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General PFOS/PFOA

Q. What are Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA)?

A. PFOS and PFOA are synthetic fluorinated organic chemicals used in many industrial and consumer products such as nonstick cookware, stain-resistant fabric and carpet, some food packaging and specialized foam, including Aqueous Film Forming Foam. AFFF is highly effective for controlling petroleum-based fires, and is used by the military services, commercial aviation and industry.

Q. Why is PFOS/PFOA being discovered on closed and active installations?

A. Since the 1970s, the Air Force used Aqueous Film Forming Foam - a firefighting foam containing PFOS/PFOA - at crash sites, in fire training areas and some maintenance hangers at active, Reserve, Air National Guard installations. In the U.S., the Air Force is systematically testing for potential PFOS/PFOA contamination in soil, surface water and groundwater where AFFF may have been released.

Q. How many Air Force locations have had PFOS/PFOA releases?

A. The Air Force identified approximately 200 installations in the U.S. (active, Reserve, Air National Guard and closed) where AFFF may have been released and is conducting site inspections to confirm if releases occurred. The Air Force is prioritizing sampling based on factors, such as; potential pathways to drinking water, depth to groundwater and potential for contaminate to migrate off base.

PFCs

Q. Is it true the Air Force has known for decades that PFCs are dangerous to humans?

A. The Air Force depends on the EPA and the Department of Health and Humans Services Agency for Toxic Substances and Disease Registry to determine potential danger to human health and the environment. In 1999, the EPA began investigating PFOS and did the same for PFOA in 2000. It wasn't until 2009 however, that EPA accumulated sufficient information to issue its first provisional lifetime drinking water health advisory. Between 2009 and 2016, the Air Force issued initial policy to address sampling and response actions for PFOS and PFOA, conducted Preliminary Assessments at nearly all our installations and began providing alternative drinking water at certain sites that tested above the EPA's lifetime HA. The EPA issued its Lifetime Health Advisory in 2016 at the current level and the Air Force has adjusted its response to meet that new level.

Q. Did the Air Force conduct studies on PFCs in the 1970s and 1980s?

A. The Air Force has the ability to conduct risk assessments associated with how Airmen should safely handle materials in their work. The AF does not have the capability to address risk associated with drinking water, food safety etc. Between 1979 and 1995, the Air Force conducted a small number of studies (10-15), which included PFOA and PFOS, most of which were intended to address occupational exposure risk. The Air Force relies on the EPA to address and set environmental regulatory limits for human health. The EPA conducts rigorous peer-reviewed processes to establish risk levels for chemicals and used several hundred studies that resulted in the drinking water health advisory we have today.

Air Force Response to PFOS/PFOA in drinking water

Q. How is the Air Force addressing PFOS/PFOA on closed and active installations?

A. The Air Force's investigation work and mitigation actions are guided by the Comprehensive Environmental Response, Compensation and Liability Act, or CERCLA, applicable state laws and the EPA's lifetime drinking water health advisory of 70 parts per trillion.

The Air Force is using a comprehensive approach – identify, respond, prevent – to address the potential for PFOS/PFOA contamination of drinking water, and respond appropriately. When drinking water sample results indicate PFOS/PFOA concentrations exceed 70 ppt, and there is evidence the Air Force is likely a primary source of the contamination, the Air Force determines an appropriate mitigation action, such as providing an alternate drinking water source, filtration system, and/or providing bottled water if needed. When PFOS/PFOA are detectable but below the lifetime HA level in drinking water, the Air Force may conduct well monitoring as needed to track level changes and determine if further action is needed.

Q. What is the Air Force's comprehensive approach to PFOS/PFOA?

A. The Air Force is focused on three lines of effort to address PFOS/PFOA contamination of drinking water supplies:

- *Identify:* The Air Force is conducting sampling and analysis of drinking water systems enterprise-wide. Additionally, in the U.S. the Air Force is identifying potential AFFF release sites; conducting site inspections to confirm releases; and using groundwater, surface water, soil and sediment sampling to map potential plume migration pathways.
- *Respond:* Where PFOS/PFOA levels exceed the lifetime health advisory levels in drinking water supplies, and there is indication the AF is likely a primary source of the contamination, the Air Force will immediately provide alternate drinking water sources if needed. If necessary, the Air Force will then identify and initiate a long-term solution to provide drinking water that does not exceed the HA, which may include alternate water supply sources or filtration systems.
- *Prevent:* The Air Force replaced legacy AFFF in emergency response vehicles with more environmentally responsible AFFF, and will replace AFFF in all hangar fire prevention systems. Additionally, the Air Force is evaluating approaches to reduce the risk of inadvertent discharges and ensure containment of both the legacy and replacement foam.

