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MEMORANDUM FOR DISTRIBUTION C
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FROM: HQ USAF/A4
1030 Air Force Pentagon
Washington, DC 20330-1030

SUBJECT: Air Force Guidance Memorandum Establishing Aqueous Film Forming Foam (AFFF)-
Related Waste Management Implementation Guidance

By Order of the Secretary of the Air Force, effective immediately, this Air Force Guidance Memorandum (AFGM) 2019-32-01 is a first instance of a USAF/A4 publication that establishes AFFF-Related Waste Management Implementation Guidance. Compliance with this AFGM is mandatory. **(T-1)**. To the extent its directions are inconsistent with other Air Force publications, this AFGM prevails, in accordance with AFI 33-360, *Publications and Forms Management*.

This AFGM applies to individuals at all levels, including the Air Force Reserve and Air National Guard (ANG). It establishes AFFF-related waste management implementation guidance in support of the SAF/IEE memorandum dated 29 Dec 2017, *Managing AFFF-related perfluorooctane sulfonate and perfluorooctanoic acid (PFOS/PFOA) Waste* that directs the management of PFOS/PFOA-containing waste to protect human health. This AFGM will be updated as needed to address changes in regulatory requirements, DoD determinations of risk, or development of new technologies. Publications and forms are available for downloading or ordering on the e-Publishing web site at www.e-Publishing.af.mil. There are no releasability restrictions on this publication.

Attached is AFGM2019-32-01, AFFF-Related Waste Management Implementation Guidance.

Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule located in the Air Force Records Information Management System.

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This AFGM becomes void after one year has elapsed from the date of this AFGM, or upon incorporation into a new document by interim change to, or rewrite of AFGM2019-32-01 whichever is earlier.

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1. Purpose: By Order of the Secretary of the Air Force, this guidance document immediately implements requirements for Air Force management of aqueous film forming foam (AFFF)-related waste streams containing perfluorooctane sulfonate and perfluorooctanoic acid (PFOS/PFOA). Compliance with this memorandum is mandatory.

1.1 Applicability: This guidance document applies to Active, Reserve, Air National Guard (ANG), and Base Realignment and Closure (BRAC) installations and surrounding areas within the United States, US territories, and where applicable. Any reference to Remedial Project Managers (RPMs) includes Program Managers (PMs) and BRAC Environmental Coordinators (BECs). This guidance document addresses the management of AFFF-related waste streams that result from Air Force responses to releases of C6 and legacy C8 formulations of AFFF product resulting from a spill, accidental release, emergency response, fire training activities, environmental investigations, and management of AFFF (e.g. management and disposal of legacy products).

1.2. Air Force Implementation Guidance:

- 1.2.1 In the absence of applicable federal or state-specific statutory or regulatory requirements for managing AFFF-related waste (PFOS/PFOA), follow the 5-Step process set forth in Section 2, using best technical judgement to determine treatment options and final disposition methods.
- 1.2.2 Section 2.5, Step 5 (Table 2-1) provides preferred and alternate methods of disposition for each type of waste media based on various factors, including concentration levels of PFOS/PFOA. Notes, referenced or identified by superscripts in Table 2-1, provide additional information to aid the decision process. Every effort should be made to adhere to the preferred method; consult with AFCEC/CZ, AFCEC/CIB, or ANG POC, as applicable, on issues where further interpretation is necessary or significant deviations from the preferred or alternate methods are proposed.

2. Five Step Process to Determine Treatment Options and Final Disposition Methods. (T-1).

2.1. Step 1: Identify AFFF-related waste media to be managed

- 2.1.1. Liquid. Includes investigative derived waste (IDW), rinsate, residual treatment system liquid, AFFF liquid concentrates/solutions, liquids derived from construction and liquid waste captured from routine system inspections, test, and maintenance, accidental releases, and emergency responses.
- 2.1.2. Soil/sediment. Includes IDW, Remedial Investigation/Action derived waste, and contaminated soil/sediment excavated from a construction project, spill, accidental release, or emergency response
- 2.1.3. Other solids. Includes used personal protective equipment (PPE), sampling equipment, and construction debris (e.g., contaminated rags, tubing, booms, empty containers, concrete, asphalt, and other building materials, etc.).
- 2.1.4. Spent treatment media (non-residential). Includes spent carbon, resin and other treatment media.

