FINAL
Preliminary Assessment Report Camp Minden Training Site, Louisiana

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

February 2019

Prepared for:

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Acronyms and Abbreviations

AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
amsl	above mean sea level
AOI	area of interest
ARNG	Army National Guard
ARNG-ILE	Army National Guard Environmental Programs Division
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMTS	Camp Minden Training Site
CSM	conceptual site model
FETI	Fire and Emergency Training Institute
FTA	fire training area
IED	Installations and Environment Division
LDEQ	Louisiana Department of Environmental Quality
LAAP	Louisiana Army Ammunition Plant
LAARNG	Louisiana Army National Guard
LMD	Louisiana Military Department
LNG	Louisiana National Guard
LSU	Louisiana State University
LTC	Lieutenant Colonel
NG/L	nanograms per liter
NPL	National Priority List
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
SI	Site inspection
SSGT	Staff Sergeant
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 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) (a suite of related chemicals), 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 Camp Minden Training Site (CMTS) in Webster and Bossier Parishes, Louisiana, to assess potential PFAS release areas and exposure pathways to receptors. Ownership of CMTS, formerly the Louisiana Army Ammunition Plant (LAAP), was transferred to the State of Louisiana in 2004. The installation is currently managed by the Louisiana Department of the Military (LMD) for use as a regional training center; and, several former LAAP production lines are leased to commercial/industrial tenants. One tenant, the Louisiana State University Fire and Emergency Training Institute (LSU FETI), operates a fire training area (FTA) in the southwest portion of the installation.

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 10 April 2018
- Interviewed personnel associated with CMTS/LAAP activities during the site visit including the Bossier Parish Fire Chief, retired LAAP Environmental Manager/Safety Officer and the Manager of the LSU FETI.
- Incorporated input received from Louisiana Department of the Military (LMD) personnel, who obtained operational information directly from their CMTS tenants.
- Completed visual site inspection at a suspected PFAS release location and documented with photographs

Sampling of the three installation potable water wells for PFAS compounds was conducted by the ARNG in April 2017. With one exception, no detections were reported in the sample results. The exception was 6:2 fluorotelomer sulfonate (FTS) which was detected in Well 22 at an estimated concentration of 5.72 nanograms per liter. The laboratory qualified the result with a “J” flag because the detected concentration is less than the method reporting limit. This compound is included in the EPA Method 537 suite. Due to its unknown toxicity, a screening level has not been developed for this compound.

One area of interest (AOI) related to potential PFAS releases was identified at CMTS based on PA data. The AOI is shown on **Figure ES-1** and described below:

Area of Interest	Name	Used by	Release Dates
AOI 1	LSU FETI Fire Training Area	LSU FETI	2007 to 2013

This PA Report documents the known FTA operated by the LSU FETI. No other locations where PFAS may have been stored or released into the environment at CMTS were identified during the PA.

Based on potential AFFF releases at this AOI, there is potential for exposure to PFAS contamination in surface water and sediment for all receptors via ingestion, and in shallow groundwater for all receptors due to the comingling of surface water and shallow groundwater in the vicinity of Camp Minden and due to the existence of nearby drinking water wells. No other sources of PFAS were identified in the local area surrounding Camp Minden through interviews or review of previous investigations. The Conceptual Site Model for Camp Minden is shown on **Figure ES-2.**

CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Camp Minden, LA			
REVISED	12/11/2018	GIS BY	MS	12/11/2018
SCALE	1:3,000	CHK BY	SS	12/11/2018
Base Map: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan,		PM	RG	12/11/2018

Legend

- Area of Interest
- Potential PFAS Release
- No Suspected Release
- Facility Boundary
- Water Body
- River/Stream

N

Summary of PA Findings

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Figure ES-1

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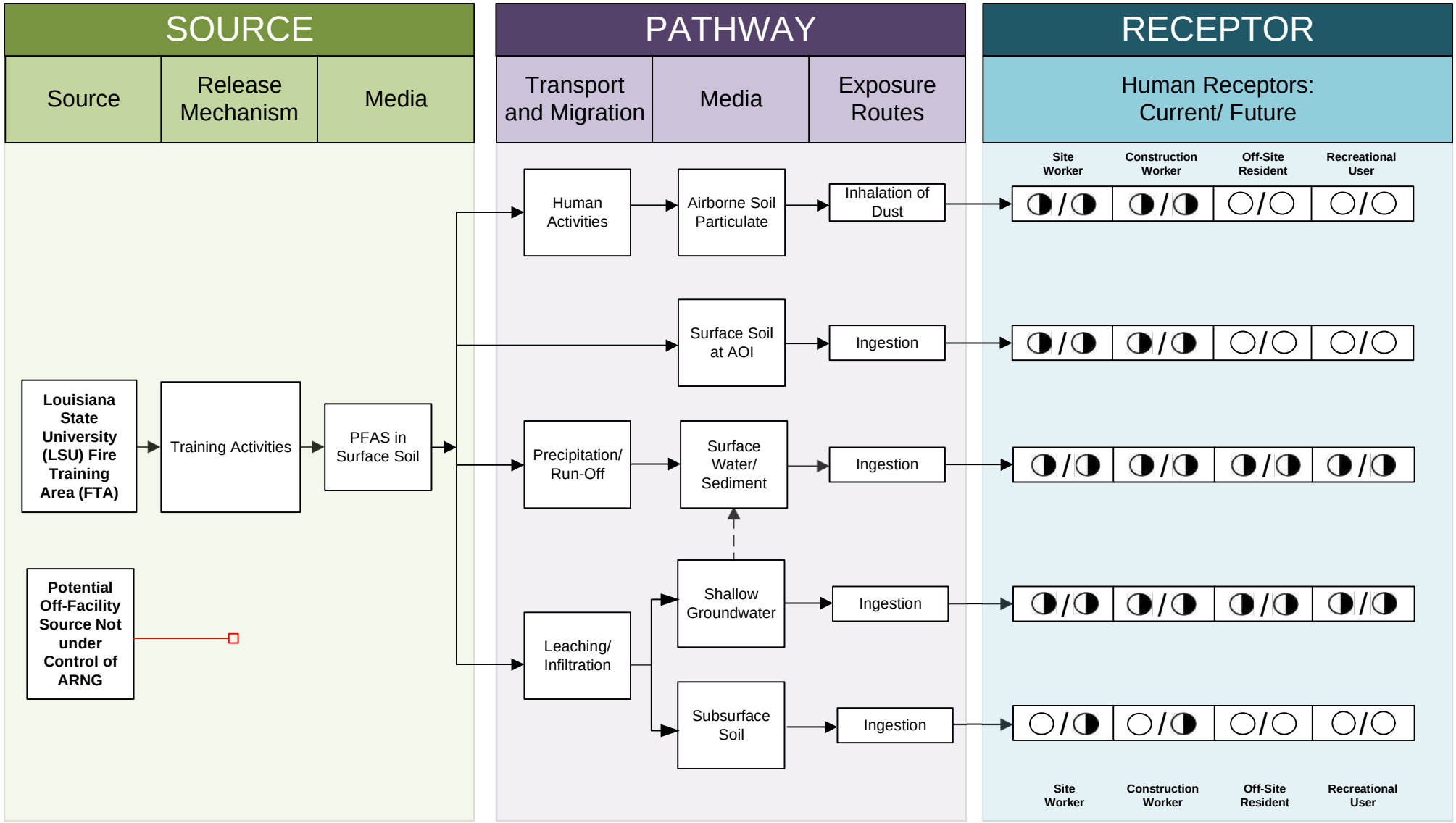


LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Complete Pathway

Figure ES-2
Conceptual Site Model
Camp Minden Training Site

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 (IED), Cleanup Branch contracted AECOM Technical Services, Inc. (AECOM) to perform *Preliminary Assessments (PAs) and Site Inspections 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. The ARNG is assessing potential effects on human health related to processes at their facilities that used per- and poly-fluoroalkyl substances (PFAS) (a suite of related chemicals), 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 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 varies. 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 or State of Louisiana standards regulating PFAS in drinking water. In the absence of federal maximum contaminant levels, some states have adopted their own drinking water standards for PFAS.

This report presents findings of a PA for PFAS at Camp Minden Training Site (CMTS) (formerly the Louisiana Army Ammunition Plant [LAAP]) in Webster and Bossier Parishes, Louisiana 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 Report documents the known Fire Training Area (FTA) operated by the Louisiana State University Fire and Emergency Training Institute (LSU FETI) where PFAS-containing materials have historically been stored and used and therefore have the potential to be released into the environment at CMTS. No other locations where PFAS may have been stored or released into the environment at CMTS were identified during the PA. 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 10 April 2018
- Interviewed personnel associated with CMTS/LAAP activities during the site visit including the Bossier Parish Fire Chief, retired LAAP Environmental Manager/Safety Officer and Manager of the LSU FETI.
- Incorporated input received from Louisiana Department of the Military (LMD) personnel, who obtained operational information directly from their CMTS tenants.

- Completed visual site inspection (VSI) at a potential PFAS release location and documented with photographs
- Developed a conceptual site model (CSM) to outline the potential release and pathway of PFAS for the area of interest (AOI) identified

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 Area:** describes the known FTA at the facility identified during the site visit.
- **Section 3** – **Non-Fire Training Areas:** notes no other locations of potential or suspected PFAS releases at the facility were identified.
- **Section 4** – **Emergency Response Areas:** notes no areas of suspected or potential AFFF release at the facility (i.e., in response to emergency situations) were identified.
- **Section 5** – **Adjacent Sources:** notes no other locations of potential or suspected PFAS releases were identified adjacent to the facility 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 and uncertainties 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

CMTS includes approximately 15,268.8 acres of land in Webster and Bossier Parishes (**Figure 1-1**). The installation is bounded by U.S. Highway 80 and I-20 to the north, U.S. Highway 164 to the south, Dorcheat Bayou to the east, and Clarke Bayou to the west. The cities of Shreveport and Bossier City are approximately 22 miles west of the installation and the towns of Dixie Inn and Minden are nearby to the northeast. Private parcels (off-facility) surround CMTS. The Village of Doyline and surrounding rural areas border the site to the south and the unincorporated community of Goodwill borders the site to the north (URS, 2016).

The administrative and residential facilities occupy approximately 154 acres, commercial production lines and LMD mission support facilities occupy 2,970 acres, and 12,142.8 acres are woodlands. The operational range area consists of 18 ranges used by the Louisiana Army National Guard (LAARNG) for tactical training for Army National Guard troops. Current training includes both non-live-fire and live-fire activities. The non-operational area is composed of 27 small parcels scattered throughout the west-central portion of the installation.

Several former LAAP production lines are used by either commercial/industrial tenants or are unused, locked, and secured from entry. Currently, LAARNG staffs approximately 244 people at CMTS. Fewer than 222 people work in the areas leased to tenants.

The following is an overview of the various areas comprising CMTS reported in the Five Year Review (URS, 2016):

Location	Size	Structures
Area A Administration area	54 acres	33 buildings
Area B Maintenance area	58 acres	43 buildings
Lines C, D, E, G, H, J, K, and S	565 acres	312 buildings
Storage facilities L and M	238 acres	246 buildings
Part operation areas Y and N	110 acres	43 buildings
Miscellaneous areas O, P, W, and STP 1	22 acres	13 buildings
Test areas: Central Proving Ground (CPG), T-7, and EWI	28 acres	6 buildings
Burning grounds BG-5, BG-8, and DA-9	102 acres	7 buildings
3 Landfills	7 acres	0 buildings

The U.S. Government acquired the site in 1941 for use as a U.S. Army Armament, Munitions, and Chemical Command installation. In 1996, all production ceased at LAAP and the facility was placed in modified caretaker status (LAAP, 2001). In 1989, LAAP was added to the National Priority List (NPL). In 2004, legislation authorized the U.S. Army to convey LAAP to the State of Louisiana. In accordance with the Deed of Transfer, approximately 14,949 acres were transferred to the State of Louisiana by and through the LMD. As described in the Finding of Suitability for Transfer (LAAP, 2004a) and separate Finding of Suitability for Early Transfer (LAAP, 2004b), the State is expected to use the majority of the property for military training activities, with the remaining area used for commercial/industrial purposes and the U.S. Army retains the responsibility for ensuring that CERCLA selected remedies, as established in Records of Decision, remain protective of human health and the environment. In 2005, the site was renamed CMTS.

Contract listings and expiration dates for CMTS real property agreements applicable to the scope of this PA are included in **Appendix A**.

1.5 Facility Environmental Setting

CMTS is located in the Upper West Gulf Coast Plain region. Most of CMTS has flat terrain, and the major landform is the ancient Red River floodplain. Elevations throughout CMTS range from 145 feet (ft) to 225 ft above mean sea level (Shaw, 2005).

1.5.1 Geology

The geology of CMTS is characterized by unconsolidated continental and marine sediments, ranging in age from Eocene to Pleistocene. Pleistocene terrace deposits derived from the ancestral Red River cover the surface and generally grade from clays and silts at the surface to sand and gravel at depth. The terrace deposits are divided into Upper and Lower Terrace sands. The Sparta Sand Formation lies directly below the Terrace deposits, but is limited to the far eastern portion of CMTS (i.e., east of Boone Creek). The Sparta Sand Formation origin is fluvial-deltaic, deposited by the ancestral Mississippi River, and consists of non-marine massive sands, silty sands, and occasional lignite shale. The Cane River Formation is a low-permeability marine clay unit separating the overlying Terrace and Sparta Sands and the underlying Wilcox-

Carrizo Sand. The Cane River Formation varies in thickness from 200 to 300 feet. The Wilcox-Wilcox Group and Carrizo Sand underlie the Cane River Formation. The Upper Wilcox Group consists of massive continuous sand beds and subcrops beneath the western quarter of the site up to thicknesses as great as 550 feet (Shaw, 2005).

1.5.2 Hydrogeology

Three water-bearing units are present at the facility, listed in order from shallow to deep: Upper Terrace, Lower Terrace/Sparta Sand, and the Wilcox-Carrizo; one confining unit (Cane River Formation) overlies the Wilcox-Carrizo. The shallow groundwater system includes the Upper Terrace aquifer and the Lower Terrace/Sparta Sand aquifer, while the deep groundwater system is made up of the Wilcox-Carrizo aquifer. The deep groundwater within the Wilcox-Carrizo is confined by the overlying beds of the Cane River Formation. On the west side of CMTS, the Cane River Formation is absent, and the Lower Terrace sands rest unconformably on the Wilcox-Carrizo sands. The Sparta Sand is absent west of Boone Creek (Shaw, 2005).

The stream erosional valleys truncate the Lower Terrace / Sparta Sand aquifers. Clarke Bayou on the west and Bayou Dorcheat on the east form effective flow boundaries for the Upper Terrace aquifer, and to some extent the Lower Terrace/Sparta Sand aquifer. As shown on **Figure 1-2**, groundwater flow within the Terrace units generally follows the topography and discharges to surface water drainage features (URS, 2016). There is some component of downward groundwater flow from the Upper Terrace to the Lower Terrace. The deep Wilcox-Carrizo aquifer is an important drinking water and industrial use aquifer in northwest Louisiana. The aquifer is recharged from rainfall in the outcrop areas and from the overlying alluvial sediments.

Camp Minden has three installation potable water wells, well numbers 4A, 18 and 22 which draw from the Wilcox aquifer. The total depths of these wells are 420, 691 and 612 feet below ground surface, respectively (URS, 2017).

Under the Installation Restoration Program, the ARNG completed an inventory of nearby water supply wells. In addition to the three installation potable water wells, the inventory identified two public water supply wells north of the installation which draw from the Terrace aquifer (Village water system); public wells south of the installation (four Doyline water system, one Jenkins water system and one Horseshoe Road water system) which draw from the Wilcox-Carrizo aquifer; and numerous private residential wells south of the installation which draw from both the Wilcox-Carrizo aquifer and from the overlying Terrace aquifer. These well locations and other groundwater features are shown on **Figure 1-2**.