Q. What is the difference between groundwater and surface water?

A. The water on the Earth's surface—surface water—occurs as streams, lakes, and wetlands, as well as bays and oceans. Surface water also includes the solid forms of water— snow and ice.

The water below the surface of the Earth is ground water. The vast majority of underground water occupies the spaces between soil and rock particles. At a certain depth below the land surface, the spaces between the soil and rock particles can be totally filled with water, resulting in an aquifer. (Source: USGS)

Q. What is the Air Force doing when it finds groundwater or surface water contaminated with PFOS/PFOA?

The Air Force is using groundwater, surface water, soil and sediment sampling to map potential migration pathways to drinking water. Where PFOS/PFOA levels exceed the lifetime health advisory (LHA) levels in drinking water supplies, and there is evidence the AF is likely a potential source of the contamination, the Air Force will immediately provide alternate drinking water sources if needed. If necessary, the Air Force will then identify and initiate a long-term solution to provide drinking water that does not exceed the LHA, which may include alternate water supply sources or filtration systems.

Q. How is the Air Force responding to regulator requests for PFOS/PFOA sampling at former and active installations?

A. Requests for environmental sampling for PFOS/PFOA by regulatory agency officials are addressed on a case-by-case basis. In cases where a specific local, state or federal regulation or agreement is driving the request, the installation must have reason to believe an Air Force release of PFOS/PFOA is probable (based on past installation activities), and be able to determine if there is a likelihood for the contamination to reach a

drinking water source. For overseas installations, the AF is conducting sampling and analysis of Air Force drinking water sources.

Q. How does the Air Force respond if they are the water purveyor?

A. The Air Force is testing all drinking water supplies where it is the purveyor. If sample results exceed the EPA's lifetime health advisory of 70 parts per trillion, the Air Force will immediately provide a safe drinking water source and follow the EPA-recommended actions, which include retesting, communicating with local regulators and drinking water officials, proper consumer notification and evaluation of options to reduce PFOS/PFOA concentrations below the lifetime HA.

Investigation/Mitigation Cost

Q. In the fall of 2016, the Air Force said it plans to spend $2 billion to clean up PFC-contaminated water. Is that still an accurate estimate?

A. The estimate was a projection of the potential cost across the entire Department of Defense, and is only an anecdotal estimate. Please contact the public affairs team at the Office of the Secretary of Defense for information on the total cost of PFOS/PFOA activities.

Q. How much money is set aside by the Air Force for PFOS/PFOA investigations and mitigations?

A. For fiscal year 2018, the Air Force is projecting approximately $293 million for all environmental restoration program activities, including actions related to PFOA/PFOS response.

Q. Does the Air Force cover the cost of maintaining water filters overtime?

A. PFCs are found widely in the environment today, and there are likely other contributors to the contamination. However, where drinking water is above the lifetime health advisory and the Air Force could be a contributor, we will work with local authorities to provide alternative drinking water if needed and identify interim mitigation options. Following installation and initial monitoring, the Air Force will maintain filters on private wells until a long-term alternative can be implemented. If the Air Force installs filters on public wells, public water systems will assume ownership, operation and maintenance of the filters after a period of Air Force maintenance to ensure proper operation.

Testing Method

Q. How does the Air Force test for PFOS/PFOA in drinking water?

A. The Air Force employs EPA Method 537 to test samples for drinking water contaminants. Information about EPA Method 537 can be found on the EPA website.

Well Sampling/Results

Q. What will happen if my private well is found to have levels of PFOS/PFOA above the lifetime drinking water health advisory levels due to PFOS/PFOA that have migrated off the installation?

A. The Air Force's priority is protecting human health and drinking water sources. If the Air Force samples your well and determines the PFOS/PFOA level is above the EPA's lifetime drinking water HA, the Air Force will provide alternate drinking water supplies or implement mitigation approaches. This may include supplying your household with bottled drinking water, connecting your home to a public drinking water supply, or installing a treatment/filtration system on your private well.

Q. My well sampling yielded results below the HA—how can the Air Force know that won't change? Will they continue sampling?

A. When PFOS/PFOA are detectable but below the lifetime HA level in drinking water, the Air Force may

conduct well monitoring as needed to track level changes and determine if further action is needed.

Q. Will the Air Force test my well?

A. The Air Force is taking a proactive, measured approach to sampling off-base wells. During the site inspection phase, the Air Force will identify wells to sample based on probability of contamination, proximity to contaminant areas and possible pathways from the site of contamination to the drinking water wells. If the site inspection indicates your well might be impacted, we could then sample the well.

