“Protecting Fire Fighters from Dangerous Chemicals in AFFF”

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Pre-presentation question?
Protein Foam

In the 1960s, Fluoroprotein Foam was developed and included a fluorinated surfactant. It was considered “better” than protein because it had a greater blanket life and was compatible with dry chemical.
ARFF Fire Fighters Have Multiple Routine Exposures to Foam Concentrate and Finished Foam During Training, Maintenance and Emergency Response.
Perfluorooctane Sulfonate – PFOS
Perfluorooctanoic Acid - PFOA

PFOS & PFOA’s are Part of a Larger Group Called: Per and Polyfluoroalkyl Substances - PFAS

PFAS Have Been and in Some Cases, Still Are Used As Surfactants to Improve the Effectiveness of Fire Fighting Foam

The EPA Warns that PFAS are PERSISTENT, BIO-ACCUMULATIVE and TOXIC - PBT
PERSISTENT – Stable, Does not break down in the environment

BIO-ACCUMULATIVE – builds up over time in the body

TOXIC - Poisonous

Potential Exposure Routes

• Ingestion of contaminated food and water
• Absorption
• Inhalation
HEALTH HAZARDS – PFOS and PFOA

Human epidemiological studies found associations between PFOA exposure and high cholesterol, increased liver enzymes, decreased vaccination response, thyroid disorders, pregnancy induced hypertension and preeclampsia, and cancer (testicular and kidney). (EPA 2016e)

There is suggestive evidence that PFOS and PFOA may cause cancer. (EPA 2016d)

The American Conference of Governmental Industrial Hygienists (ACGIH) has classified PFOA as a Group 3 carcinogen – confirmed animal carcinogen with unknown relevance to humans. (Group 2B) (IARC 2016)
PFAS are present in a number of household and workplace items such as:

- Food grown in contaminated soils, and or watered with contaminated water
- Food packaging that includes PFA in the manufacturing process
- Household products such as stain and water repelling products, non-stick products (teflon), polishes, waxes, paints and cleaning products
- Drinking water from contaminated sources
- Firefighting foam
- Chrome – plating
- Electronics manufacturing
- Living organisms, fish, animals and humans
- Was used in the thermal layer in the manufacturing of certain bunker gear
AFFF manufactured after 2002 is made with a process called Telomerization, which is a process for polymerizing perfluoroethylene to produce perfluorinated surfactants. These surfactants have carbon chains that range from C4 to C24 in length.

The EPA indicates that shorter (>C8) carbon chains have a reduced potential for toxicity and bioaccumulation.

PFOA - C8 has 8 Carbons
C6 Versus C8

C8 = PFOS / PFOA

C6 = PFOS / PFOA Free, but still accumulates PFOA through the manufacturing process.

C6 utilizes many other PFC chemicals to achieve the same performance as C8.

WE ARE TRADING TODAYS PROBLEM FOR TOMORROWS PROBLEM!
ACTION ITEMS

• Identify the type foam in your inventory. Contact the foam manufacturer with the foam type, Lot number or date of purchase. People handling the foam should know the difference between C6 and C8 and what foam they are handling.

• Ensure that Safety Data Sheets (SDS) are available for employees to review for all dangerous chemical on hand, including C6 and C8 AFFF.

• Develop and implement SOP’s for the safe handling of AFFF.

• The next generation of foam is likely to be fluorine free, but regardless of the safety claims made by manufacturers, continue to treat foam as a dangerous chemical.
ACTION ITEMS

• Consult with your environmental department for guidance relative to:
  • Approved methods / locations for foam testing, training and maintenance.
  • Approved disposal methods for foam concentrate
  • Approved disposal methods for disposal of foam containers
• There currently is no established PFAS blood level at which a health effect is known nor is there a level that predicts health problems.
• Most people in the US will have measurable amounts of PFAS in their blood.
• The blood test for PFAS can only tell us of specific PFAS in your body at the time of the blood test.
• The blood test results cannot predict or rule-out the development of future problems related to exposure.
FOAM HANDLING

During Firefighting

• Use common sense. Wear your PPE. If your PPE is contaminated with foam, rinse it off at the scene, bag it and launder as per PPE manufacturers' guidelines.

• Use all the foam you need to extinguish the fire and secure a safe scene, then stop discharging foam. Remember: Life – Property – Environment

• Flush the truck as per Department SOP and environmental department guidance.

• Wash thoroughly or shower after exposure.
FOAM HANDLING

During Reservice, Maintenance or Testing:
• Limit unnecessary exposure
• Wear Tyvek suits with booties
• Wear rubber, latex or nitrile gloves
• Wear goggles
• Wear respiratory inspection, SCBA or approved respirator. (Minimum P-100 or R-100 Mask).

Check with your Haz-Mat Team

Respiratory protection is particularly important to the person monitoring the foam level and anyone who is pouring foam into the top fill cover.
OPEN DISCUSSION

POST PRESENTATION Question?
PROTECT YOURSELF!

DO NOT WAIT FOR THE DEPARTMENT, THE UNION OR THE GOVERNMENT TO PROTECT YOU!

SHARE THIS INFORMATION!

CONTINUE TO LEARN!

GOOGLE PFOS!

READ SDS’s

EXPECT THE UNEXPECTED!