Sampling of the three Camp Minden installation potable water wells for PFAS compounds was conducted by the ARNG in April 2017. With one exception, no detections were reported in the sample results. The exception was 6:2 fluorotelomer sulfonate (6:2 FTS) which was detected in Well 22 at an estimated concentration of 5.72 nanograms per liter (NG/L). The laboratory qualified the result with a “J” flag because the detected concentration is less than the method reporting limit. This compound is included in the EPA Method 537 suite. Due to its unknown toxicity, a screening level has not been developed for this compound. The tabulated sampling results are included in **Appendix A**. **Appendix A** also includes a Fomtec product fact sheet which includes additional information regarding 6:2 FTS.

1.5.3 Hydrology

All surface water runoff from the installation exits along the southern boundary by four natural streams that originate north of CMTS. Bayou Dorcheat forms the eastern boundary of the installation, and Clarke Bayou forms the western boundary (**Figure 1-3**). Boone Creek and its

tributaries drain the eastern and central portions and flow into Bayou Dorcheat. Caney Branch and a manmade unnamed ditch drain the western portions, and then flow into Clarke Bayou. Both Clarke Bayou and Bayou Dorcheat flow south into Lake Bistineau. The streams on CMTS receive both surface runoff as well as groundwater discharge from the Upper and Lower Terrace aquifers. The installation's active wastewater treatment plant discharges to Boone Creek near the southern installation boundary (URS, 2016).

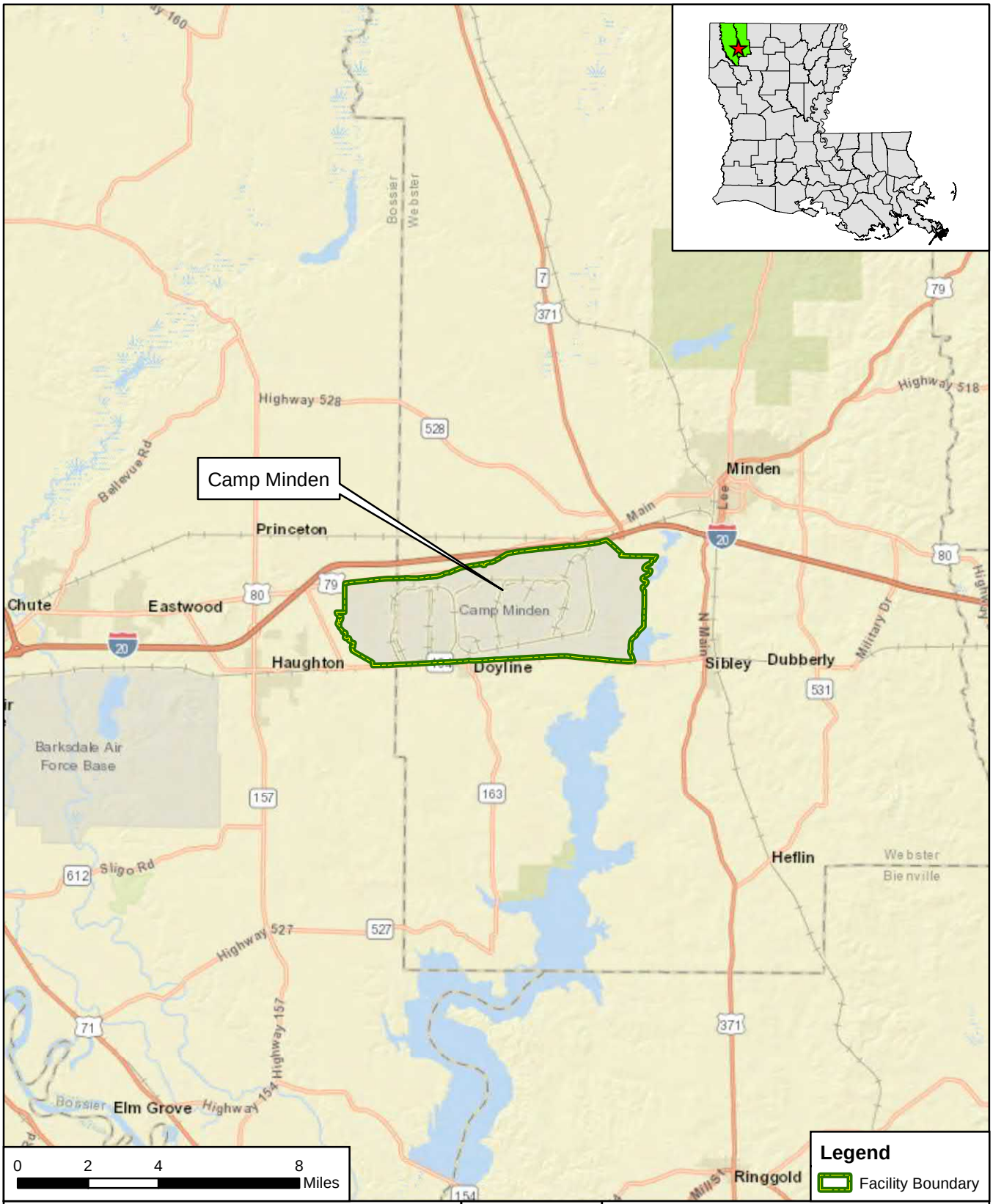
1.5.4 Climate

Prevailing southerly winds provide a moist subtropical climate. Climate data are reported for the nearby city of Minden, where average annual temperatures range from 52.3 degrees Fahrenheit (°F) to 75.6°F. January is the coldest month with average temperatures from 33ºF to 56°F. The warmest month tends to be July, with average monthly temperatures from 72ºF to 93°F. Average annual rainfall in Minden is 55.43 inches. The wettest months are November and December, with the least rainfall during August and September (U.S. Climate Data, 2017).

1.5.5 Current and Future Land Use

Based on the Finding of Suitability for Early Transfer (LAAP, 2004b), current and future land uses for CMTS are limited to commercial, industrial, and military activities, with limited residential areas. Specific CMTS land use by area is currently as follows:

Area A – LMD administration, Youth Challenge Program, Force Protection Headquarters, Regional Training Institute/DFAC (Louisiana National Guard [LNG])), All Ranks Club, staff housing
Area B – Unit Training Equipment Site (LNG), LMD Maintenance Shop, Forestry, Webster Parish Prison, Fire Station (Bossier Parish Fire Department), and commercial tenants GATX and East Camden Highland Railroad
Area C – Three buildings are leased by commercial explosive tenant, Expal (a Division of Maxim Corporation), the remainder is unoccupied
Areas D, E, K and P – Currently unused and secured from entry
Area F – Minimal use by commercial tenant, T.G. Mercer, for pipe storage
Area G – Commercial explosive tenant, Goex, a Division of Hogdon Powder
Area H – Commercial explosive tenant, BST, a Division of Orica Corporation
Area I – Commercial explosive tenant, ESI
Area J – Commercial explosive tenant, Nyles Acquisitions LLC
Areas L-1, L-2, L-3, L-4, L-5 and L-6 – Explosive storage magazines
Area M-1, M-2, M-3, M-4 – Inert storage warehouses used by LMD, LNG, and commercial tenants
Area N – LMD salvage yard
Area O – East Camden Highland Railroad
Other – LSU FETI



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SCALE	1:253,440	CHK BY	SS	9/21/2018
Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI,		PM	RG	9/21/2018

Facility Location

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Figure 1-1

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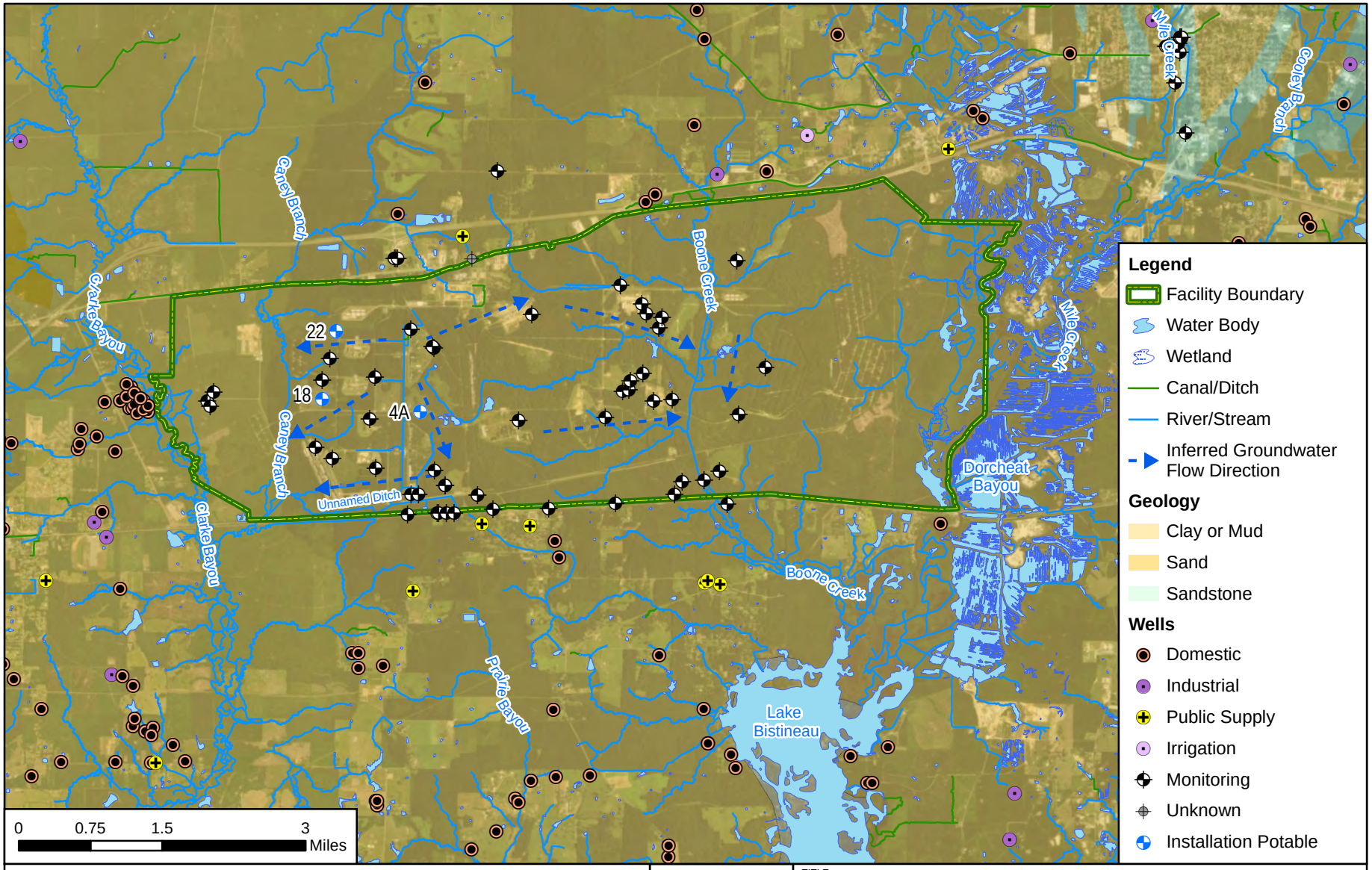

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Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	2/13/2019

TITLE

Groundwater Features

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Figure 1-2

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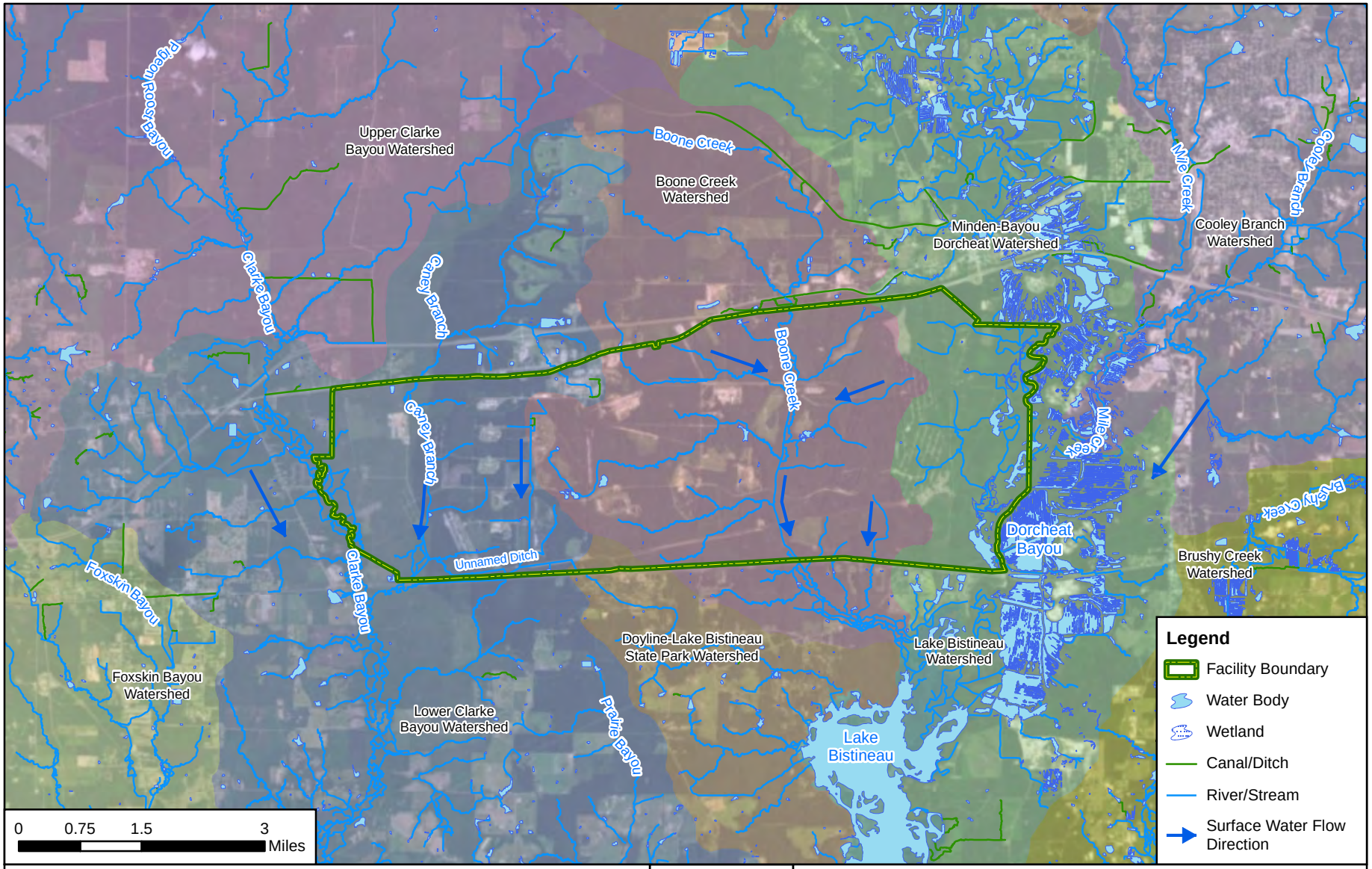

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Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	2/13/2019

TITLE

Surface Water Features

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Germantown, MD 20876

Figure 1-3

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2. Fire Training Areas

With the exception of the LSU FETI, no FTAs were identified at CMTS during PA interviews. In cases of emergencies, responses are provided by the Bossier Parish Fire Department which maintains its own training facility several miles west of CMTS.

As shown on **Figure 2-1** (inset), the LSU FETI is located on the southwest portion of CMTS, within CMTS' security controlled perimeter fence. The geographic coordinates are 32°32'18.31"N and 93°26'13.14"W.

LSU FETI is an active facility that began operations in 2007 (**Figure 2-1**). Their FTA includes a mock petroleum fuel above ground storage tank (AST) "farm" situated within an approximate 850 square feet bermed concrete containment area located in an approximate 19-acre clearing. A 0.9-acre surface water impoundment is adjacent to the FTA. LSU FETI offices and warehouse space are located approximately ¼-mile west of the training area.