Q. I live near an installation; why won't the Air Force sample my well?

A. Air Force sampling actions are data driven. We use data and site information to map contaminant migration and potential pathways to drinking water so we can continue to protect human health by focusing sampling efforts in the locations potentially impacted. The Air Force evaluates site-specific factors to assess if there is a potential for contamination to reach drinking water supplies.

Q. Can you provide the results of samples taken off base?

A. We can't release results for specific wells – that information belongs to the well owner – but we can provide a range of PFOS/PFOA levels.

General Water Use

Q. Can I cook, bathe and brush my teeth with water tested above HA?

A. The EPA health advisory is specific to the human consumption of water. According to the EPA, water is safe for activities that do not include consumption, such as bathing, doing laundry and washing dishes. For more information, contact the EPA or your local and state health department.

Q. Will my pets be contaminated if they drink water tested above HA?

A. The EPA health advisory is specific to the human consumption of water. For more information, please refer to the EPA.

Q. Can I breathe in PFOS/PFOA or absorb through my skin through the dirt and/or wind?

A. These health advisories only apply to exposure scenarios involving drinking water. For additional health specific information, please refer to the EPA, your medical provider or your local and state health department.

Agricultural/Food Concerns

Q. Will eggs, milk, fruits, vegetables and meat from farms using water above HA contain a significant amount of PFOS/PFOA to be concerned?

A. These health advisories only apply to exposure scenarios involving drinking water. They are not appropriate for use in identifying risk levels for ingestion of food sources, including fish, meat produced from livestock that consumes contaminated water, or crops irrigated with contaminated water. For more information, contact the EPA or your local and state health department.

Q. Will livestock, fruits and vegetables still be considered organic?

A. Please contact the U.S. Department of Agriculture for questions about organic certification.

Q. What about surface water? How does this impact fishing and crabbing?

A. These health advisories only apply to exposure scenarios involving drinking water. They are not appropriate for use in identifying risk levels for ingestion of food sources, including: fish, meat produced from livestock that consumes contaminated water, or crops irrigated with contaminated water. For more

information, contact the EPA or your local and state health department.

Regulations/State Laws

Q. Why is the Air Force focusing its efforts on temporary solutions? Why not just start cleanup and fix the root of the problem?

A. PFOS/PFOA is an emerging contaminant; regulations are few and evolving. Protecting human health is an Air Force priority and we are aggressively responding to potential drinking water contamination when there is evidence the Air Force is likely a primary source of that contamination. Additionally, the Air Force is moving forward in accordance with the CERCLA process to identify, define and mitigate potential contamination. The CERCLA process is federal law; makes certain thorough investigation work is done, and promotes accountability, community involvement and long-term protectiveness.

Q. What is the Air Force doing about potential food contamination?

A. The Department of Defense does not have the expertise nor authority to conduct a food safety investigation, or to develop a food-specific interim health-based guideline. The U.S. Food and Drug Administration (FDA) oversees the safety of foods through the assessment of potential exposure and risk.

Q. Will the Air Force follow lower health advisory levels passed by states?

A. The Air Force complies with state environmental cleanup laws to the extent authorized and required by Federal law.

Q. Will the Air Force fund a study on the health effects of people exposed to PFCs in drinking water?

The Air Force relies on the Agency for Toxic Substances and Disease Registry (ATSDR), under the Department of Health and Human Services (DHHS), for guidance on health based actions. To date, ATSDR has not conducted a nationwide health study to determine what, if any, health effects from PFOS/PFOS exposure can be substantiated and what actions should be taken.

Q. Will the Air Force pay for blood testing for individuals who live in areas impacted by PFOS/PFOA that have migrated off base?

A. The Air Force does not have authority to pay for blood tests. The Air Force relies on the Agency for Toxic Substances and Disease Registry (ATSDR), under the Department of Health and Human Services (DHHS), for guidance on health based actions. To date, ATSDR does not recommend blood tests. They assert the ubiquitous nature of PFAS over the decades assures virtually everyone on the planet has some level in their blood stream. PFOS/PFOA levels in blood gradually diminish over an extended period of time and nothing can be done to address or speed up that process.

Reimbursements/Claims

Q. Will the Air Force pay for my drop in property value?

A. Residents who believe they have incurred damages may submit a claim to the base's legal office using the Air Force claims process.

