DRAFT

Fire Fighting Foam Coalition

February 11, 2013

Michael Healy
Assistant Secretary
Environment and Engineering
Australia Department of Defence

Dear Mr. Healy,

I was asked by Bill Nicholls to respond to your letter to him of 4 January 2013 on issues associated with the chemicals contained in aqueous film forming foam (AFFF). I am the Executive Director of the Fire Fighting Foam Coalition (FFFC), a non-profit trade association whose members are manufacturers of fire fighting foam agents and their chemical components. We work closely with the US Department of Defense and the US Environmental Protection Agency on issues related to the environmental impacts of fire fighting foams.

All modern AFFF agents contain telomer-based fluorosurfactants. This includes the Ansulite products referenced in your letter and all other currently manufactured AFFF agents (except possibly some produced in China). **Telomer-based AFFF agents do not contain or breakdown to PFOS.** In addition they contain about 30-60% less fluorine than PFOS-based AFFF. Figure 1 provides an overview of the differences in chemistry between PFOS-based and telomer-based products.

Any measurement of significant amounts of PFOS in telomer-based AFFF is likely to have been caused by contamination of the equipment used to store, transfer, or test the agent in question. Any equipment that has been used with PFOS-based foam and has not been thoroughly flushed multiple times is likely to be contaminated. This would not be unexpected as existing stocks of PFOS-based foams continue to be used in Australia. Other than the incident referenced in your letter, our members are not aware of any telomer-based AFFF agents being shown to contain PFOS.

We would caution against the use of the term "PFOS free." At this point PFOS has become ubiquitous in the environment and there are background levels that can always be measured.

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Enclosed are results of aquatic toxicity testing of fire fighting foams sponsored by FFFC[1]. The results are similar to those referenced in your letter for the Ansulite and Solberg products. The fluorine-free foams tested were about an order of magnitude higher in aquatic toxicity than AFFF agents.

Telomer-based AFFF agents currently contain predominantly six carbon (C_6) fluorosurfactants and will be transitioning to pure C_6 fluorosurfactants over the next few years in response to the EPA PFOA Stewardship Program. Under this program eight fluorochemical manufacturers have voluntarily agreed to reduce 95% by year-end 2010 and work to eliminate by year-end 2015 both plant emissions and product content of PFOA (perfluorooctanoic acid), PFOA precursors, and related higher homologue chemicals. As noted in the following two paragraphs, existing data shows that shorter-chain compounds (C_6 and below) have a lower potential for toxicity and biopersistence.

The predominant breakdown product of the shortchain C_6 fluorosurfactants contained in telomer-based AFFF agents is commonly referred to as the 6:2 fluorotelomer sulfonate (6:2 FTS)[2]. A broad range of existing data indicate that 6:2 FTS is not similar to PFOS in either its physical or ecotoxicological properties[3,4,5,6]. 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 biopersistence screening studies that provide a relative measure of biouptake and clearance[7] (see Figure 2).

Work has also been done on a possible breakdown product and contaminant that may be found in trace quantities in AFFF-type fluorosurfactants: perfluorohexanoic acid (PFHxA). Extensive data on PFHxA presented in 2006 and 2007 provide a very favorable toxicology (hazard) profile[8,9,10]. Testing done on four major toxicology end points showed 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[11]. Combining these data with those presented 2006 and 2007 provides significant evidence that this particular end product has a low hazard profile based on current data.

As noted in your letter, only foam agents that have passed the requirements of the milspec (MIL-F24385F) can be used for military applications in the United States. In addition, the Federal Aviation Administration (FAA) requires that all US airports carry foam that meets the milspec. Enclosed are a US Department of Defense Risk Alert on AFFF and an FAA Certification Alert that provide more information on these requirements. Currently only AFFF agents are able to meet the performance requirements of the milspec. A list of these products is contained in the US Department of Defense qualified products database (QPD). Recent testing by the US Naval Research Labs showed that the Solberg RF6 product referenced in your letter does not meet the performance requirements of the milspec and as such would not meet FAA requirements for use at US airports[12].

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FFFC appreciates the opportunity to provide information on these issues to the Australia Department of Defence. Please let us know if you have any questions.