Since 2007, propane is used to simulate fuel fires inside the bermed mock AST farm for the purpose of industrial brigade training performed approximately 3 to 4 times per year. Currently such training uses Micro Blaze Out, a firefighting concentrate, procured by staff in LSU's Baton Rouge headquarters from Verde Environmental. Prior to 2013, a different material, Fomtec, was used for training. Safety data sheets (SDSs) for Micro Blaze Out and Fomtec appear in **Appendix B**. PFAS is excluded from the chemical composition reported for the product Micro Blaze Out. All current Fomtec formulations are described as containing fluoroproteins or fluorocarbons with some fluorine free formulations available that are referred to as 3F. Earlier formulations of Fomtec cannot be confirmed. Fomtec is manufactured by Dafo Fomtec AB, a privately owned Swedish company. For training exercises conducted at the mock AST farm, the firefighting concentrate is diluted in water at a one percent (1%) concentration. Fluids generated during training are contained from within a bermed area. The bermed area drains to the nearby surface impoundment through conveyance piping and then via open ditch. Construction details for the impoundment and ditch were not available; therefore these features are presumed to be unlined.

Transfer of the firefighting concentrate liquid, from 150-gallon storage totes to 5-gallon eductors, is performed inside the enclosed warehouse building west of the FTA. No spills were reported; however standard procedure reported by LSU FETI staff calls for use of sorbent material to clean liquid spills within the warehouse, which is subsequently disposed of per applicable requirements.

Water, supplied by CMTS' water supply well network, is used for all other training conducted at the LSU FETI.

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REVISED	12/11/2018	GIS BY	MS	12/11/2018
SCALE	1:3,000	CHK BY	SS	12/11/2018
Base Map: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan,		PM	RG	12/11/2018

Legend

- Potential PFAS Release
- No Suspected Release
- Facility Boundary
- Water Body
- River/Stream

N

Fire Training Area

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Figure 2-1

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3. Non-Fire Training Areas

PA interviews did not identify other areas at CMTS with a history of use or release of materials potentially containing AFFF. All buildings at CMTS equipped with fire suppression systems use water only. With the exception of LSU FETI described in Section 2, former LAAP staff and current LMD personnel have reported that to the best of their knowledge, LAAP and all CMTS tenants (listed in Section 1.5.5) do not currently use and did not historically use materials potentially containing PFAS.

3.1 Camp Minden Fire Stations

The original LAAP fire station (in Area A behind the Military Police Station), operated from approximately 1941 until 1992. It was replaced with a new station (Area B), which operated from approximately 1992 until 1996 when all equipment was liquidated. The LAARNG staffed the newer station on a volunteer basis from approximately 2005 until 2013, when volunteer operations ceased. Since 2013 that station is used exclusively by the Bossier Parish Fire Department. Former LAAP and current LMD staff and the Bossier Parish Fire Chief have reported that to the best of their knowledge, PFAS-related materials have never been used or stored at either fire station.

3.2 Landfills

Camp Minden currently maintains one active landfill used exclusively for construction debris. Closed landfills are located in Area P, DA 9 and BG-8.

Landfills are not usually a primary release area of PFAS, but materials disposed of in landfills may create a secondary source of contamination. Such materials, to name a few, may include sludge from a WWTP that processes PFAS-laden water, used AFFF storage containers, or products associated with waterproofing uniforms or boots. At Camp Minden, no information obtained indicates PFAS-related materials were disposed of in any landfill.

4. Emergency Response Areas

Explosions have occurred in the past at CMTS (in 1968, 2005, 2006, 2012 and 2015), however there were no associated fires reported at the site of the explosion. LMD personnel with knowledge of the incidents report water was used exclusively for suppression of all secondary fires of timber surrounding the site of the explosion. Similarly during LAAP operations, firefighting protocol specified use of high pressure water in case of an emergency at production lines and other facilities.

5. Adjacent Sources

No off-site PFAS sources adjacent to the CMTS were identified during the PA.

6. Conceptual Site Model

Based on the PA findings, the LSU FETI FTA was identified as an AOI (**Figure 6-1**). A CSM identifies three components necessary for potentially complete exposure pathways: (1) source, (2) pathway, (3) receptor. If any of these elements are missing, the pathway is considered incomplete.

In general, the potential PFAS exposure pathways are ingestion and inhalation. Dermal contact is not considered to be a potential exposure pathway as studies have shown very limited absorption of PFAS through the skin (NGWA, 2018). Receptors at CMTS include site workers, construction workers, in-holding residents, residents outside the facility boundary to the south, and recreational users. The CSM for the LSU FETI indicates which specific receptors could potentially be exposed to PFAS.

6.1 AOI 1 - LSU FETI

Based on the documented current formulation and unknown earlier formulations of Fomtec used at LSU FETI before 2013 (when it was replaced with Micro Blaze Out), potential releases of AFFF to soil, surface water, sediment and groundwater may have occurred at the LSU FETI between 2007 and 2013. The area surrounding the AOI is well-vegetated minimizing fugitive dust emissions; however, ground-disturbing activities at the AOI could result in site and construction worker exposure to potential PFAS contamination via inhalation of dust or ingestion of soil or shallow groundwater.

In their anionic forms, PFAS are water soluble and can migrate readily from soil to groundwater or surface water via leaching and run-off. Given the length of time since the AFFF release and the average precipitation at the facility, it is possible that potential PFAS contamination at the LSU FETI AOI has migrated from the soil and surface water impoundment via over land surface water flow and into the groundwater via infiltration. Caney Branch lies west of the CACTF and drains this AOI. From the LSU FETI AOI, surface water primarily drains to the surface water impoundment. Minor drainage may flow north or south to nearby tributaries of Caney Branch which flow west to intercept Caney Branch. Caney Branch flows south, then east, eventually discharging to Lake Bistineau. Therefore, potentially complete exposure pathways for surface water and sediment via ingestion exist for site and construction workers, residents, and recreational users of Caney Branch and associated surface water bodies such as Lake Bistineau (e.g., fishing).

Previous investigations completed at CMTS indicate that infiltrating precipitation entering the shallow groundwater system discharges to surface water bodies (i.e., Caney Branch on the western portion of CMTS and Boone Creek on the central and eastern portions of CMTS). However, a small fraction of infiltrating precipitation may enter a deeper groundwater flow system. Precipitation which infiltrates and reaches deeper groundwater may bypass streams and be intercepted by on-Post wells and downgradient public and private residential wells in the Doyline area. Therefore, due to the existence of nearby drinking water wells and the comingling of surface water and groundwater in the vicinity of Camp Minden, a potentially complete pathway for groundwater exists via ingestion for all receptors (site and construction workers, residents and recreational users) (URS, 2017).

The CSM for the LSU FETI AOI is shown on **Figure 6-2**.

CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Camp Minden, LA			
REVISED	12/11/2018	GIS BY	MS	12/11/2018
SCALE	1:3,000	CHK BY	SS	12/11/2018
Base Map: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan,		PM	RG	12/11/2018

Legend

- Area of Interest
- Potential PFAS Release
- No Suspected Release
- Facility Boundary
- Water Body
- River/Stream
- Surface Water Flow Direction
- Inferred Groundwater Flow Direction

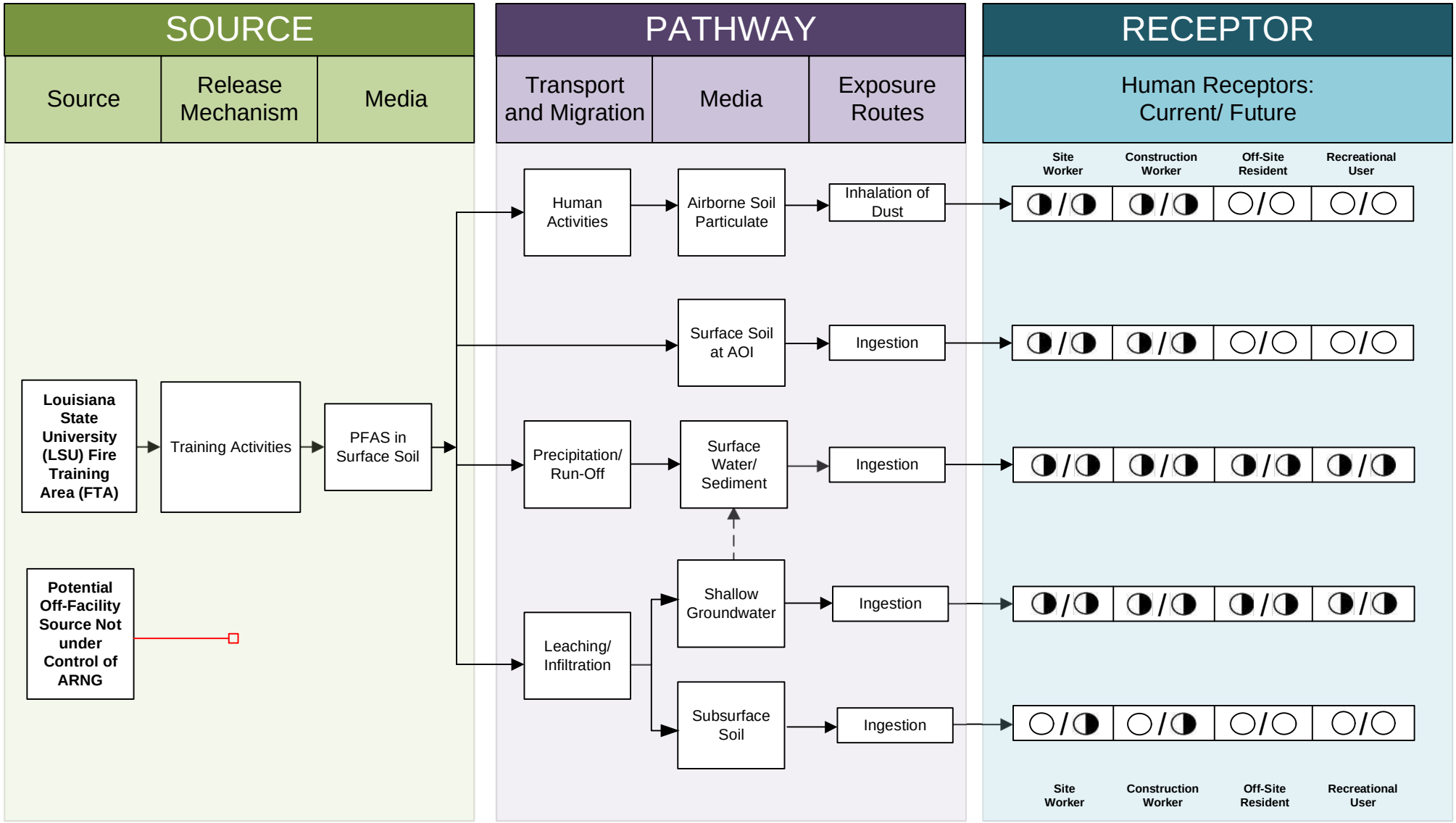
N

Area of Interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-1

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\LA\Minden\Fig_6-1_Minden_AOI.mxd



LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Complete Pathway

Figure 6-2
Conceptual Site Model
Camp Minden Training Site

7. Conclusions

One AOI related to PFAS releases was identified at CMTS, specifically the LSU FETI (**Figure 7-1**).

7.1 Findings

Based on potential AFFF releases at the LSU FETI AOI, there is potential for exposure to PFAS contamination in soil, surface water, sediment and groundwater: via ingestion and inhalation by site workers, construction workers and visitors; via ingestion by offsite residents using groundwater for drinking water; and, via ingestion by recreational users of surface water. No evidence of other accidental or incidental spills or leaks from AFFF storage containers/areas were identified during the VSI. No other areas at CMTS were identified to have historically stored or used AFFF.

Sampling of the three installation potable water wells for PFAS compounds was conducted by the ARNG in April 2017. With one exception, no detections were reported in the sample results. The exception was 6:2 FTS which was detected in Well 22 at an estimated concentration of 5.72 NG/L. The laboratory qualified the result with a “J” flag because the detected concentration is less than the method reporting limit. This compound is included in the EPA Method 537 suite. Due to its unknown toxicity, a screening level has not been developed for this compound.

7.2 Uncertainties

Available 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, or 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. Sometimes the provided information was incomplete. 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 (1969 to present), 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 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 storage of PFAS were reviewed, current personnel were interviewed and potential source areas were visually inspected.

The following table summarizes the uncertainties associated with the PA:

Area of Interest	Source of Uncertainty
AOI 1	LSU FETI staff does not have information regarding previous formulations of AFFF used at the facility. The quantity of AFFF used in fire training exercises was not known, nor were drawings of piping conveying fluids away from the mock AST farm available. The PA relied on the recollections of interviewed personnel. Input was not received from all CMTS tenants.

7.3 Potential Future Actions

Based on the documented absence (2007-present) of the release of PFAS-containing materials at the LSU FETI warehouse and offices on CMTS, evidence does not indicate that current or former LSU FETI activities contributed PFAS contamination to soil, groundwater, surface water, or sediment at the LSU FETI warehouse and offices. LSU FETI warehouse and offices will not move forward in the CERCLA process.

Interviews (covering 2007 to present) indicate that former LSU FETI activities may have resulted in potential PFAS releases at the LSU FETI FTA AOI identified during the PA. Based on the CSM developed for the AOI, there is potential for receptors to be exposed to PFAS contamination in soil, groundwater, surface water, and sediment at 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).

ARNG evaluates the need for an SI at the LSU FETI FTA at CMTS based on the presence of a PFAS release, possible receptors, and the migration potential of PFAS contamination to receptors.

Table 7-1 PA Findings Summary

Area of Interest	AOI Location	Rationale	Potential Future Action
AOI 1: LSU FETI FTA	32°32'18.31"N and 93°26'13.14"W	Fire training at LSU FETI began in 2007 and occurs three to four times per year. A one percent solution of Fomtec was used from 2007 to 2013; however, it is unknown whether the product used at that time contained PFAS.	Proceed to an SI, focus on soil, groundwater, surface water and sediment.

CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Camp Minden, LA			
REVISED	12/11/2018	GIS BY	MS	12/11/2018
SCALE	1:3,000	CHK BY	SS	12/11/2018
Base Map: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan,		PM	RG	12/11/2018

Legend

- Area of Interest
- Potential PFAS Release
- No Suspected Release
- Facility Boundary
- Water Body
- River/Stream

N

Summary of PA Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 7-1

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\LA\Minden\Fig_7-1_Minden_Summary.mxd

8. References

Louisiana Army Ammunition Plant (LAAP). 2001. Installation Action Plan for Louisiana Army Ammunition Plant. March 2001.

LAAP. 2004a. Finding of Suitability for Transfer for the Former Louisiana Army Ammunition Plant. September.

LAAP. 2004b. Finding of Suitability for Early Transfer. For the Former Louisiana Army Ammunition Plant. December.

National Ground Water Association. 2018. *Groundwater and PFAS: State of Knowledge and Practice*. January 2018.

Shaw Environmental, Inc. 2005. Follow-on Remedial Investigation for Soils and the Site-wide Ground Water Operable Unit, prepared for U.S. Army Environmental Center, September.

URS. 2016. Final Five Year Reviews Camp Minden: Fifth Five Year Review OU-001, OU-002, OU-004, OU 005 and OU-007; Third Five-Year Review OU-008; Second Five Year Review OU 009 and OU-010; First Five Year Review OU-011, prepared for U.S. Army National Guard and U.S. Army Corps of Engineers. August.

URS. 2017. Data Summary Report, Groundwater and Surface Water Sampling, Camp Minden LA, prepared for U.S. Army National Guard and U.S. Army Corps of Engineers. May.

U.S. Climate Data. 2017. Minden, LA, https://www.usclimatedata.com/climate/minden/louisiana, accessed 22 September 2017.

U.S. Environmental Protection Agency (USEPA). 1991. *Guidance for Performing Preliminary Assessments under CERCLA.* September.

