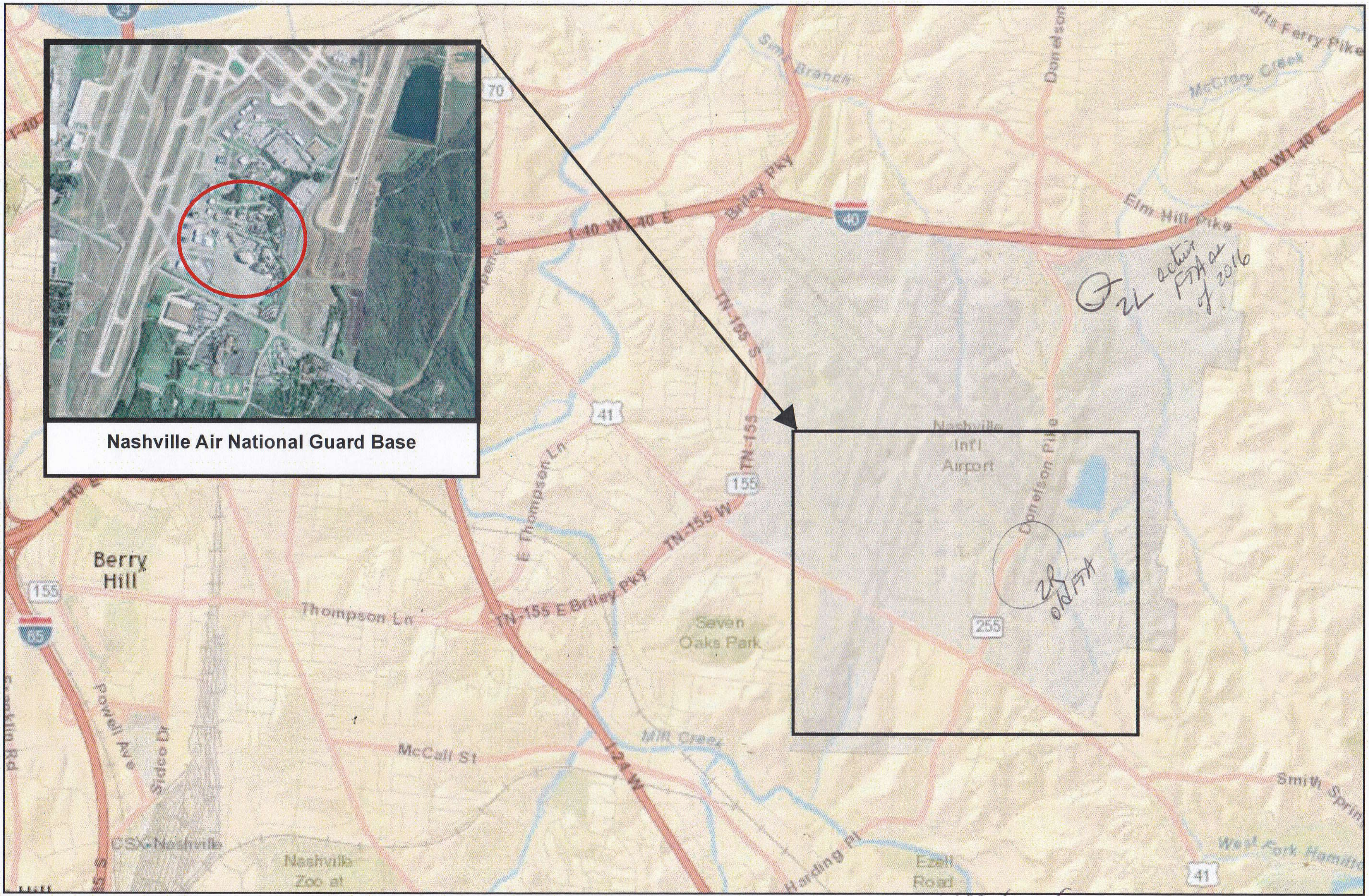


Figure 1
Site Location Map

Nashville Air National Guard Base
Nashville, Tennessee

NORTH

0 1 2
Miles

NAAuth FTA West of North end of 2L(?) (current as of 2016)
OLD: FTA under 02R runway under parking lot (unknown)