Q. Why have some claims been denied?

A. We can’t speak to specific details of denied claims.

Generally speaking, however, the Air Force may only pay claims when there is a legal obligation to do so. Under the Federal Tort Claims Act the claimant must demonstrate that their injury was caused by a negligent act(s) of the Air Force or one of its employees. In addition, the alleged negligent act must fall

outside of the “discretionary function exception,” which essentially means the negligent act must also violate a law, regulation, or practice of the applicable agency.

Q. Will the Air Force reimburse communities for costs incurred in dealing with contamination issues?

A. The Air Force does not have the legal authority to retroactively reimburse communities for costs incurred in dealing with environmental contamination issues. However, we continue to work with affected communities to identify proactive strategies to address this issue. Where we have factual data acknowledging we are a contributor to the contamination, the Air Force has the authority, under the Defense Environmental Restoration Program, to enter into prospective agreements with a state/local government entity to obtain its services to assist the Air Force in meeting its obligations. The Air Force may also contract a third party to address clean-up mitigation. These agreements must be signed prior to expending funds.

Aqueous Film Forming Foam (AFFF)

Q. What is AFFF?

A. Aqueous Film Forming Foam, or AFFF, is a firefighting agent used commercially and by the Department of Defense, including the Air Force. Most commonly used to combat petroleum fires in aircraft accidents, hangars and during live-fire training exercises, this formulation of AFFF contains perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) - two perfluorinated compounds that persist in the environment and are not known to degrade by any natural process. The EPA has classified these compounds as emerging contaminants due to inconclusive human health risks and evolving regulatory standards.

Q. Why didn’t the Air Force immediately stop using AFFF after the health concerns regarding PFOS/PFOA came to light?

A. It was not until November 2015 that there was a more environmentally responsible option available on the DOD’s qualified products list for firefighting agents. With the identification of this effective substitute, the AF has replaced its entire inventory of legacy AFFF to this more responsible and environmentally safer version.

Q. Why doesn’t the Air Force just use PFOS/PFOA free foam?

A. AFFF agents that contain some form of PFOS/PFOA or related flurosurfactants are the most effective foams currently available to fight flammable liquid fires in military, industrial, aviation and municipal arenas. They provide rapid extinguishment, burn-back resistance and protection against vapor release.

Foam manufacturers are transitioning to the use of more environmentally responsible formulas that do not contain long-chain perfluorinated compounds. These short-chain formulas are low in toxicity and not considered bio- accumulative or bio-persistent.

AFFF Replacement Program

Q. When did the Air Force begin eliminating PFOS-based AFFF?

A. In 2007, U.S. Air Force locations in Europe began replacing PFOS-based AFFF in both mobile and fixed systems with European-Union-approved AFFF after the European Parliament and the council of the European Union issued a directive restricting the use of PFOS-containing substances.

In March 2011, the Air Force Civil Engineer Center initiated an informal plan for Air Force fire chiefs to dispose of “excess” PFOS-based AFFF Air Force-wide over a 10-year period. In November 2015, more environmentally responsible formulas were added to the DOD’s qualified products list for firefighting agents. The Air Force began replacing both PFOS-based and other legacy AFFF products with a new, environmentally responsible formula in August 2016. The Air Force completed new foam delivery in August 2017.

Q. What type of replacement foam will be used and how effective is it?

A. The Air Force awarded a $6.2 million contract to ICL Performance Products for 418,000 gallons of Phos-Chek 3 percent, six carbon chain AFFF. Delivery began in August 2016 and was completed in May 2017. The new formula meets both MILSPEC requirements for firefighting, and the goals of the U.S. EPA 2010/15 PFOA Stewardship Program.

Q. How is the new aqueous film forming foam (AFFF) different from the legacy AFFF?

A. The legacy AFFF formula contains long-chain fluorosurfactants while the new formula contains shorter chain molecules. Data reviewed by the EPA in 2009 suggests these shorter-chain formulas are less toxic because the chemicals are cleared from the body faster and are not considered bio-accumulative or bio-persistent. The new formula meets both military specifications for firefighting, and the goals of the EPA's 2010/15 PFOA Stewardship Program.

Q. When will legacy AFFF be out of the Air Force's inventory?

A. The Air Force began replacing legacy AFFF in fire trucks and stockpiles in August 2016. AFCEC completed delivery of 418,000 gallons of replacement foam to all locations in August 2017. AFFF contained in some fire protection systems in hangars will be replaced in conjunction with hangar renovations. Unlike mobile fire trucks, AFFF in hangars are contained to a stationary location — a more controlled environment.

Q. Is the Air Force replacing AFFF anywhere other than hangars and fire trucks?

A. Some installations may have put the new AFFF bench stock in trailers or overhead storage tanks but the Air Force has reduced the backup requirement. All legacy AFFF (C8) has been removed from vehicles and bench stock to include any fire department storage containers.