Appendix A
Data Resources

Data resources will be provided separately on CD. Data resources for Camp Minden Training Site include:

Camp Minden Leases and Agreements

- Cooperative Agreement and Amendment - Pine Country Education Center District and The Louisiana Military Department
- Memorandum of Understanding – Louisiana State University Fire and Emergency Training Institute and Pine Country Education District

Camp Minden PFAS Release Information

- Fomtec Data Sheet
- Fomtec Updated Fact Sheet

Camp Minden In Holding Well Sampling Results

- 11August2017 Well Sample Results

STATE OF LOUISIANA
PARISH OF WEBSTER

AMENDMENT TO
COOPERATIVE AGREEMENT

NOW BEFORE ME, the undersigned authority, a Notary Public, duly commissioned and qualified within our State and Parishes came and appeared:

The PINE COUNTRY EDUCATION CENTER DISTRICT, a political subdivision of the State of Louisiana, herein represented by its Chairman, R. O. Machen, Jr. acting with full Authority and approval of the Board of Commissioners;

and

The LOUISIANA MILITARY DEPARTMENT, appearing herein through its authorized representative , COL Lester R. Schmidt; State Contracting Officer, whose mailing address is Louisiana Military Department, Camp Beauregard, Building 718, Pineville, LA 71360-3737 who did enter into this Cooperative Agreement as follows:

Pursuant to Louisiana law, including but not limited to, Louisiana Constitution, Article VII, Section 14(C), Louisiana R.S 33:1321 et. seg, and Louisiana R.S. 29:33(B), the parties enter into this Cooperative Agreement for a public purpose for the mutual benefit of all parties and the public at large.

The parties do herby agree to amend the original Cooperative Agreement executed by Louisiana Military Department on October 10, 2002, and filed in the Conveyance Records of the Office of the Clerk of Court of Webster Parish, Louisiana, on October 15, 2002, under Registry Number 45837. Said original agreement provided that the Louisiana Military Department agreed to lease to Pine Country Education Center District (PCECD) 30.88 acres in Section 19, Township 18 North, Range 10 West, Webster Parish, on the Louisiana Army Ammunition Plant (LAAP).

The purpose of this agreement is to amend the original lease so as to add three additional buildings known and identified as Buildings 636, 650 and 607. Also, to set forth an agreement for PCECD to provide fire protection support as needed at Camp Minden, fire fighting training, and fire protection equipment excess to PCEC District needs to the Louisiana Military Department's personnel who have been assigned the duty of fire protection for Camp Minden (formerly Louisiana Army Ammunition Plant).

PCECD will abide by standard procedures at Camp Minden to enter and exit the facility. The Louisiana Military Department (LMD) will properly maintain the infrastructure for providing utilities to PCECD in Area M-1. The specific requirements for utilities is as follows:

Electricity/Gas: LMD agrees to maintain the infrastructure in a state of readiness and repair to permit uninterrupted service by PCEC of electricity. Electricity fees will be metered usage at the actual local utility supplier rates. Installation of meters will be at the expense of PCEC. In the event that Camp Minden's electrical distribution system is sold or conveyed to the local electricity supplier, this service will be contracted

directly between the PCEC and the supplier. Gas (if needed) will be contracted directly between PCEC and Supplier.

Telephone. PCEC will contract directly with a private provider.

Sewage and Water. The LMD shall provide and maintain the sewage and water system such that is adequate to accommodate PCEC's operations. Sewer system and water use will be charged at a flat rate of $50 per month each. In the event that Camp Minden's sewage and water systems are sold or conveyed to another supplier, these services will be contracted directly between the PCEC and the supplier.

Otherwise, this said amendment is subject to all of the terms of the original Cooperative Agreement.

THUS DONE AND SIGNED on this the 18th day of October, 2005.

By: COL Lester W. Schmidt,
State Contracting Officer

LOUISIANA MILITARY DEPARTMENT

By: R. C. Machen, Jr.,
Chairman

PINE COUNTRY EDUCATION CENTER DISTRICT

WITNESSES:

NOTARY PUBLIC:

DON E. SAYERS
NOTARY PUBLIC, WEBSTER PARISH
LOUISIANA ID No. 005849
MY COMMISSION IS FOR LIFE

SENTELL LAW FIRM, L.L.C.

Sherburne Sentell, Jr.
Sherburne "Sherb" Sentell, III

Sentell Building
111 North Monroe Street
P. O. Box 875
Minden, LA 71058-0875

Phone (318) 377-0123
Fax (318) 377-0124

October 22, 2002

LOUISIANA MILITARY DEPARTMENT
Attention: COL Lester R. Schmidt
Building 223, Jackson Barracks
New Orleans, LA 70146-0330

In Re: Cooperative Agreement between Pine Country Education Center District and the Louisiana Military Department.

Dear COL Schmidt:

Enclosed please find a certified copy of the Cooperative Agreement between the Pine Country Education Center District and the Louisiana Military Department which was filed on October 15, 2002 under Registry Number 456437 at Book 943 Page 310 of the Conveyance records of Webster Parish. On behalf of the District, I want to thank the Louisiana National Guard and the Louisiana Military Department for their assistance in helping us to establish what we believe will be, among other things, a state of the art fire fighting training facility. We believe that having this fire fighting training facility located on the Louisiana Army Ammunition Plant will serve as a mutual benefit to all parties.

Once again, thank you for your assistance. With best regards, I am

Very truly yours,

Sherb Sentell

C. Sherburne Sentell, III

CSSIII/tb
Enclosure

cc: LTC Thompson
R. O. Machen, Jr.

REGISTRY NO.
456437

SUELLINA S. FRAZIER
CLERK OF COURT
WEBSTER PARISH, LA
02 OCT 15 PM 2:27
MARLO F. JACKSON
DEPUTY CLERK

STATE OF LOUISIANA

PARISH OF WEBSTER

COOPERATIVE AGREEMENT

NOW BEFORE ME, the undersigned authority, a Notary Public, duly commissioned and qualified within our State and Parishes came and appeared:

> The **PINE COUNTRY EDUCATION CENTER DISTRICT**, a political subdivision of the State of Louisiana, herein represented by its Chairman, R. O. Machen, Jr., acting with full authority and approval of the Board of Commissioners;
>
> and
>
> The **LOUISIANA MILITARY DEPARTMENT**, appearing herein through its authorized representative, COL Lester R. Schmidt, whose mailing address is Building 223, Jackson Barracks, New Orleans, LA 70146-0330,

who did enter into this Cooperative Agreement as follows:

Pursuant to Louisiana law, including but not limited to, Louisiana Constitution, Article VII, Section 14(C), Louisiana R.S. 33:1321 et seq, and Louisiana R.S. 29:33(B), the parties enter into this Cooperative Agreement for a public purpose for the mutual benefit of all parties and the public at large.

The Cooperative Agreement between the parties is as follows:

(1) The **Louisiana Military Department** hereby agrees to lease to the **Pine Country Education Center District** the following described property:

> A 30.88 acre, more or less tract of land located in Section 19, Township 18 North, Range 10 West, Louisiana Army Ammunition Plant (LAAP), Webster Parish, Louisiana, more particularly described as follows:
>
> Commencing at a 3/8" iron rod located at the intersection of the centerline of Dutch Harbor Road and the entrance gate to Area M-1/M-4, LAAP, Webster Parish, Louisiana, and run South 2093.68 feet; thence run East 741.68 feet to a set 5/8" iron rod on the East right of way of a road for the point of beginning; thence continue East 1507.57 feet to a set 5/8" iron rod; thence run South 842.81 feet to a set 5/8" iron rod on the North right of way of a railroad; thence run South 85 degrees 50 minutes 38 seconds West 1069.97 feet along said North right of way to the East right of way of a service spur; thence run South 88 degrees 06 minutes 33 seconds West 30.85 feet along said right of way; thence run North 88 degrees 14 minutes 17 seconds West 45.93 feet along said right of way; thence run North 85 degrees 56 minutes 41 seconds West 50.15 feet along said right of way; thence run North 82 degrees 09 minutes 21 seconds West 45.98 feet along said right of way; thence run North 76 degrees 24 minutes 21 seconds West 43.44 feet along said right of

way; thence run North 71 degrees 22 minutes 40 seconds West 49.04 feet along said right of way; thence run North 64 degrees 34 minutes 38 seconds West 41.98 feet along said right of way; thence run North 62 degrees 14 minutes 12 seconds West 49.39 feet along said right of way; thence run North 56 degrees 08 minutes 33 seconds West 38.58 feet along said right of way; thence run North 52 degrees 11 minutes 12 seconds West 46.40 feet along said right of way; thence run North 47 degrees 48 minutes 46 seconds West 48.05 feet along said right of way; thence run North 42 degrees 49 minutes 12 seconds West 42.91 feet along said right of way; thence run North 36 degrees 06 minutes 46 seconds West 43.64 feet along said right of way; thence run North 31 degrees 53 minutes 21 seconds West 48.66 feet along said right of way; thence run North 28 degrees 10 minutes 12 seconds West 44.58 feet along said right of way; thence run North 22 degrees 20 minutes 53 seconds West 42.21 feet along said right of way; thence run North 19 degrees, 47 minutes 43 seconds West 45.06 feet along said right of way; thence run North 20 degrees 04 minutes 23 seconds West 48.21 feet along said right of way to a set 5/8" iron rod on the South right of way of a road; thence run North 71 degrees 39 minutes 03 seconds East 34.40 feet along said South right of way to the PC of a curve to the right having the following design criteria: Delta - 85 degrees 56 minutes 24 seconds, Radius - 278.25 feet, Tangent - 259.20 feet, and Length - 417.35 feet; thence run along said curve a chord bearing and distance of North 25 degrees 04 minutes 19 seconds East 393.56 feet along said right of way; thence run North 19 degrees 56 minutes 21 seconds West 127.30 feet along said right of way to the point of beginning, together with all improvements thereon and all rights thereunto belonging.

(2) The term of the lease shall be twenty-five (25) years. In addition, at the end of the twenty-five (25) year period, it is agreed that the **Pine Country Education Center District** can renew the lease under the same terms and conditions, at no additional cost, for an additional twenty-five (25) year period.

(3) The consideration for the above-described lease is the mutual desire of both parties to develop a firefighter training center on the said property and the invaluable assistance that the **Pine Country Education Center District** has previously provided to the **Louisiana Military Department**, as well as the mutual benefit that will be derived from both parties by having a state of the art firefighting training center located on land adjacent to land used by the **Louisiana Military Department**. Further consideration is the mutual benefit to both parties provided by having firefighting training services and an educational facility co-located on the property. The **Pine Country Education Center District** shall construct buildings and improvements on the above-described property and once constructed, those buildings and all improvements and the right to

use said buildings shall be owned by the **Pine Country Education Center District.**

(4) It is understood that during the term of this lease and any renewals the **Pine Country Education Center District** shall have full and unrestricted use of the above-described property and all buildings and improvements thereon and rights thereunto belonging. It is expressly understood that the **Pine Country Education Center District** may sublease the above-described property. The **Louisiana Military Department** warrants that it has good and merchantable title and/or rights to the above-described property and full and complete authority to enter into this agreement.

(5) This Cooperative Agreement will be published in the official journal of the Parish, pursuant to Louisiana R.S. 33:1325.

THUS DONE AND SIGNED on this the 4th day of September, 2002.

WITNESSES:

Rachel Pepper

Paula Foster

PINE COUNTRY EDUCATION CENTER DISTRICT

By: R. O. Machen, Jr., Chairman

NOTARY PUBLIC

STATE OF LOUISIANA

PARISH OF ORLEANS

THUS DONE AND SIGNED on this the 10th day of October, 2002.

WITNESSES:

LOUISIANA MILITARY DEPARTMENT

By: COL Lester R. Schmidt
Authorized Agent

William L. Stroud
NOTARY PUBLIC

STATE OF LOUISIANA
PARISH OF WEBSTER

I hereby certify this to be a full and true copy of an original instrument filed in my office on the date and hour and under the Registry Number stamped herein to be recorded in the Conveyance ✓ Mortgage ___ Chattal Mortgage ___ Records Bk 843 Pg 310

Given under my hand and seal of office on said date or filing.

SUELETHA S. FRAZIER
Clerk of Court
By: Marla Jackson
Deputy Clerk & Ex-Officio Recorder

WILLIAM L. STROUD
NOTARY PUBLIC
State of Louisiana
My Commission Is Issued For Life

MEMORANDUM OF UNDERSTANDING

Board of Supervisors of Louisiana State University and Agricultural and Mechanical College, acting herein on behalf of the **LSU FIRE AND EMERGENCY TRAINING INSTITUTE**, herein represented by its duly authorized official, whose mailing address is 330 Thomas Boyd Hall, Baton Rouge, Louisiana 70803 (hereinafter LSU) and **PINE COUNTRY EDUCATION DISTRICT**, a political Subdivision of the State of Louisiana pursuant to Louisiana R.S. 40:1551 located in Webster Parish, Louisiana, herein represented by its duly authorized Board of Commissioners and Chairman, whose mailing address is P.O. Box 875, Minden, Louisiana 71058-0875 (hereinafter PCEC),

Enter into this Memorandum of Understanding relating to the construction, use and maintenance of a fire training center, according to all terms, conditions and provisions set forth below to wit:

1. PCEC was established to provide a fire training center and coordinate such efforts with the Louisiana State University Fire and Emergency Training institute. Accordingly, PCEC does hereby agree to permit LSU to use at no cost the area and buildings designated as LSU FETI at Pine Country together with the training center under the terms, conditions, and provisions set forth in this Memorandum of Understanding.

2. LSU shall have and does hereby agree to the following obligations and provisions under this Memorandum of Understanding and for such receives state funding (currently $70,000) to operate LSU FETI at Pine Country:

    a) LSU shall be entitled to utilize LSU FETI at Pine Country for training career or volunteer fire departments in north Louisiana at no cost, charge or obligation to LSU.

    b) LSU shall schedule intended usage of LSU FETI at Pine Country in cooperation with PCEC in order to verify use of the facilities as intended.

    c) Each party hereto believes the entirety of LSU FETI at Pine Country facilities to be safe for use in any activities by LSU. Should any person suffer any damage, loss, expense, or injury relating to the use of LSU FETI at Pine Country while under the direct supervision of LSU, to the extent such damage, loss, expense or injury was due to the actions of LSU FETI, LSU agrees to fully indemnify and hold PCEC harmless for any claim arising which is or may be asserted against PCEC, including reasonable attorneys fees which may be incurred by PCEC in the defense of any such claim.

d) LSU agrees that its use and activities of LSU FETI at Pine Country will always be in accordance with the National Fire Codes.

e) LSU will be responsible for minor maintenance, utilities, and upkeep of classrooms, offices and training props.

f) PCEC will be responsible for major construction of buildings or training props.

g) This agreement is effective the date of the last signature hereto and may be terminated by either PCEC or LSU upon sixty (60) days prior notice to the other.

h) Except as otherwise provided by this Agreement, neither party grants to the other a license for the use of the name or emblem of the other without its express prior written approval.

i) This Agreement does not make any party the employee, agent or legal representative of the other party for any other purposes whatsoever. No party is granted any rights or authority to assume or to create any obligations or responsibility, express or implied, on behalf of or in the name of another party. In fulfilling its obligations pursuant to this Agreement, each party shall be acting as an independent contractor.

j) LSU represents that LSU has adequate liability insurance, such protection being applicable to LSU's officers, employees, and agents while acting within the scope of their employment by LSU. LSU has no liability insurance as such that extends protection to another person.

k) Notwithstanding any provision herein to the contrary, each party hereto agrees, to the extent allowed by law, to indemnify, defend, and hold the other, its officers, directors, agents, and employees harmless from and against any and all losses, liabilities, and claims, including reasonable attorney's fees to the extent they arise out of or result from the willful act, fault, omission, or negligence of the indemnifying party or of its employees, contractors, or agents in performing its obligations under this Agreement provided, however, that neither party hereto shall be liable to the other for any consequential damages arising out of its willful act, fault, omission, or negligence.

l) This Agreement constitutes the entire Agreement and understanding between the parties hereto and cancels, terminates, and supersedes any prior Agreement or understanding relating to the subject matter hereof between the parties. There are no representations, promises, licenses,

warranties, covenants, or undertakings other than those contained herein. None of the provisions of this Agreement may be waived or modified except expressly in writing signed by both parties.