BB&E

Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
KMG 2/22/2016

Document Path: H:\ITGIS\ANG\AFFF PFC\Nashville\Site Location Map Nashville.mxd

Appendix B.2
Visual Site Inspection Checklists

Visual Site Inspection Checklist

Names(s) of people performing VSI: CW3 [redacted]

Recorded by: [redacted]

ARNG Contact: CW5 [redacted]

Date and Time: 5/22/18 ~ 10a

Method of visit (walking, driving, adjacent): walking

Source/Release Information

Site Name / Area Name / Unique ID: ARNG AASF #1

Site / Area Acreage:

Historic Site Use (Brief Description): ANG until ~ April 2015

Current Site Use (Brief Description): ARNG AASF

Physical barriers or access restrictions: security guarded gate

1. Was PFAS used (or spilled) at the site/area? **Y / N**

1a. If yes, document how PFAS was used and usage time (e.g., fire fighting training 2001 to 2014):

no incidents, every other year for system tested, foam deployed

2. Has usage been documented? **Y / N**

2a. If yes, keep a record (place electronic files on a disk):

—

3. What types of businesses are located near the site? **Industrial / Commercial / Plating / Waterproofing / Residential**

3a. Indicate what businesses are located near the site

Nashville Int'l Airport

4. Is this site located at an airport/flightline? **Y / N**

4a. If yes, provide a description of the airport/flightline tenants:

ANG and general aviation / airfreight

VSI 2:4

Visual Survey Inspection Log

Other Significant Site Features:

1. Does the facility have a fire suppression system? Y / N

1a. If yes, indicate which type of AFFF has been used:

High Expansion Foam

1b. If yes, describe maintenance schedule/leaks:

odd year testing, even year water

1c. If yes, how often is the AFFF replaced:

10 year to test fire pumps are checked and certified, power dropped to check generator operation (weekly generator checks also), the unit is notified of test.

1d. If yes, does the facility have floor drains and where do they lead? Can we obtain an as built drawing?

Transport / Pathway Information

Migration Potential:

1. Does site/area drainage flow off installation? Y / N

1a. If so, note observation and location:

2. Is there channelized flow within the site/area? Y / N

2a. If so, please note observation and location:

3. Are monitoring or drinking water wells located near the site? Y / N

3a. If so, please note the location:

Ask Brad/Jd

4. Are surface water intakes located near the site? Y / N

4a. If so, please note the location:

5. Can wind dispersion information be obtained? Y / N

5a. If so, please note and observe the location.

6. Does an adjacent non-ARNG PFAS source exist? Y / N

6a. If so, please note the source and location.

6b. Will off-site reconnaissance be conducted? Y / N

VSI 3:1

Visual Survey Inspection Log

Significant Topographical Features:

1. Has the infrastructure changed at the site/area? **Y / N**

1a. If so, please describe change (ex. Structures no longer exist):

2. Is the site/area vegetated? **Y / N**

2a. If not vegetated, briefly describe the site/area composition:

3. Does the site or area exhibit evidence of erosion? **Y / N**

3a. If yes, describe the location and extent of the erosion:

4. Does the site/area exhibit any areas of ponding or standing water? **Y / N**

4a. If yes, describe the location and extent of the ponding:

Receptor Information

1. Is access to the site restricted? **Y / N**

1a. If so, please note to what extent:

2. Who can access the site? **Site Workers / Construction Workers / Trespassers / Residential / Recreational Users / Ecological**

2a. Circle all that apply, note any not covered above:

3. Are residential areas located near the site? **Y / N**

3a. If so, please note the location/distance:

4. Are any schools/day care centers located near the site? **Y / N**

4a. If so, please note the location/distance/type:

5. Are any wetlands located near the site? **Y / N**

5a. If so, please note the location/distance/type:

VSI 4:4

Visual Survey Inspection Log

Additional Notes

Photographic Log

Photo ID/Name	Date & Location	Photograph Description

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: AASF#1_Berry Field

Why has this location been identified as a site? High expansion foam hangar fire suppression system fully tested (foam deployed) every two years (odd years). (Water only system testing on even years.) No other historical discharges of foam.

Are there any other activities nearby that could also impact this location?