Q. How is the AF disposing of AFFF?

A. The process for AFFF disposal is to drain and collect the legacy AFFF from fire vehicles then triple rinse the vehicle foam tanks and collect the effluent. The legacy AFFF and effluent will then be sent to an authorized disposal facility for incineration. The incineration disposal method is currently the most environmentally safe way to eliminate the health and environmental risks associated with AFFF.

Q. Has the Air Force considered using fire-fighting foam made with non-fluorinated chemicals? If so, which ones?

A. To date, no non-fluorinated AFFF formulation has met the MILSPEC performance criteria necessary to safeguard our Airmen from real time fire emergency responses.

AFFF agents that contain some form of PFOS/PFOA are the most effective foams currently available to fight flammable liquid fires in military, industrial, aviation and municipal arenas. They provide rapid extinguishment, burn-back resistance and protection against vapor release. Foam manufacturers are transitioning to the use of more environmentally-responsible formulas that do not contain long-chain PFOS/PFOA. These short-chain formulas are low in toxicity and not considered bio-accumulative or bio-persistent.

AFFF Replacement in Hangars

Q. How many hangars require new foam?

A. According to base-report counts, there are approximately 386 facilities with AFFF systems on active duty Air Force installations, to include Air Force Reserve and Air Guard tenant facilities.

Q. When will hangar foam replacement be complete?

A. The Air Force expects to complete the project to replace hangar foam in FY18.

AFFF Containment

Q. What are holding ponds and tanks in fire training areas used for? What's the difference?

A. Fire training area tanks and ponds collect burn pit effluent (foam, fuel, etc.) so it doesn't get in storm water drains. For example, retention ponds are placed at the bottom of a slope from a burn pit to catch runoff. Ponds are equipped with a double, high-density Polyethylene liner and designed for the required operating volume, plus rainfall from a 10-year-rain event. Ponds also have leak-monitoring stations.

Q. How does the Air Force empty/dispose of AFFF-containing runoff in holding ponds, tanks and other containment methods in training areas?

A. The Air Force negotiates with the local waste water treatment plant to determine what they will receive from burn pits.

Q. What protocols does the Air Force follow for uncontained AFFF releases?

A. Even though PFOS and PFOA are not designated as hazardous, the Air Force treats AFFF releases as a hazardous material release, which requires immediate action. Installations are required to establish response procedures in accordance with National Fire Protection Standard 472. This standard defines hazardous material response requirements.

Q. What about risks of trucks leaking AFFF?

A. The Air Force's vehicular maintenance program ensures truck systems operate properly and malfunctions are quickly identified and fixed. Due to proactive maintenance, foam line leaks seldom occur, and even those rare occurrences have a second line of protection from drip pans under the vehicles to prevent ground contamination.

Future AFFF use

Q. When will the new AFFF be ready to use?

A. Except for four overseas locations awaiting shipping lanes to reopen, the new foam is already in use across the service.

Q. How will the Air Force respond to AFFF releases once trucks are equipped with the new AFFF?

A. The Air Force will continue to treat all AFFF release as a hazardous material release. Although environmentally preferable, six-carbon chain foams like Phos-Chek 3 percent still contain trace amounts of PFOA.

The Air Force discontinued regular fire truck system tests in July 2015 and will not resume foam-discharge tests, even with the new foam product, unless the installation has an environmentally approved containment system. The Air Force is retrofitting all fire trucks with a system that supports fire protection training needs and is environmentally friendly. The new system bypasses the tank containing AFFF and, instead, flows water through the extinguishing system and the cart, gathering data readings and discharging water from the vehicle's turret. Retrofitting approximately 850 fire trucks will take 15 months and be complete by December 2018.

Q. At one time, there was no reason to believe that legacy PFOS-based firefighting foam was not safe. What is the Air Force doing to ensure history isn't repeated?

A. The Air Force is taking steps to guard against future contamination by replacing legacy AFFF stockpiles with a foam that reduces PFOS/PFOA exposure, Phos-Chek 3 percent, six carbon chain AFFF. The Air Force is taking additional steps to reduce or eliminate unnecessary foam releases by:

- Retrofitting all fire vehicles with a switch mechanism to test functionality without discharging AFFF into the environment.
- Standardizing hangar systems and replacing systems containing the old formulation in conjunction with building renovations.
- Conducting fire training exercises in double-lined pits to prevent soil and groundwater contamination.
- Treating any uncontained releases of AFFF as if it were a hazardous-material spill and requiring immediate cleanup.