WITNESS

Kanna M. Marquez

Kanna M. Marquez

Kimberly McCoy

Kimberly McCoy

Lynn Taylor

Stacy Pipitone

PINE COUNTRY EDUCATION DISTRICT

By: Ronald Romaker

Chairman

March 17, 2008

Date

BOARD OF SUPERVISORS OF
LOUISIANA STATE UNIVERSITY AND
AGRICULTURAL & MECHANICAL COLLEGE

By: Jerry Jr. Landry

Vice Chancellor for Finance and
Administrative Services

Date: 3/27/08

Fomtec® FFFP 3%

foam concentrate

Description

Fomtec FFFP 3% is a film forming fluoroprotein foam concentrate (FFFP) containing hydrolysed protein and preservatives, together with a blend of fluorinated surfactants to achieve the maximum synergistic effect. The blend of fluorochemicals selected is effective in reducing the surface tension of water as well as the interfacial tension between water and oil sufficiently low to give stable film on the surface of the fuel and as a result it gives fire extinguishing rates superior to those obtained with synthetic based compounds. Incorporation of protein in the formulation produces a thick visible blanket which has exceptional burnback resistance.
Fomtec FFFP 3% should be used as a 3% proportioned solution in fresh or sea water. The correct proportioning or mixture ratio is 3 parts of concentrate and 97 parts of water.

Application

Fomtec FFFP 3% is intended for use on B class hydrocarbon fuel fires such as oil, petroleum and aviation fuels. Fomtec FFFP 3% can be applied directly onto the fire surface and is also suitable for subsurface injection. It is compatible with all dry powders and can be used in dry powder/foam twin agent systems.

Fire Performance & Foaming

The fire performance of this product has been measured and documented according to "International Approvals" stated in this document. The foaming properties are depending on equipment used and other variables such as water and ambient temperatures. Average expansion 7:1, average ¼ drainage time 03:30 minutes using UNI 86 test nozzle.

Proportioning

Fomtec FFFP 3% can easily be proportioned at the correct dilution using conventional equipment such as:

- Inline inductors
- Balanced pressure, variable flow proportioning systems
- Bladder tanks
- Around the pump proportioning systems
- Water turbine driven foam proportioners
- Self inducting branch pipes and nozzles

The equipment should be designed to the foam type.

Compatibility

Contact one of the Fomtec sales team with questions.

Technical data

Appearance	Dark brownish liquid
Specific gravity at 20°C	1,17 +/- 0.01 g/ml
Viscosity at 20°C	≤ 30 mPas
pH	6,5 – 8,5
Freezing point	-15°C
Recommended storage temperature	-15 - 49°C
Suspended sediment (v/v)	Less than 0,2%
Surface tension	≤ 18,5 dynes/cm

Environmental impact

Fomtec FFFP 3% is formulated using raw materials specially selected for their fire performance and their environmental profile. Fomtec FFFP 3% is biodegradable. The handling of spills of concentrate or foam solutions should however be undertaken according to local regulations. Normally sewage systems can dispose foam solution based on this type of foam concentrate, but local sewage operators should be consulted in this respect. This product contains NO PFOS or PFOA.
Full details will be found in the Material Safety Datasheet (MSDS).

Storage / Shelf life

Stored in original unbroken packaging the product will have a long shelf life. Shelf life in excess of 10 years will be found in temperate climates. As with all foams, shelf life will be dependent on storage temperatures and conditions. If the product is frozen during storage or transport, thawing will render the product completely usable.
We recommend following our guidelines for storage and handling ensuring favourable storage conditions.

Packaging

We supply this product in 25 litre cans and 200 litre drums. We can also ship in 1000 litre containers or in bulk.

Litres per piece	Packaging	Part no
25 litres	Can	13-3029-01
200 litres	Drum	13-3029-02
1000 litres	Container	13-3029-04
Bulk	Special request	

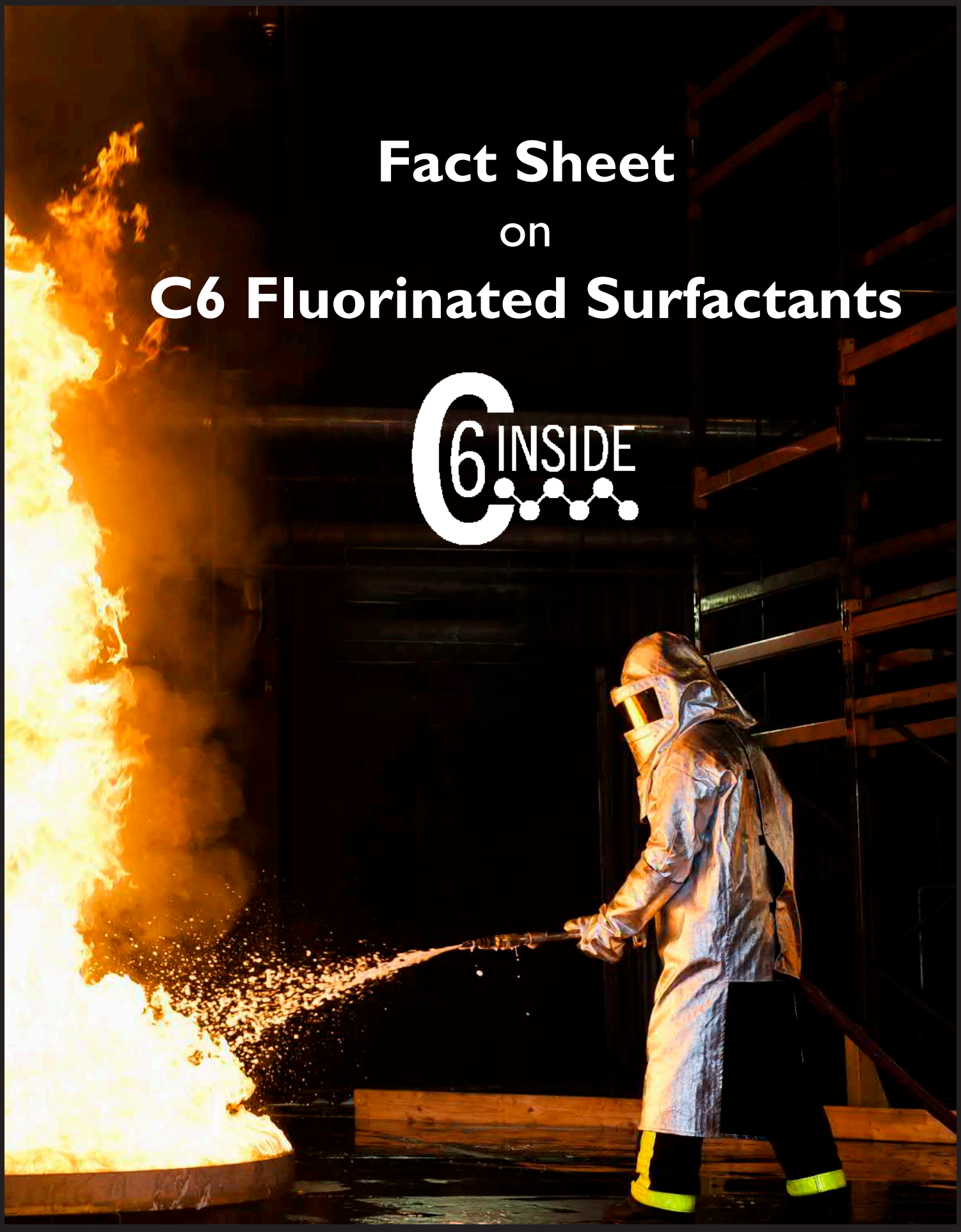
International Approvals

- EN 1568 part 3
- MED Module B
- IMO MSC/Circ.670
- GOST Approval, Russia

Revised: 04.05.2016

Fact Sheet
on
C6 Fluorinated Surfactants

C6 INSIDE



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fomtec
Fire Fighting Foams & Equipment

Fact Sheet on C6 Fluorinated Surfactants

More than a decade after 3M stopped production of PFOS-based AFFF agents; there is continued discussion within the fire protection industry on the environmental impact and efficacy of fire fighting foams. The discussion of environmental impact is usually focused on foams that contain fluorochemicals, while the discussion of efficacy is usually focused on foams that do not contain fluorochemicals. The first part of this fact sheet is in content and wording based on Fire Fighting Foam Coalitions fact sheet to provide you with accurate, up-to-date information about these issues. More information can be obtained from www.fffc.org. The last pages cover our own view point when it comes to efficiency and environmental friendliness of different foam types.

Key facts

- All modern AFFF agents (except some produced in China) contain telomer-based fluorosurfactants.
- Telomer-based AFFF agents are the most effective foams currently available to fight flammable liquid fires in military, industrial, aviation, and municipal applications. They provide rapid extinguishment, burnback resistance, and protection against vapour release.
- Fire test results presented at the 2011 SUPDET conference and 2013 Reebok conference showed that AFFF agents are significantly more effective at extinguishing flammable liquid fires than fluorine-free foams.
- Telomer-based foams **do not** contain or break down into PFOS (per fluorooctane sulfonate) or homologues of PFOS such as PFHxS (perfluorohexane sulfonate).
- Telomer-based foams **do not** contain or break down into any chemicals that are currently listed as persistent organic pollutants (POPs) under the Stockholm Convention.
- Telomer-based foams **are not** made with PFOA (perfluorooctanoic acid) or any PFOA-based products.
- Telomer-based foams **are not** made with any chemicals that are currently considered by environmental authorities to be persistent, bioaccumulative, and toxic (PBT).
- Telomer-based foams **are not** banned or restricted from use. We are aware of no pending legislation to regulate telomer-based foams in Australia, Canada, Europe, Japan, or the United States.
- The C6-based fluorosurfactants that have been the predominant fluorochemicals used in telomer-based AFFF for the last 25 years are low in toxicity and **not considered** to be bioaccumulative or biopersistent.
- Foam manufacturers are in the process of transitioning to the use of pure C6-based fluorosurfactants in response to the US EPA PFOA stewardship program.

Fluorinated Surfactants

All AFFF firefighting agents contain fluorinated surfactants (fluorosurfactants). They are key ingredients that provide AFFF with the required low surface tension (15 to 17 mN/m) and positive spreading coefficient that enables film formation on top of lighter fuels. It is this film formation capability that gives AFFF its name and its effectiveness against flammable liquid fires. The chemicals used to produce fluorosurfactants can be manufactured by different processes and have different chemical structures. The fluorosurfactants used in AFFF have historically been produced from fluorochemicals manufactured by two methods: electrochemical fluorination and telomerization. AFFF agents manufactured by 3M contain fluorosurfactants produced by electrochemical fluorination. All other AFFF agents contain fluorosurfactants produced by telomerization.

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PFOS

In 2002, 3M voluntarily stopped production of a number of products including AFFF agents because they contain and degrade into perfluorooctane sulfonate (PFOS). PFOS is considered by environmental authorities to be persistent, bioaccumulative and toxic (PBT). Regulations in the United States, Canada, European Union, Australia, and Japan act as a ban on new production of PFOS-based products including foams. These regulations do not currently restrict the use of existing stocks of PFOS-based foam in the US, Australia, or Japan. In the EU and Canada, existing stocks of PFOS-based foam must be removed from service in 2011 and 2013, respectively. Production and sale of PFOS foams continues in China.

Telomers

All modern AFFF agents (except some produced in China) contain telomer-based fluorosurfactants. Telomer-based AFFF agents do not contain or break down into PFOS and have about 30 - 60% less fluorine than PFOS-based AFFF. Telomer-based AFFF agents are not made with any chemicals that are currently considered by environmental authorities to be PBT. The US Environmental Protection Agency (EPA) has indicated that some telomer-based fluorochemicals can break down in the environment into perfluorooctanoic acid (PFOA) or other perfluorocarboxylic acids (PFCAs). Further, EPA states that their concern is focused on long-chain perfluorinated chemicals (LCPFCs) containing eight carbons or more (C8, C10, C12). Existing data shows that shorter-chain compounds (C6 and below) have a lower potential for toxicity and bioaccumulation.

EPA PFOA Stewardship Program

Under the EPA 2010/15 PFOA Stewardship Program eight fluorochemical manufacturers have voluntarily agreed to reduce by 95% by year-end 2010 and work to eliminate by year-end 2015 both plant emissions and product content of PFOA, PFOA precursors, and related higher homologue chemicals. EPA intends to propose a regulation in 2012 that would close any loopholes in the Stewardship Program such as treated article imports.

Efficacy

At the 2011 SUPDET Conference, the Naval Research Laboratories (NRL) presented the results of fire testing of AFFF agents and fluorine-free foam[1]. Although the testing was limited in scope, it provided clear evidence of the importance of film formation to foam performance. Extinguishment times for AFFF agents on 28 ft^2 (c:a 2.6 m^2) pool fires tested at full strength were on average 77% faster for gasoline, 88% faster for methyl cyclohexane (MCH), and 70% faster for heptane when compared to fluorine-free foam. For isooctane, where the tested AFFF agents were unable to form a film, fluorine-free foam extinguished the fire about 10% faster (Table 1). AFFF agents extinguished all gasoline and heptane fires in less than 30 seconds, the time required to pass the United States military specification (MilSpec). The fluorine-free foam was unable to extinguish any gasoline or heptane fire in less than 30 seconds. Foam agents must meet the requirements of the MilSpec in order to be listed on the US Department of Defence qualified products database (QPD) and used for military applications[2]. The Federal Aviation Administration (FAA) requires all US airports to carry AFFF agents that meet the MilSpec and are listed on the QPD[3].

Table 1: Extinction Times (seconds)

Foam Type	Heptane	Gasoline	MCH	Isooctane
AFFF (3%)	25	21	19, 20	32, 33
AFFF (6%)	23, 28	22	22, 23	32, 33
Fluorine-free (6%)	43	34, 41	33, 46	29, 30

Table 2: Spray Extinction Times (minutes)

Foam Type	Heptane	Gasoline	Jet A-1
AFFF (1%)	1:03	0:38	0:22
AR-AFFF 1x3	2:11	1:25	1:25
Fluorine-free (1%)	2:14	3:36	3:12
Fluorine-free (1%)	2:21	2:21	3:21
Fluorine-free (3%)	None	None	1:00

Table 3: Spray Pan out Extinction Times (seconds)

Foam Type	0.25 m^2	0.785 m^2	4.52 m^2	7.06 m^2
AFFF (1%)	0:35	1:19	2:16	2:06
Fluorine-free (1%)	0:50	1:55	2:21	None

In addition many national authorities outside of the US require the use of AFFF agents that meet the MilSpec, including the Australia Department of Defence. At the 2013 Reebok Foam Conference, a paper was presented by Manuel Acuna of VS Focum summarizing his company's development of a fluorine-free foam agent[4]. The presentation contained side-by-side test data done at the same facility under the same conditions comparing the fire performance of AFFF agents and fluorine-free foams. The results showed that AFFF agents performed significantly better than fluorine-free foams in spray extinction tests (0.785 m^2) and pan fires ranging in size from 0.25 m2 to 7.06 m^2 (Table 2 and 3).

Environmental Impact

The environmental impact of AFFF-type fluorosurfactants has been extensively studied and a large body of data is available in the peer-reviewed scientific literature. The bulk of this data continues to show that C6-based AFFF fluorosurfactants and their likely breakdown products are low in toxicity and not considered to be bioaccumulative or biopersistent. Groundwater monitoring studies have shown the predominant breakdown product of the short-chain C6 fluorosurfactants contained in telomer-based AFFF to be 6:2 fluorotelomer sulfonate (6:2 FTS)[5]. A broad range of existing data on 6:2 FTS indicate that it is not similar to PFOS in either its physical or ecotoxicologicalproperties[6,7,8,9]. Recent studies on AFFF fluorosurfactants likely to break down to 6:2 FTS show it to be generally low in acute, sub-chronic, and aquatic toxicity, and neither a genetic nor developmental toxicant. Both the AFFF fluorosurfactant and 6:2 FTS were significantly lower than PFOS when tested in bio-persistence screening studies that provide a relative measure of bio up-take and clearance[10]. Aerobic biodegradation studies of 6:2 FTS in activated sludge have been conducted to better understand its environmental fate[11]. These studies show that the rate of 6:2 FTS biotransformation was relatively slow and the yield of all stable transformation products was 19 times lower than 6:2 fluorotelomer alcohol (6:2 FTOH) in aerobic soil. In particular, it was shown that 6:2 FTS is not likely to be a major source of perfluorocarboxylic acids or polyfluorinated acids in wastewater treatment plants. Importantly neither 6:2 FTOH nor PFHpA (perfluoroheptanoic acid) were seen in this study. PFHxA is a possible breakdown product and contaminant that may be found in trace quantities in telomer based AFFF. Extensive data on PFHxA presented in 2006 and 2007 gave a very favourable initial toxicology (hazard) profile[12,13,14]. Testing was done on four major toxicology end points: sub-chronic toxicity in rats, reproductive toxicity in rats, developmental toxicity in rats, and genetic toxicity. Results show that PFHxA was neither a selective reproductive nor a selective developmental toxicant. In addition it was clearly shown to be neither genotoxic nor mutagenic. In 2011 results were published from a 24-month combined chronic toxicity and carcinogenicity study, which demonstrated that under the conditions of this study PFHxA is not carcinogenic in rats and its chronic toxicity was low[15].