ANG release (NW of TNARG) of AFFF was documented in ANG PFAS PA (2016)

Training Events

Have any training events with AFFF occurred at this site? yes

If so, how often? Every two years hangar system tested using 2.3% high expansion foam

How much material was used? Is it documented? During testing: 3-4' deep on hangar floor (25 gallons estimated), WWTP notified in advance, piping flushed with water and floor grates cleaned before and after training

Identify Potential Pathways: Do we have enough information to fully understand over land surface water flow, groundwater flow, and geological formations on and around the facility? Any direct pathways to larger water bodies?

Surface Water:

Surface water flow direction? West to OWS/WWTP (contact [redacted] for OWS mgmt info)

Average rainfall?

Any flooding during rainy season?

Direct or indirect pathway to ditches? Direct/indirect to sewer

Direct or indirect pathway to larger bodies of water? No

Does surface water pond any place on site? No

Any impoundment areas or retention ponds? No

Any NPDES location points near the site? Unknown

How does surface water drain on and around the flight line? West

Preliminary Assessment – Conceptual Site Model Information

Groundwater: unknown (reference 2016 ANG PFAS PA)

Groundwater flow direction?

Depth to groundwater?

Uses (agricultural, drinking water, irrigation)?

Any groundwater treatment systems?

Any groundwater monitoring well locations near the site?

Is groundwater used for drinking water?

Are there drinking water supply wells on installation?

Do they serve off-post populations?

Are there off-post drinking water wells downgradient

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? Not on ARNG property – operated by BNAirport

If so, do we understand the process and which water is/was treated at the plant?

Do we understand the fate of sludge waste?

Is surface water from potential contaminated sites treated?

Equipment Rinse Water

1. Is firefighting equipment washed? Where does the rinse water go? No

2. Are nozzles tested? How often are nozzles tested? Where are nozzles tested? Are nozzles cleaned after use? Where does the rinse water flow after cleaning nozzles? (see above – nozzle test w/ foam odd years)

3. Other?

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker

Construction Worker

Recreational User

Residential

Child

Ecological

Note what is located near by the site (e.g. daycare, schools, hospitals, churches, agricultural, livestock)?

Documentation

Ask for Engineering drawings (if applicable).

Has there been a reconstruction or changes to the drainage system? When did that occur?

Appendix C
Photographic Log

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility #1	Davidson County, Tennessee

Photograph No. 1

Description:

Flight Apron

Photograph No. 2

Description:

Fire suppression system piping in the basement of the hangar

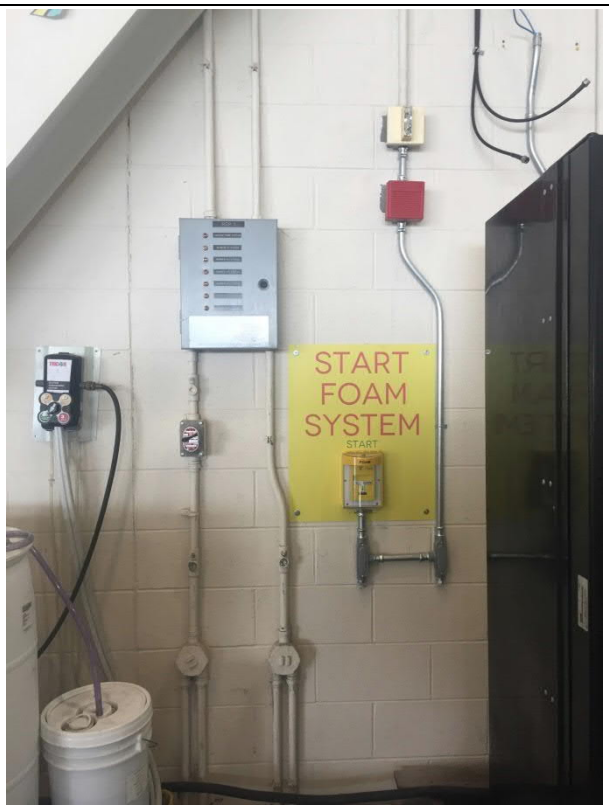
APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility #1	Davidson County, Tennessee

Photograph No. 3

Description:

Fire suppression system pull station



Photograph No. 4

Description:

Foam pump control cabinet

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility #1	Davidson County, Tennessee