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- 2.1.5. Spent filters (residential). Includes treatment cartridges from household filtration units.
 - 2.1.6. AFFF (C6 and legacy C8) product. Includes actual product and product infiltrated by water not associated with an accidental release or emergency response.
 - 2.1.7. Surface water. Includes stormwater, pond water, etc. (Note: Sampling and treatment of surface water requires prior approval from AFCEC/CZ/CIB or ANG, as applicable.)
 - 2.1.8. Sludge. Includes sewage sludge from wastewater treatment or settled suspensions/bottom sediments from other treatments/processes/tanks. Sampling and treatment of sludge requires prior approval from AFCEC/CZ/CIB or ANG, as applicable.
 - 2.1.9. Other. To be determined (Note: Contact AFCEC/CZ/CIB or ANG a waste produced is not identified)
- 2.2. Step 2: Containerize, sample and characterize generated waste**
- 2.2.1. Containerize or isolate waste (e.g., drums, totes, or stockpile management such as bladders, lined holding ponds, and tanks); then label and sample it and review sampling results to determine next steps. See Notes 1 through 8 in Table 2-1.
 - 2.2.2. Characterize AFFF-related waste (when applicable) using methods compliant with Quality Systems Manual (QSM) 5.2, Table B-15, or the most current method required by DoD Environmental Laboratories Accreditation Program-accredited laboratories.
 - 2.2.3. If necessary, analyze for toxicity characteristic leaching procedure using SW-846 Test Method 1311 for volatile organic compounds, semivolatile organic compounds, pesticides, herbicides, metals, polychlorinated biphenyls, total petroleum hydrocarbons, flashpoint, reactivity, ignitability, corrosivity, pH, sulfide, and cyanide.
- 2.3. Step 3: Determine media-specific treatment/disposal decision points**
- 2.3.1. Handling of all regulated co-contaminants in AFFF-related waste must comply with applicable federal and state promulgated standards. If other contaminants of concern (COCs) exceeding regulatory standards are identified in the waste, the waste will be managed to address the regulated COC according to applicable legal requirements.
 - 2.3.2. Liquid
 - 2.3.2.1 Non-detect, indicated by laboratory results.
 - 2.3.2.2 Detected at less than or equal to the US EPA Lifetime Health Advisory (LHA) of 70 parts per trillion (ppt) in liquid.
 - 2.3.2.3 Detected above US EPA LHA of 70 ppt and/or applicable state-specific promulgated standards in potential drinking water.
 - 2.3.3. Soil
 - 2.3.3.1 Detected above the US EPA risk-based screening level (RSL) for soil of 1.26 parts per million (ppm), determined by calculation using the US EPA oral reference dose for PFOS/PFOA.
 - 2.3.3.2 Detected at less than or equal to the US EPA RSL for soil (1.26 ppm).

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- 2.3.4. Other solids are eligible for disposal as municipal solid waste IAW RCRA Subtitle D Solid Waste regulations, unless prohibited by local municipal landfill restrictions.
- 2.3.5. Residential filter cartridges/treatment media are excluded from the definition of “hazardous waste” under 40 CFR § 261.4(b)(1) allowing them to be disposed in residential trash as household solid waste, unless local restrictions apply.

2.4 Step 4: Evaluate media-specific treatment technology options for final disposition:

- 2.4.1. Return small quantities of solid and liquid IDW below the RSL or LHA, respectively, to source location at point of generation^{footnote 1 in table 2-1}.
- 2.4.2. Treatment (liquid waste streams only). AFFF-contaminated wastewater must be treated on-site prior to discharge. Effluent must achieve reduction to less than or equal to US EPA LHA and/or applicable state or local promulgated standards. Treated effluent can be discharged to permitted wastewater treatment works (industrial, federal, or privately – owned treatment works) IAW AFI 32-1067 and National Pollutant Discharge Elimination System (NPDES) Permit, as applicable. No co-contaminant greater than its regulatory discharge standard is allowed. Concentrated waste resulting from the use of separation/treatment technologies must either be incinerated or be further treated to destructively degrade all PFOS/PFOA to the extent measurable using appropriate methods. Treated media can be subsequently disposed of municipal solid waste. Consult with AFCEC/CZ personnel for guidance on appropriate treatment technologies applicable to installation-specific circumstances
- 2.4.3. Incineration/thermally destructive technology at an approved permitted facility. Thermal regeneration temperature must reach and be sustained above 1,700 degrees Fahrenheit throughout destruction process. Coordinate with AFCEC POC for guidance on this disposal option.
- 2.4.4. RCRA Subtitle D landfill. Used for disposal of non-hazardous municipal, industrial, and construction and demolition (C&D) solid waste. This treatment option is practical for low volume, low concentration waste, with little probability for drinking water contamination. Coordinate with AFCEC POC for guidance on this disposal option.
- 2.4.5. RCRA Subtitle C landfill. Used for disposal of hazardous solid waste. AFFF product or if AFFF-related waste is co-mingled with another COC with concentrations exceeding regulatory standards and regulated hazardous waste was identified and properly managed for disposal. Coordinate with AFCEC POC for guidance on this disposal option.
- 2.4.6. Solidification then landfill. Used for solid and/or liquid waste contaminated with AFFF product at high concentration (e.g., spent media, liquid and solid wastes at fire training facilities). Certain liquid wastes can be solidified prior to landfill in either a Subpart C or Subpart D landfill. Coordinate with AFCEC POC for guidance on this disposal option.