Conclusions

Telomer-based AFFF agents are the most effective agents currently available to fight class B, flammable liquid fires. They do not contain or breakdown into PFOS and are not likely to be a significant source of long-chain perfluorochemicals. They do contain fluorosurfactants that are persistent, but are not generally considered to be environmental toxins. AFFF and fluorochemical manufacturers are in position to meet the goals of national stewardship programs with pure short-chain fluorosurfactants that provide the same fire protection characteristics with reduced environmental impacts.

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Our own experience

Dafo Fomtec has worked for many years developing both AFFF-type of foam concentrates as well as fluorine free types (FFF-types). In this work we have gained a lot of experiences on how these kinds of foam works – both regarding fire performance and environmentally aspects.

In our mind fire performance is paramount in order to save life, assets and environment. A fire is a very dangerous situation that can change from small and controllable to a huge uncontrolled firestorm within a blink of an eye. In a fire scenario people's life are at risk both civilians trapped in the flames and firefighters combating the fire. A fire is destroying assets for huge values – the longer the fire is

allowed to continue the higher the value is literarily spoken going up in smoke. Moreover, a fire is a heavy pollutant, unless it is a controlled fire where it is optimised to give a more or less full combustion at high temperatures – like a power plant where the chemical reaction yielding more or less water and carbon dioxide. I fire is on the contrary often going on with depletion of oxygen – incomplete combustion (pyrolysis) – and forms severe pollutants. Just a few examples, polycyclic aromatic hydrocarbons (i.e. benzopyren) that are mutagenic and carcinogenic are formed from incomplete combustion of organic materials. One of the most utilized plastics, PVC, is forming dioxins (to be more accurate: polychlorinated dibenzodioxin) when combusted – also a well know environmental pollutant. Hence, the longer a fire is ongoing, the more pollutants are formed – generating thick black smoke that spreads widely. It is also worth to point out that a lot of these pollutants are contaminating the run-off water used for extinguishing the fire. This is just another reason it is important to extinguish as fast as possible – to minimize run-off water that needs to be collected afterwards.

There has been a lot of focus on the environmental aspect of fluorine containing foam concentrates, like in AFFF-type and fluorine free foam concentrates. In literature we have seen commercials where firefighters are shooting flowers from their foam generators, plants are flourishing and are greener than ever. This is, however, to simplify things too much. It is not that simple, just taking out one component makes things environmentally friendly. As has been shown above, the new short chain fluorosurfactants have a very good environmental, health and safety profile. They and their breakdown products have been proven to be virtually non-toxic. They are not considered bioaccumulative or persistent. On the other hand they add incredible fire performance to a foam concentrate.

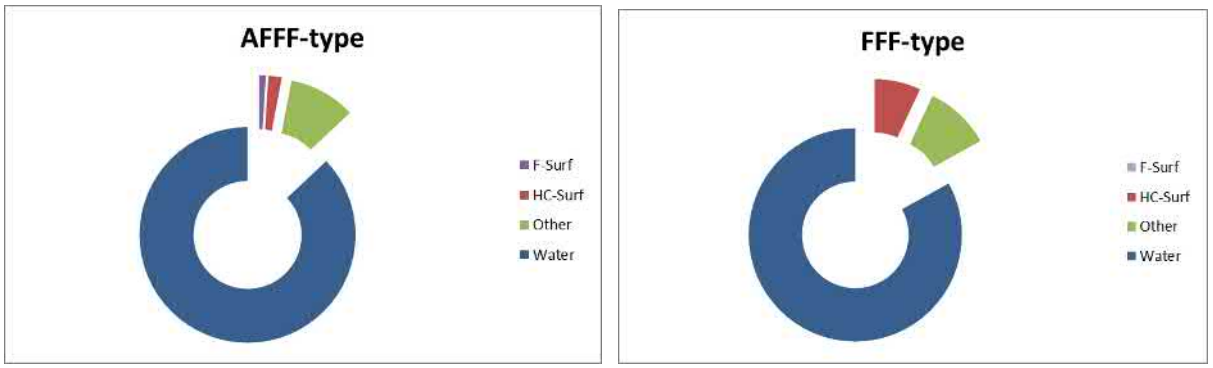

Figure 1 *The above diagrams represents the difference in composition between an average AFFF-type foam and a FFF-type of foam. The major part of the composition is water and just minor parts are surfactants. Note that the hydrocarbon surfactants are at a much higher level in the FFF-type compared to the AFFF-type.*

Looking at general representation of the compositions of the two foam types as concentrates in figure 1, there are three striking things to note (i) the major part is water, (ii) there are no fluorosurfactants present in the FFF-type of foam and (iii) the amount of hydrocarbon surfactant is a lot higher compared to an AFFF-type of foam. It is not possible to take away the fluorosurfactants without any kind of compensation to keep fire performance at a decent level.

However, this is in the concentrate, but this is not how it is used. It is diluted with water to a premix, and that changes the situation dramatically. In figure 2 below show the composition of the above foam types as premixes. Even though the additions are minute, they are crucial for the fire performance – for both types of foam.

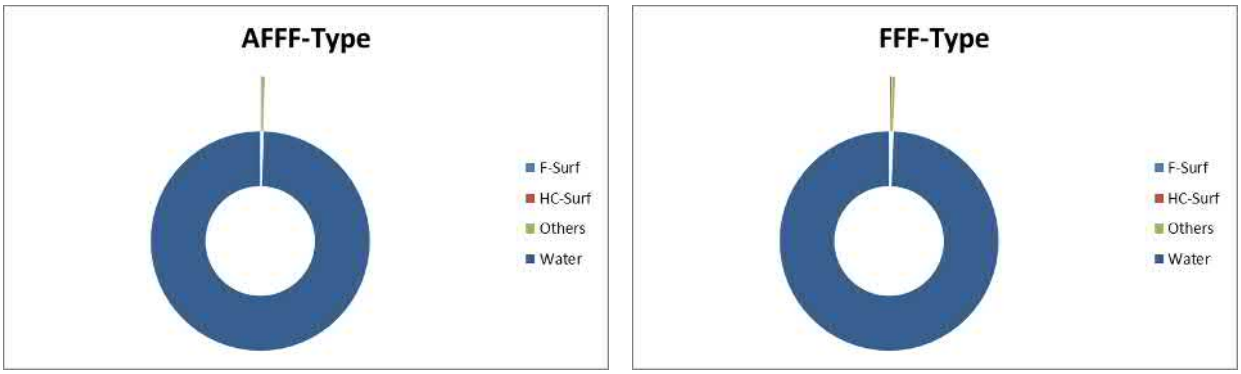

Figure 2 *The composition of a ready to use premix of water and foam concentrate. Note that all active ingredients are less than 1% of the composition.*

Fire performance

If we consider fire performance between the two types of foam our experience is the following. A good FFF-type of foam can pass the EN1568-3 test with good fire rating. Our Enviro 3x3 Ultra have Class IB, which means that it extinguish within three minutes and pass the burnback test with more than 15 minute. Looking at a good AFFF-type of foam we also achieve Class IB, but with one huge difference. In the former case the extinction is just at the end of the 3-minute mark but with the AFFF-type we extinguish within the first 1½ minute, more or less half the time. The burnback remains the same but the crucial part – fast and efficient extinguishment is a lot different.

A fire test according to UL 162 Type III is often conducted with two different foam qualities – one with low expansion around 4 and with higher expansion around 7. When we do a comparative test between an AFFF-foam and a FFF-foam, we see very clear differences between these at low foam qualities. A high performing AFFF-foam was tested at expansion ratio of 3.8 and application flow rate at 7.6 l/min during 3 min. application time. In this case, the extinction was reached after 2:14 min. The FFF-foam with expansion ratio of 4.3 using a flow rate of 11.4 l/min and application time during 5 min reached extinction after 3:24 min. From these results we can calculate how much foam premix is needed to reach extinction. The calculation gives that the AFFF needs 17.0 l premix while the FFF-needs 38.8 l, corresponding to 2.3 times more. When conducting burnback tests on these two foams, the AFFF passed without any problem. For the FFF-foam the situation was very different. When the burnback pipe was lifted, the fire spread along the edges of the pan and went successively into the pan and after about 1 min. the whole pan was re-engaged in fire.

The same test at higher expansion ratios around 7, we once again see differences In extinction performance. Using the same calculation method mentioned above, we can calculate that the FFF-foam needs 1.9 times more foam that the AFFF type. On the other hand, during burnback in this case the FFF-type self-extinguished the fire when the burnback pipe was lifted.

It is no doubt that FFF-type foams are good and they do pass the fire tests. However, again and again we see a difference in performance against a AFFF type. There is a factor of 2 in fire performance that appear time after time. Moreover, the results clearly imply that special care needs to be taken while selecting a FFF-foam for an existing application. It is not only to look at fire rating and fire performance but also consider if the foam suits the system when it comes to expected expansion. The question arises, how good are the FFF-foams on real big fires?

At the end this means that an AFFF-type of foam is about twice as fast as FFF-type in extinction. In a real situation this means that at least double amount of water and foam concentrate will be needed, resulting in a lot more of contaminated run-off water to collect that needs to be cleaned. This brings us in to the environmental discussion.

Environmental Impact

As have been demonstrated above the fluorosurfactants based on C6-telomers are not considered as toxic, bioaccumulative or persistent according to POP. There are not much that differ these surfactants from ordinary hydrocarbon surfactants in this respect. In fact, there are hydrocarbon surfactants that are a lot worse in this respect, not too far from PFOS – but these are surprisingly never discussed in this context. As an example of such hydrocarbon surfactant we can take ethoxylated nonylphenols. These types degrades to nonylphenol which is persistent, bioaccumulative and not biodegradable. But worst of all, nonylphenol is endocrine disruptor an mimics the hormone oestrogen causing feminization of organisms. It is worth to point out that nonylphenol surfactants are strongly restricted to be used in Europe but it is still possible to buy. Dafo Fomtec has never used such kind of surfactants.

As we have touched earlier FFF-foams are frequently marketed with highly exaggerated statements making the world a lot better place just because they are fluorine free. As we have seen, it is not necessarily giving the full picture. Real life is much more complicated than just the presence or not of one substance in a formulation. Instead of arguing about this, let's have a look at real figures regarding aquatic toxicity and see how this correlates to the components in the formulation. Data like this has been published in literature and we decided to do our own investigation where we can correlate the results to the components in the formulation. The aquatic toxicity was determined with Rainbow Trout at a independent lab. The foams selected were a high performing FFF-type, high performing ARC- and AFFF-types, an ordinary AFFF-type and a Class A type. The latter for class A fires for porous and fibrous materials.

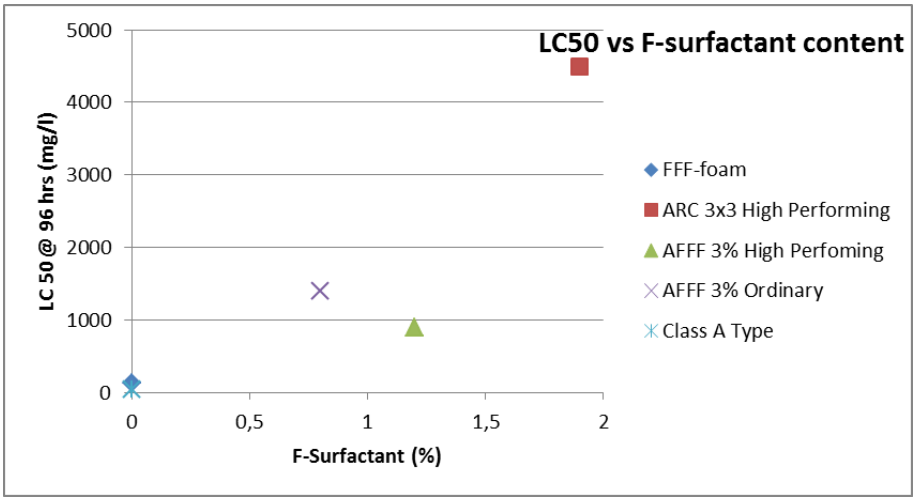

Figure 3 *Toxicity vs the concentration of fluorosurfactants in the formulations.*

In figure 3 the aquatic toxicity is shown as a function of the amount of fluorinated surfactants in the formulation. In order to interpret the results correctly it is important to know that a high value is better. Then one can add more of the substance before it affects an aquatic population. In this case

we measure the LC_{50}-value – which means the concentration (in mg/litre) needed to kill 50% of the population. As can be seen there are no correlation at all.

Figure 4 shows the aquatic toxicity plotted versus the concentration of hydrocarbon surfactants in the formulation. In this case we can see a very strong correlation between the aquatic toxicity and HC-surfactants. The more HC-surfactants that are present in the formulation the lower the value for aquatic toxicity. This indicates strongly that it is the hydrocarbon surfactants and not the fluorosurfactants that are responsible for the aquatic toxicity. Note that the one of the highest LC_{50}-values obtained was with a formulation containing the highest concentration of fluorosurfactants.

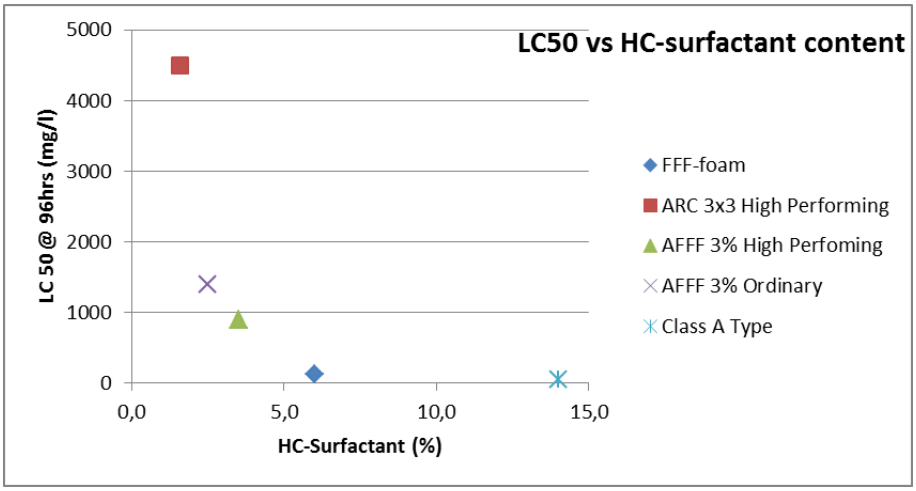

Figure 4 *Toxicity vs the concentration of hydrocarbon surfactants in the formulations.*

Conclusively, components that are always present in any formulation regardless if they are fluorine free or not are the most problematic ones regarding fish toxicity. These hydrocarbon surfactants are necessary in order to give the foam its main properties regarding expansion and drainage time. Hence, we cannot be without them. And as we discussed above, the FFF-type of foams (Class A foam is also fluorine free) have a lot higher concentration of HC-surfactants.

Remember, the LC_{50}-values presented above were on the foam concentrates as is. This is not how they are used. All concentrates are diluted with water to a premix that is the ready-to-use solution. Roughly, the concentrates are diluted 100 times. That means that we roughly can estimate the LC_{50}-value of the premixes from the values on the concentrates – simply speaking they will be about 100 times higher. This means that even the foam concentrate with the lowest LC_{50}-value will increase from around 40 mg/litre to 4000 making it ranked from slightly toxic to relatively harmless according the classification used world-wide, see table below.