Photograph No. 5

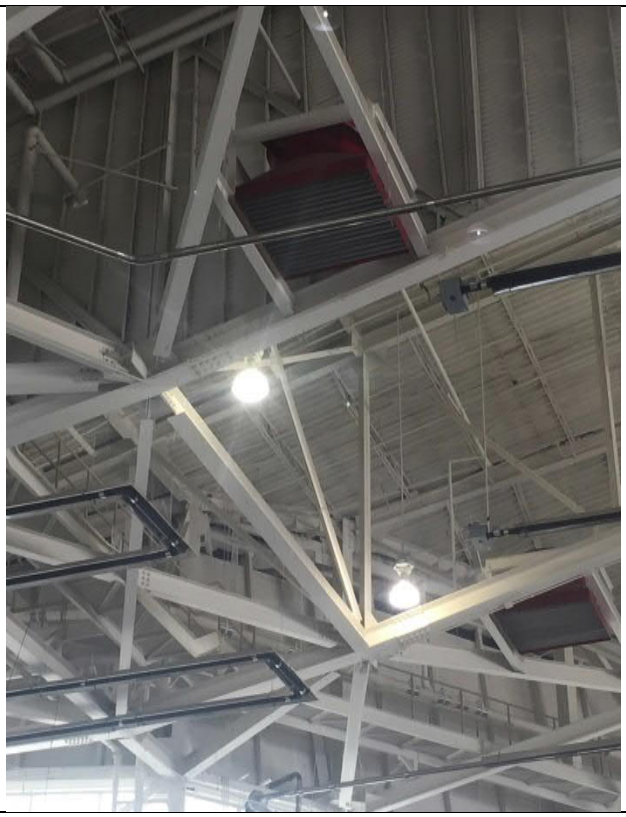
Description:

Fuel truck parking, near apron drains

Photograph No. 6

Description:

High expansion foam bell nozzle



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility #1	Davidson County, Tennessee

Photograph No. 7

Description:

Fire suppression system controls

Photograph No. 8

Description:

Hangar floor drains to OWS

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility #1	Davidson County, Tennessee

Photograph No. 9

Description:

Foam concentrate holding tank, with label and showing fluid levels

Photograph No. 10

Description:

AFFF mobile fire extinguisher carts

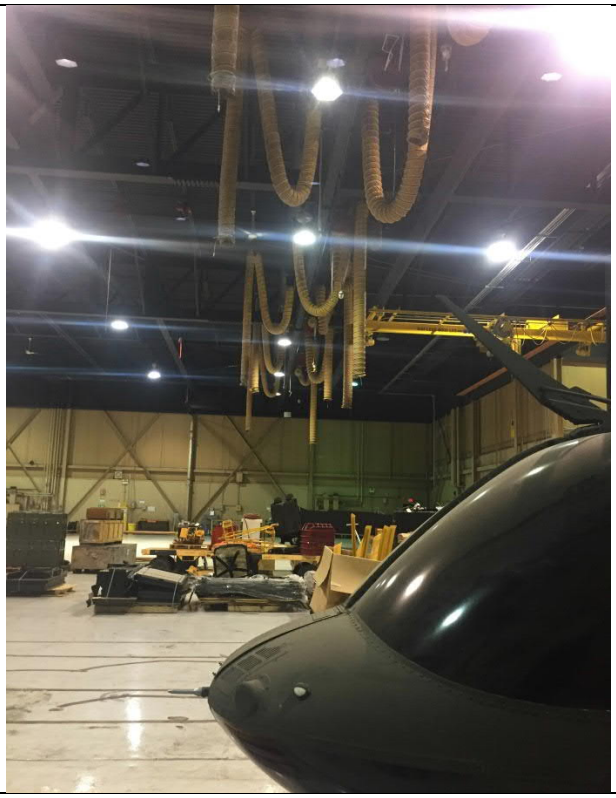
APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility #1	Davidson County, Tennessee

Photograph No. 10

Description:

Interior of storage hangar with no fire suppression system



Photograph No. 12

Description:

Storage hangar to the right of drainage area

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility #1	Davidson County, Tennessee

Photograph No. 13

Description:

Stored AFFF Label

Photograph No. 14

Description:

Wash Rack

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility #1	Davidson County, Tennessee