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2.4.7. Other available treatment technology. Evaluation must be determined by business case analysis and assessment of risk. Coordinate with AFCEC POC for guidance on this disposal option. On-site treatment of aqueous waste is commercially feasible and cheaper than incineration. However, on-site treatment options for soils and other solids is currently limited. Soil-washing and thermal desorption technologies are undergoing validation and may provide a cost-effective option in the near future.

2.5. Step 5: Determine Final Disposition for Preferred (Pref A) or Alternate (Alt B) Method Using Section 2.4, Step 4.

Table 2-1. AFFF-Related Waste Disposal Determination

AFFF-related Waste Media Type	Treatment/Disposal Decision Points (Reference Sections 2.4.1 through 2.4.7 and superscripts reference notes after table)											
	Non detect		Detected below US EPA LHA (liquid) or approved RSL (soil)		Detected above US EPA LHA or state promulgated standard (liquid)		Detected above US EPA RSL (soil)		Eligible for disposal as solid waste in off-base landfill		Meets 40 CFR §261.4 (b)(1) exclusion for disposal in resident's trash	
	Pref A	Alt B	Pref A	Alt B	Pref A	Alt B	Pref A	Alt B	Pref A	Alt B	Pref A	Alt B
Liquid	2.4.1 ¹	^{1c}	2.4.1 ¹	2.4.2 ^{1c}	2.4.2 ²	2.4.3 2.4.7						
Soil	2.4.1 ¹	2.4.4	2.4.1	2.4.4			2.4.1 ^{1a}	2.4.3 2.4.7				
Spent treatment media (non-residential)			2.4.3 ³	2.4.4	2.4.3 ³	2.4.5 2.4.7						
Spent filters/treatment media (residential)									2.4.4 ⁴		2.4.4 ⁴	
Other solids (e.g., PPE, rags, booms, containers, construction debris)									2.4.4 ⁵			
Onsite Surface water (imminent threat to human drinking water receptors)					2.4.2 ⁶	2.4.7						
Sludge (from onsite operations managing AFFF)			⁷		2.4.6 ⁷	2.4.3 2.4.7						
Waste AFFF (e.g., AFFF product for disposal, soil or large solutions of AFFF in lagoons, other impoundments, or as a result of spill/					2.4.2 ⁸ 2.4.3 ⁶ 2.4.5 ⁸	2.4.6 ⁶ 2.4.7	2.4.3 2.4.5	2.4.6				

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emergency responses)												
Other (TBD)					2.4.7	1(b)ii						

Notes:

1. In general, containerize and characterize AFFF-related waste to determine appropriate disposal method. The Installation RPM shall refer to Table 2-1 for preferred and alternate methods of treatment/disposal with the following exceptions:
 - a. In the absence of applicable regulatory requirements, EPA Region 4 operating procedures “SESDPROC-202-R3, *Management of Investigative Derived Waste* (July 2014)” may be followed to return IDW to the source location.
 - i. Installation RPM to determine, on a case-by case basis, what can reasonably be considered a small IDW quantity and if it is feasible to return it to the source location at the point of generation without sampling, based on site-specific conditions and best engineering judgment (avoid leaving mounded soil or standing liquid).
 - ii. As a best management practice, containerize, sample and store AFFF-related waste generated from environmentally, culturally, and/or mission sensitive areas prior to disposal.
 - iii. AFFF-related waste generated off installation should not be returned to source locations.
 - b. As an AF preference, large quantities of liquid AFFF waste should be characterized and treated, using either GAC, ion exchange, or other approved treatment technology to below the US EPA LHA, then disposed of IAW AFI 32-1067. If liquid is treated to non-detect (determined by laboratory analysis), then discharge as non-hazardous liquid to POTW or FOTW, as applicable.
 - i. Installation RPM, with AFCEC technical support, will determine final disposition for large quantities of IDW, including monitoring well development water, IAW installation standard IDW management procedures and business case analysis.
 - ii. If a business case analysis supports use of a technology (innovative) other than preferred (Pref A) or alternate (Alt B) methods in Table 2-1, RPM to request approval from AFCEC/CZ/CIB or ANG, as applicable.
 - c. Waste water management involving releases of known PFOS/PFOA-impacted water into Industrial Wastewater Treatment Plants (WTPs), Federally Owned Treatment Works (FOTWs), or Publically Owned Treatment Works (POTWs) require a written authorization between the AF and the treatment works facility prior to discharge.
2. Liquids must be managed as a preference by treatment technology based on business case analysis or in compliance with contract terms, if any. If treated using either GAC, ion exchange, or other approved treatment technology, liquid waste must achieve concentrations less than the US EPA LHA or promulgated state standard prior to final disposition IAW installation SOPs. RPM to determine final disposition based on compliance with AFI 32-1067, risk and business case analysis.
3. Spent treatment media (non-residential). Spent treatment media to be regenerated/reactivated as required. Incineration or other thermally destructive technology at an approved permitted facility must sustain 1,700 degrees Fahrenheit to dispose of spent filter media, or to regenerate spent filter media.
4. Spent residential treatment cartridges/treatment media to be disposed with resident’s household trash.
5. Other solids (e.g., used Personal Protective Equipment (PPE), rags, booms, empty containers, or construction debris) shall be disposed as non-hazardous solid waste in appropriate off-base landfill
6. Surface water impacted with PFOS/PFOA from AFFF. For each occurrence, assessment and approval from AFCEC/CZ/CIB or ANG, as applicable, is required prior to sampling or treating surface water; assessment will be based on the risk of imminent threat to human health due to ingestion of PFOS/PFOA-impacted drinking water.
7. Sludge impacted with PFOS/PFOA from AFFF. For each occurrence, approval from AFCEC/CZ/CIB or ANG, as applicable, is required prior to sampling or treating sludge.
 - a. Sludge from existing treatment systems with AFFF-related waste less than the US EPA RSL will be managed IAW AFI 32-1067 and applicable installation waste management procedures.
 - b. Sludge from existing treatment systems with AFFF-related waste greater than the US EPA RSL shall be containerized

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and destroyed/disposed of in accordance with applicable law.

8. AFFF-related waste management at firefighting training facilities and hangars. AFCEC/CO and CX shall coordinate to develop Best Management Practices (BMPs) for minimizing the volume of AFFF-impacted solid or liquid waste generated.
 - a. AFCEC CO/CX shall research alternatives and program projects to minimize AFFF-impacted waste generation.
 - b. AFCEC/CO shall publish BMPs to minimize test event discharges for facility/hangar-installed AFFF systems.
 - c. Installations shall manage hangar activities to minimize accidental AFFF-water releases to the environment.
 - d. Other BMPs to be documented in subsequent updates of this implementation guidance.

3. Funding and Contract Support

3.1. Funding eligibility for AFFF-related waste management

- 3.1.1. Restoration program inspection, investigation or remedial response activities (BRAC or ERA, or ANG O&M when restoration is not ERA eligible).
- 3.1.2. O&M- related waste generated or identified during O&M activities (e.g. off-site solid waste disposal or treatment and firefighting training facilities/hangars) (Facilities O&M)
- 3.1.3. Municipal system operations (funding IAW signed agreements such as Memoranda of Understanding and Environmental Services Agreements).
- 3.1.4. Surface water and sludge (with significant impact to drinking water identified) will require HAF-level approval for sampling and/or treatment (EQ or Facilities O&M funds).
- 3.1.5. MILCON-related waste generated or identified during MILCON activities (MILCON funds).

3.2. Contract Support

This guidance should be referenced when developing contracts involving AFFF-related wastes. Contractors supporting Air Force ERP investigation or remediation efforts shall comply with this guidance. Contractors shall containerize/isolate AFFF-related waste, unless otherwise noted. Contractors supporting sampling efforts shall provide IDW analytical results to the Air Force within 30 days to support final disposition determinations. If waste management requirements are outside contract scope, the contractor may request funding to comply with this guidance.