Relative Toxicity	Aquatic EC50 or LC50 (mg/liter)
Super Toxic	< 0.01
Extremely Toxic	0.01 - 0.1
Highly Toxic	0.1 - 1.0
Moderately Toxic	1.0 - 10
Slightly Toxic	10 - 100
Practically Nontoxic	100 - 1000
Relatively Harmless	> 1000

This rises a relevant question, which LC_{50}-values shall be used? The values determined on the concentrates or the values of the premixes? It makes a huge difference on the assessment. Logically, it would be most relevant to use the values on the premixes since this is the intended formulation when used. The only reason to use the values on the concentrates itself is when there is an accidental release of the concentrate in nature and especially into a water system.

To wrap things up, we can summarize the fire performance and the environmental performance in a graph where we plot the different foam types with arbitrary units, see figure 5.

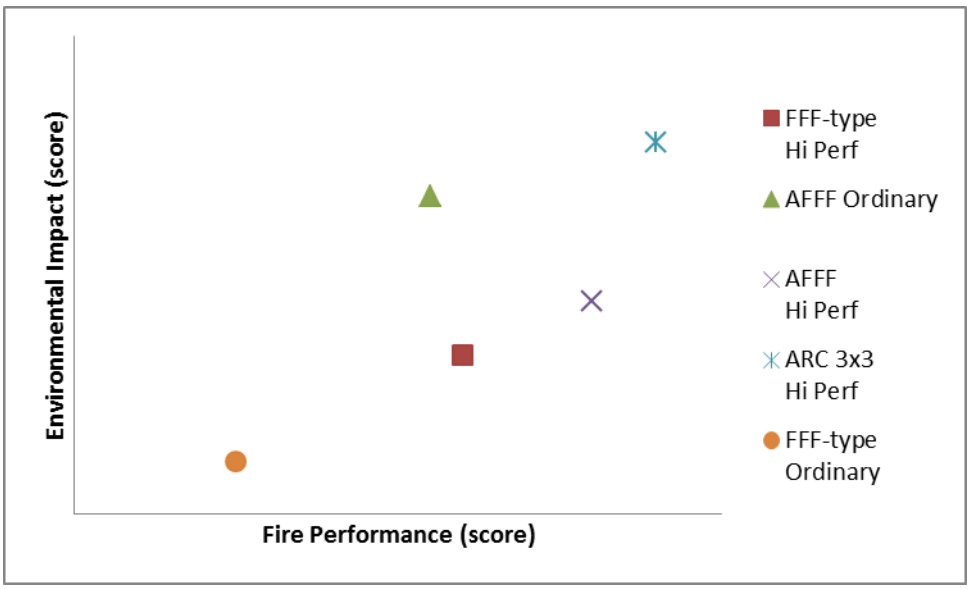

Figure 5 *Arbitrary plot of fire- and environmental performance for some selected foam types.*

This plot ranks all fluorosurfactants containing formulations higher than fluorine free formulations. This is based on LC50-values measured on the concentrates. If we instead look at LC50-values for premixes they will be on more or less the same level, about 100 times higher due to the dilution, and only fire performance will differ.

Dafo Fomtec Statement on Perfluorinated Surfactants

Perfluorinated surfactants are used in AFFF and AFFF-AR foam concentrates in order to decrease surface tension and ultimately give the foam film forming properties. In recent years the firefighting foam business has transformed their use of perfluorinated surfactants to use only C6 short-chain prepared by so called telomerization. This means that the perfluorinated surfactants do not contain any PFOS or any substances that can be degraded to PFOS. The telomerization process may in some cases yield in trace amounts of PFOA, but in very small amounts if any.

Dafo Fomtec AFFF and AFFF ARC foams are formulated using specially selected raw materials, selected for their fire performance and their environmental profile. Our AFFF and AFFF ARC foams contains only C6 short-chain fluorotelomers produced by the telomerization process.

Our AFFF and AFFF ARC foam concentrates formulated with C6 short-chain fluorinated surfactants have been tested by independent laboratories for PFOS and PFOA impurities. The results shows that the level of PFOS and PFOA in our foam concentrates are below the detection limit of 20 ppb of the analysis method. This means that these foam concentrates are in accordance with US EPA Stewardship Programme 2010/15, EU Directive 2006/122/EC and amended Council Directive 76/769/EEC and Commission Regulation 2017/1000 amending Annex XVII to Regulation (EC) No 1907/2006. They are also in compliance with the C6 purity compliant definition in the Queensland Department of Environmental and Heritage Protections Operational Policy on the Environmental Management of Firefighting Foam.

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Table A-1
Camp Minden Well Sampling Results - Supply Wells 4A, 18 and 22

SAMPLE ID #	SAMPLE COLLECTION DATE (DD/MMM/YY)	ANALYTE NAME	CONCENTRATION LEVEL	RESULT UNIT OF MEASUREMENT	MINIMUM REPORTABLE LEVEL	CLP FLAGS	ANALYTICAL METHOD	Notes
W-LA-MIND-001-12APR17	04/12/2017	6:2FTS	5.72	NG/L	9.42	J	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-DUP-12APR17	04/12/2017	6:2FTS		NG/L	9.66	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-002-12APR17	04/12/2017	6:2FTS		NG/L	9.57	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-003-12APR17	04/12/2017	6:2FTS		NG/L	10.2	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-003-12APR17	04/12/2017	8:2FTS		NG/L	10.2	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-002-12APR17	04/12/2017	8:2FTS		NG/L	9.57	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-DUP-12APR17	04/12/2017	8:2FTS		NG/L	9.66	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-001-12APR17	04/12/2017	8:2FTS		NG/L	9.42	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-001-12APR17	04/12/2017	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)		NG/L	14.1	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-DUP-12APR17	04/12/2017	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)		NG/L	14.5	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-002-12APR17	04/12/2017	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)		NG/L	14.4	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-003-12APR17	04/12/2017	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)		NG/L	15.3	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-003-12APR17	04/12/2017	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)		NG/L	15.3	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-002-12APR17	04/12/2017	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)		NG/L	14.4	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-DUP-12APR17	04/12/2017	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)		NG/L	14.5	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-001-12APR17	04/12/2017	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)		NG/L	14.1	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-001-12APR17	04/12/2017	Perfluorooctanoic acid (PFOA)		NG/L	1.88	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluorooctanoic acid (PFOA)		NG/L	1.93	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-002-12APR17	04/12/2017	Perfluorooctanoic acid (PFOA)		NG/L	1.91	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-003-12APR17	04/12/2017	Perfluorooctanoic acid (PFOA)		NG/L	2.04	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-003-12APR17	04/12/2017	Perfluorobutanesulfonic acid (PFBS)		NG/L	2.04	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-002-12APR17	04/12/2017	Perfluorobutanesulfonic acid (PFBS)		NG/L	1.91	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluorobutanesulfonic acid (PFBS)		NG/L	1.93	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-001-12APR17	04/12/2017	Perfluorobutanesulfonic acid (PFBS)		NG/L	1.88	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-001-12APR17	04/12/2017	Perfluorobutanoic acid (PFBA)		NG/L	0.942	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluorobutanoic acid (PFBA)		NG/L	0.966	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-002-12APR17	04/12/2017	Perfluorobutanoic acid (PFBA)		NG/L	0.957	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-003-12APR17	04/12/2017	Perfluorobutanoic acid (PFBA)		NG/L	1.02	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-003-12APR17	04/12/2017	Perfluorodecanoic acid (PFDA)		NG/L	1.02	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-002-12APR17	04/12/2017	Perfluorodecanoic acid (PFDA)		NG/L	0.957	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluorodecanoic acid (PFDA)		NG/L	0.966	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-001-12APR17	04/12/2017	Perfluorodecanoic acid (PFDA)		NG/L	0.942	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-001-12APR17	04/12/2017	Perfluorododecanoic acid (PFDoA)		NG/L	1.88	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluorododecanoic acid (PFDoA)		NG/L	1.93	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-002-12APR17	04/12/2017	Perfluorododecanoic acid (PFDoA)		NG/L	1.91	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-003-12APR17	04/12/2017	Perfluorododecanoic acid (PFDoA)		NG/L	2.04	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-003-12APR17	04/12/2017	Perfluoroheptanoic acid (PFHpA)		NG/L	2.04	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-002-12APR17	04/12/2017	Perfluoroheptanoic acid (PFHpA)		NG/L	1.91	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluoroheptanoic acid (PFHpA)		NG/L	1.93	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-001-12APR17	04/12/2017	Perfluoroheptanoic acid (PFHpA)		NG/L	1.88	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-001-12APR17	04/12/2017	Perfluorohexanesulfonic acid (PFHxS)		NG/L	1.88	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluorohexanesulfonic acid (PFHxS)		NG/L	1.93	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-002-12APR17	04/12/2017	Perfluorohexanesulfonic acid (PFHxS)		NG/L	1.91	U	537	Sample Time: 0930 From Spigot Water Well 18

Table A-1
Camp Minden Well Sampling Results - Supply Wells 4A, 18 and 22

W-LA-MIND-003-12APR17	04/12/2017	Perfluorohexanesulfonic acid (PFHxS)	NG/L	2.04	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-003-12APR17	04/12/2017	Perfluorohexanoic acid (PFHxA)	NG/L	2.04	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-002-12APR17	04/12/2017	Perfluorohexanoic acid (PFHxA)	NG/L	1.91	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluorohexanoic acid (PFHxA)	NG/L	1.93	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-001-12APR17	04/12/2017	Perfluorohexanoic acid (PFHxA)	NG/L	1.88	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-001-12APR17	04/12/2017	Perfluorononanoic acid (PFNA)	NG/L	1.88	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluorononanoic acid (PFNA)	NG/L	1.93	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-002-12APR17	04/12/2017	Perfluorononanoic acid (PFNA)	NG/L	1.91	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-003-12APR17	04/12/2017	Perfluorononanoic acid (PFNA)	NG/L	2.04	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-003-12APR17	04/12/2017	Perfluorooctanesulfonic acid (PFOS)	NG/L	3.05	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-002-12APR17	04/12/2017	Perfluorooctanesulfonic acid (PFOS)	NG/L	2.87	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluorooctanesulfonic acid (PFOS)	NG/L	2.90	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-001-12APR17	04/12/2017	Perfluorooctanesulfonic acid (PFOS)	NG/L	2.83	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-001-12APR17	04/12/2017	Perfluoropentanoic acid (PFPeA)	NG/L	1.88	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluoropentanoic acid (PFPeA)	NG/L	1.93	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-002-12APR17	04/12/2017	Perfluoropentanoic acid (PFPeA)	NG/L	1.91	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-003-12APR17	04/12/2017	Perfluoropentanoic acid (PFPeA)	NG/L	2.04	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-003-12APR17	04/12/2017	Perfluorotetradecanoic acid (PFTeA)	NG/L	1.02	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-002-12APR17	04/12/2017	Perfluorotetradecanoic acid (PFTeA)	NG/L	0.957	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluorotetradecanoic acid (PFTeA)	NG/L	0.966	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-001-12APR17	04/12/2017	Perfluorotetradecanoic acid (PFTeA)	NG/L	0.942	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-001-12APR17	04/12/2017	Perfluorotridecanoic Acid (PFTriA)	NG/L	1.88	U	537	Sample Time: 0905 From Spigot Water Well 22
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluorotridecanoic Acid (PFTriA)	NG/L	1.93	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-002-12APR17	04/12/2017	Perfluorotridecanoic Acid (PFTriA)	NG/L	1.91	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-003-12APR17	04/12/2017	Perfluorotridecanoic Acid (PFTriA)	NG/L	2.04	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-003-12APR17	04/12/2017	Perfluoroundecanoic acid (PFUnA)	NG/L	2.04	U	537	Sample Time: 0950 From Spigot Water Well 4A MS/MSD
W-LA-MIND-002-12APR17	04/12/2017	Perfluoroundecanoic acid (PFUnA)	NG/L	1.91	U	537	Sample Time: 0930 From Spigot Water Well 18
W-LA-MIND-DUP-12APR17	04/12/2017	Perfluoroundecanoic acid (PFUnA)	NG/L	1.93	U	537	Sample Time: 0935 From Spigot Water Well 18 Duplicate sample
W-LA-MIND-001-12APR17	04/12/2017	Perfluoroundecanoic acid (PFUnA)	NG/L	1.88	U	537	Sample Time: 0905 From Spigot Water Well 22

NG/L = Nanograms per liter
J = estimated concentration
U = undetected
FTS = 6:2 fluorotelomer sulfonate

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire - Environmental Manager

Facility: CMTS
Interviewer: Packer/Stinger
Date/Time: 10 Apr 2018

Interviewee: Doyle Williams **Title:** Retired Environmental Manager/LAAP Safety Officer **Phone Number:** **Email:**	Can your name/role be used in the PA Report? Y Can you recommend anyone we can interview? N

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

Retired Environmental Manager for Army Environmental Command (2005-2008)
Former LAAP Safety Officer (1969-2005)

2. Where can I find previous facility ownership information?

Records available

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.

No history of PFAS use at LAAP. It may have been stored on Parish Fire Department trucks but never used at LAAP/CMTS. PFAS-containing materials were never used in LAAP plating operations.

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

Records available

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?

Fire suppression systems in plant buildings used high speed water deluge systems to protect workers for egress during emergency. Nozzle testing used food coloring diluted with water.

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?

No

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

AFFF not used at LAAP/CMTS.
All LAAP records were archived, current location unknown.

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)?

N/A

PA Interview Questionnaire - Environmental Manager

Facility: CMTS
Interviewer: Packer/Stinger
Date/Time: 10 Apr 2018

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? N/A
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? N/A
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. 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 history of AFFF use at LAAP.
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? History of building explosions, foam not used during responses: 1968: light switch open, 1 fatality 2005/2006: After LAAP shutdown, Explo tenant had explosion at E-Line. The vendor was reclaiming TNT on AMC contract. Criminal negligence charges were filed. A series of explosions over 1-2 hours occurred. No injuries resulted.

PA Interview Questionnaire - Environmental Manager

Facility: CMTS
Interviewer: Packer/Stinger
Date/Time: 10 Apr 2018

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?

No records, no use or storage of AFFF at CMTS. All fire responses used water.

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?

No specific knowledge

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)?

No

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

No

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?

Multiple studies conducted for LAAP under CERCLA available in Administrative Record.

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

See above

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?

Yes plating conducted at Y-Line during LAAP operations. No use of AFFF/PFAS during those operations.

PA Interview Questionnaire - Environmental Manager

Facility: CMTS
Interviewer: Packer/Stinger
Date/Time: 10 Apr 2018

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.? See above
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? N/A
26. Do you recommend anyone else we can interview? If so, do you have contact information for them? No

PA Interview Questionnaire – Fire Station

Facility: CMTS
Interviewer: Packer/Stinger
Date/Time: 10 Apr 2018

Interviewee: Robert Roe **Title:** Chief Bossier Parish Fire Department **Phone Number:** 318.949.9440 **Email:** rroe@bpfd1.org	Can your name/role be used in the PA Report? Y Can you recommend anyone we can interview? N _____

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

Chief for 3 years. Administrator of separate Fire District for prior 10 years. Minden had full time Fire Department prior to ~2007 when LA ARNG took control of the installation Bossier Parish keeps a small supply of fire fighting foam for their training center on Highway 80 in Bossier (offpost several miles to the west), but it has not been used, nor stored at CMTS.

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.

Not used or stored at CMTS

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?

No

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

No

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

Not used or stored at CMTS

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)?

Bossier Parish Fire Dept (BPFD) purchases foam from lowest priced vendor and stores on trucks at their station off post.

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

Not used or stored at CMTS

PA Interview Questionnaire – Fire Station

Facility: CMTS
Interviewer: Packer/Stinger
Date/Time: 10 Apr 2018

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?

Not used or stored at CMTS. Bossier Parish uses foam for flammable liquid fires (e.g., fuel, gas, diesel). They use Class A foam with soap. They rarely used AFFF. It was stored in 2-gallon buckets on their fire trucks. Every 3-4 years was rotated out and taken to their Haughton facility for training. Most of their responses onpost have been for wood/grass fires, but occasionally in production areas where only water is used. The water pressure on post is good so they have not needed anything else.

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?

Not used or stored at CMTS. No history of spills at BPFD however if spills were to occur their procedure is to use concentrated cleaner and allow to evaporate

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

Not used or stored at CMTS

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?

Testing not done with foam, nozzle operation checked with water.

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?

None.

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

N/A

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?

N/A

PA Interview Questionnaire – Fire Station

Facility: CMTS
Interviewer: Packer/Stinger
Date/Time: 10 Apr 2018

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?

N/A

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?

BPFD is primary responder on CMTS. They can call adjoining departments as needed for response. During the 2010 explosion, no fire occurred in the building. However nearby trees were extinguished with water.

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

N/A

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?

No

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?

N/A

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

No – only water used.

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)?

No

PA Interview Questionnaire – Fire Station

Facility: CMTS
Interviewer: Packer/Stinger
Date/Time: 10 Apr 2018

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?

Only used for training offpost approximately 8 miles to the west

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

State owned Fire Training Facility in southwest corner of CMTS. Contact Nick Palmer the Manager of the Pine Country Education Center.

Former LAAP Fire Chiefs include Jack Roberson – deceased and Dale Martin, retired Shreveport Fire Chief.

PA Interview Questionnaire – Fire Station

Facility: LSU FTA
Interviewer: Packer/Stinger
Date/Time: 10 Apr 2018

Interviewee: Nick Palmer **Title:** Manager, LSU Fire & Emergency Training Center at Pine Country **Address:** 214 Dutch Harbor, Minden, LA 71055 **Phone Number:** 318.371.3385 (O) 225.202.3717 (C) Email: npalme3@lsu.edu	Can your name/role be used in the PA Report? **Y** Can you recommend anyone we can interview? **N**

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

Pine Country Training Center is satellite to main facility in Baton Rouge. He has been manager at Pine Country Center since facility opened in 2007.

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.

Facility uses propane to simulate fires inside concrete foundation/bermed tank farm for industrial brigade training approximately 3 to 4 times per year since 2007.

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?

No - N/A

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

N/A

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

Supplies procured by staff in LSU training headquarters in Baton Rouge. Micro Blaze Out is purchased from Verde Environmental, 9223 Estex Frwy, Houston TX (703) 691-6468.

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)?

Microblaze used at 1% strength since 2013 (see attached info sheet photo).

Previously (before 2013) used Fomtec Film Forming Fluoro Protein Foam (FFFE) described as a hydrolyzed fluorinated surfactant. Attached Fomtec SDS obtained from website.

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

As needed, material is transferred inside warehouse to 5-gallon tote.

PA Interview Questionnaire – Fire Station

Facility: LSU FTA
Interviewer: Packer/Stinger
Date/Time: 10 Apr 2018

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?

150-gallon tote of Microblaze Out Class A & B 1% (currently 25% full as used for last 5 years) is stored inside former LAAP building on concrete floor.

Unused Fomtec supply was shipped back to Baton Rouge when switched to Microblaze.

Buckets of dry chemical used for refilling extinguishers. Use Plus Fifty C dry chemical MgAl silicate $NaCO_3$.

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?

No record of spills. Standard protocol would apply to spills such that absorbent material would be used.

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

N/A

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

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?

1 FTA use from 2007 to current

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

Propane

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?

Approximately 3-4 times per year, industrial brigade training would be conducted where propane used to simulate tank farm fire. Foam would be sprayed inside concrete containment which drains via above ground piping to nearby surface pond.

PA Interview Questionnaire – Fire Station

Facility: LSU FTA
Interviewer: Packer/Stinger
Date/Time: 10 Apr 2018

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?

Mr. Palmer described a mutual aid agreement exists for the LSU facility through the Bossier Parish police jury.

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?

During other training exercises, Dawn (liquid soap) has been used.

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

N/A

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?

N/A

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?

N/A

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

N/A

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)?

N/A

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?

As noted above, used material shipped back to Baton Rouge headquarters.

PA Interview Questionnaire – Fire Station

Facility: LSU FTA
Interviewer: Packer/Stinger
Date/Time: 10 Apr 2018

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

No

PA Interview Questionnaire - FacilityManager

Facility: J-Line
Interviewer: _____
Date/Time: 5-2-2018

Interviewee: Todd Bollinger **Title:** Site Manager **Phone Number:** 612-790-9966 **Email:** TBollinger@statx.com	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.

   Manufacture fire suppressant. Company 8yrs. Myself 7mo.

2. Where can I find previous facility ownership information? Presently State of Louisiana. Past ownership was US Army.

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
   Firefighting (Active Fire)
   Crash
   Fire Suppression Systems (Hangers/Dining Facilities)
   Fire Protection at Fueling Stations
   Non-Technical/Recreational/ Pest Management
   Metals Plating Facility
   Waterproofing Uniforms (Laundry Facilities)
   Other N/A

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

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?

   NONE

PA Interview Questionnaire - FacilityManager

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? NO

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

N/A

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)?

N/A

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?

N/A

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?

N/A

PA Interview Questionnaire - FacilityManager

Facility:_____
Interviewer:_____
Date/Time:_____

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?

N/A

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

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? Camp Minden has annual emergency response training for different types of catastrophes. All emergency agencies are involved.

PA Interview Questionnaire - FacilityManager

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?

N/A

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

N/A

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? There is a mutual aid agreement with Bossier Parish Fire Dept.

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)?

NO

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

NO

PA Interview Questionnaire - FacilityManager

Facility:_____
Interviewer:_____
Date/Time:_____

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? N/A

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

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?

N/A

PA Interview Questionnaire - FacilityManager

Facility:_____
Interviewer:_____
Date/Time:_____

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

no

PA Interview Questionnaire - FacilityManager

Facility:_____
Interviewer:_____
Date/Time:_____

Interviewee: GOEX POWDER, INC. **ANITA VINCENTI** **GOEX' responses in BLUE** **Title:__LOGISTICS MANAGER_____** **Phone Number:__(318) 382-9300 X226_____** **Email:_avincenti@goexpowder.com_____**	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.

Tenant / GOEX POWDER, INC. since 01January 2009

2. Where can I find previous facility ownership information? Presently State of Louisiana. Past ownership was US Army.

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
   Firefighting (Active Fire)
   Crash
   Fire Suppression Systems (Hangers/Dining Facilities)
   Fire Protection at Fueling Stations
   Non-Technical/Recreational/ Pest Management
   Metals Plating Facility
   Waterproofing Uniforms (Laundry Facilities)
   Other

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

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?

GOEX POWDER, INC. USES H2O DELUGE SYSTEM AND SPRINKLER SYSTEM.
GOEX POWDER, INC. ALSO MAINTAINS/USES FIRE EXTINGUISHERS.

PA Interview Questionnaire - FacilityManager

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?
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)?
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?
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?

PA Interview Questionnaire - FacilityManager

Facility:_____
Interviewer:_____
Date/Time:_____

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?
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?
13. Did military routinely or occasionally fire train off-post? List the units that you can recall used/trained at various areas. 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
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? Camp Minden has annual emergency response training for different types of catastrophes. All emergency agencies are involved.

PA Interview Questionnaire - FacilityManager

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?

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

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? There is a mutual aid agreement with Bossier Parish Fire Dept.

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)?

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

PA Interview Questionnaire - FacilityManager

Facility:_____
Interviewer:_____
Date/Time:_____

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? N/A
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?
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.?
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?

PA Interview Questionnaire - FacilityManager

Facility:_____
Interviewer:_____
Date/Time:_____

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

Appendix B.2
Visual Site Inspection Checklist

Visual Site Inspection Checklist

Names(s) of people performing VSI: ***Packer/Stinger***

Recorded by: ***Stinger***

ARNG Contact: ***Packer***

Date and Time: ***10-Apr-18***

Method of visit (walking, driving, adjacent): ***Driving/walking***

Source/Release Information

Site Name / Area Name / Unique ID: LSU Pine Country Education District Fire and Emergency Training Institute

Site / Area Acreage: Simulated tank farm containment area approximately 850 square feet, pond approximately 0.9 acre, located within approximate 19-acre clearing in southwest portion of CMTS.

Historic Site Use (Brief Description): Used as FTA since 2007

Current Site Use (Brief Description): Used as FTA since 2007

Physical barriers or access restrictions: Inside CMTS perimeter fence with security guarded entrance gate.

1. Was PFAS used (or spilled) at the site/area? Suspected PFAS-containing material used

1a. If yes, document how PFAS was used and usage time:

Material used at site prior to 2013 referenced as Foamtec, which is currently advertised to not contain PFAS. However previous formulation not confirmed.

2. Has usage been documented?

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

verbal

3. What types of businesses are located near the site?

3a. Indicate what businesses are located near the site

The LSU FTA is located within CMTS which is a regional military training facility which also hosts several commercial/industrial tenants. Highway164 is south of the CMTS southern perimeter with residential areas beyond.

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

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

Other Significant Site Features:

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

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

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

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

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**

1a. If so, note observation and location:

Surface water in the vicinity of the LSU FTA drains to the south to Caney Branch

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

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

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

3a. If so, please note the location:

None onsite, monitoring wells side gradient. Drinking water wells suspected downgradient.

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

4a. If so, please note the location:

5. Can wind dispersion information be obtained? **N**

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

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

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

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

Visual Survey Inspection Log

Significant Topographical Features:

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

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

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

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

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

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

Receptor Information

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

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

Site Workers / Construction Workers / Trespassers /Recreational Users / Ecological

2. Who can access the site?

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

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

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

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

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

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

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

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: Louisiana State University Fire Emergency Training Institute's Fire Training Area Camp Minden TS_LA

Why has this location been identified as a site? Foam used for petroleum fire training since 2007

Are there any other activities nearby that could also impact this location? No

Training Events

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

If so, how often? 3 to 4 days per year

How much material was used? Is it documented? Not documented. Has used ~110 gal (75% of 150 gal tote) for training over last 5 years.

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? Yes. Reference Five Year Review (URS, 2016) and multiple RI and LTM reports.

Surface Water:

Surface water flow direction? North and south to tributaries leading to Caney Branch

Average rainfall? Average annual rainfall is 55 in.

Any flooding during rainy season? Yes

Direct or indirect pathway to ditches? Direct/indirect

Direct or indirect pathway to larger bodies of water? Direct/indirect to surface impoundment on site

Does surface water pond any place on site? Pond

Any impoundment areas or retention ponds? Yes

Any NPDES location points near the site? Not reported

How does surface water drain on and around the flight line? Surface water drains north and south to tributaries leading to Caney Branch.

Preliminary Assessment – Conceptual Site Model Information

Groundwater: Reference 2015 Remedial Action Monitoring Report (URS, 2017)

Groundwater flow direction? Shallow groundwater appears to flow west discharging to Caney Branch

Depth to groundwater? Approximately 30 feet below surface (ft bgs) based on monitoring well GO288 gauging data 10/3/2017. GO288 is located SW of the LSU FETI FTA along the installation's southern boundary. This 2-inch diameter well has a total depth of 168 ft bgs, and reportedly screened from 158-168 ft bgs.

Uses (agricultural, drinking water, irrigation)? Drinking and industrial uses onsite. Drinking and agricultural uses off-site

Any groundwater treatment systems? No

Any groundwater monitoring well locations near the site? GO288 is over ½-mile southwest

Is groundwater used for drinking water? Yes

Are there drinking water supply wells on installation? Yes

Do they serve off-post populations? No

Are there off-post drinking water wells downgradient? Yes Drinking water wells located over ½-mile south-southeast

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? Yes, the WWTP discharges to Boone Creek.

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

Do we understand the fate of sludge waste? Yes

Is surface water from potential contaminated sites treated? No

Equipment Rinse Water

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

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)
Nozzle testing by LSU FETI conducted with Dawn detergent.

3. Other?

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker Y

Construction Worker Y

Recreational User Y-offsite

Residential Y-offsite

Child Y-offsite

Ecological Y

Note what is located near by the site (e.g. daycare, schools, hospitals, churches, agricultural, livestock)?
Rural area residences, agricultural/livestock and churches are offsite, south of the installation.

Documentation

Ask for Engineering drawings (if applicable). None available

Has there been a reconstruction or changes to the drainage system? When did that occur? No

Appendix C
Photographic Log

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Minden Training Site	Bossier and Webster Parishes, Lousiana

Photograph No. 1

Description:

LSU FETI's mock petroleum fuel above ground storage tank farm, facing southeast.

Date: 10 APR 2018

Photograph No. 2

Description:

LSU FETI's mock AST tank on concrete with precipitation-filled concrete containment berm, facing southwest.

Date: 10 APR 2018

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Minden Training Site	Bossier and Webster Parishes, Lousiana

Photograph No. 3

Description:

LSU FETI surface water impoundment, facing west.

Date: 10 APR 2018

Photograph No. 4

Description:

LSU FETI offices entrance, facing north.

Date: 10 APR 2018

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Minden Training Site	Bossier and Webster Parishes, Lousiana

Photograph No. 5

Description:

View from LSU FETI offices toward the FTA, facing east.

Date: 10 APR 2018

Photograph No. 6

Description:

LSU FETI FTA mock AST containment berm in foreground with vertical pipe that conveys water from berm to open ditches, facing west.

Date: 10 APR 2018

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Minden Training Site	Bossier and Webster Parishes, Lousiana

Photograph No. 7

Description:

LSU FETI propane tanks used to fuel fire during training at the FTA.

Date: 10 APR 2018

Photograph No. 8

Description:

Micro Blaze Out storage tote (150-gallons) staged in LSU FETI warehouse.

Date: 10 APR 2018

APPENDIX C – Photographic Log

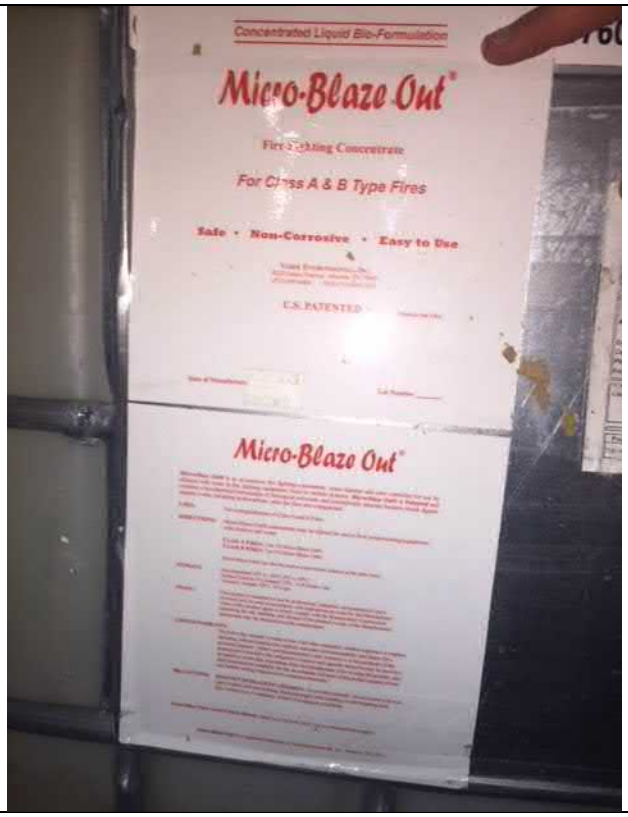
Army National Guard, Preliminary Assessment for PFAS	Camp Minden Training Site	Bossier and Webster Parishes, Lousiana

Photograph No. 9

Description:

Micro Blaze Out product label

Date: 10 APR 2018



Photograph No. 10

Description:

Micro Blaze Out shipping label showing supply vendor information.

Date: 10 APR 2018

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Minden Training Site	Bossier and Webster Parishes, Lousiana

Photograph No. 11

Description:

Plus Fifty C Dry Chemical used by LSU FETI for recharging fire extinguishers.

Date: 10 APR 2018