Sincerely,

Tom Cortina
Executive Director
Fire Fighting Foam Coalition

Cc: Bill Nicholls

Enclosures

Figure 1. Fluorotelomer-based and PFOS-based Chemistry

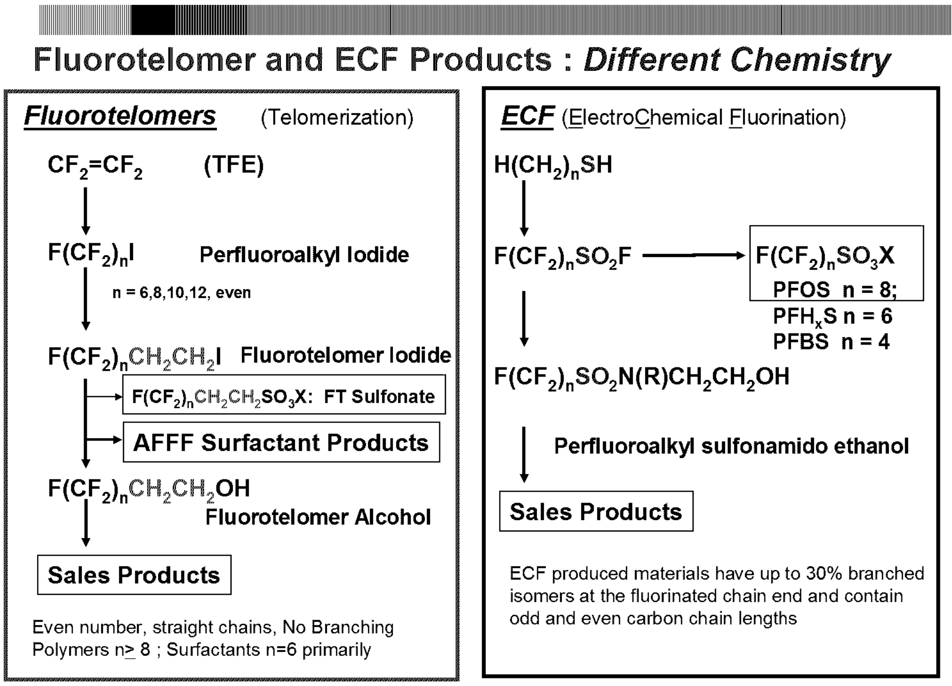
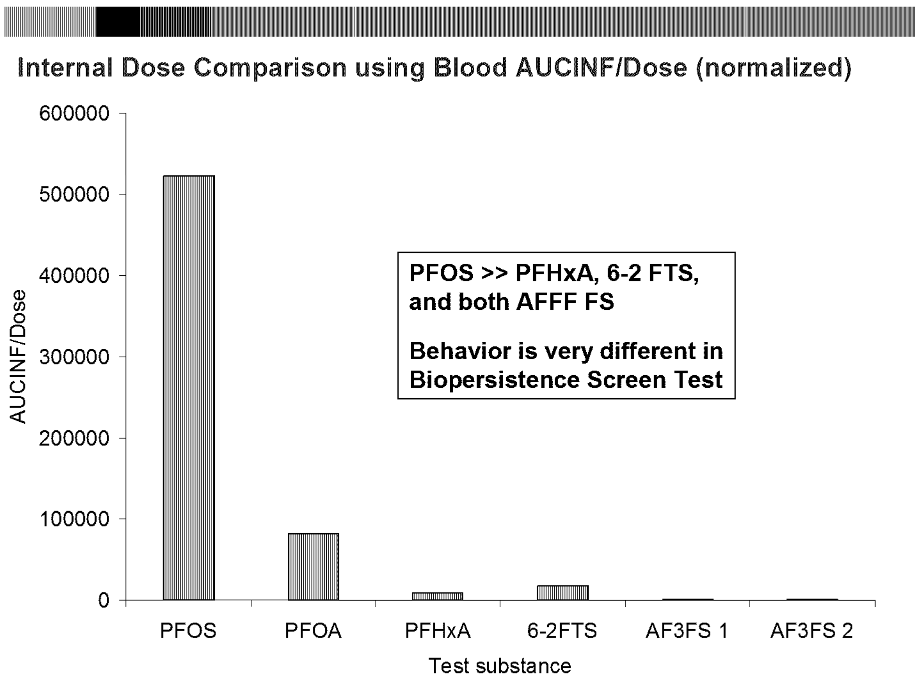


Figure 2. Biopersistence Screening Study Results



References

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[3] DuPont 2007a. H-27901: Static, Acute 96-Hour Toxicity Test with Rainbow Trout, *Oncorhynchus mykiss*. Unpublished report, DuPont-21909.
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[11] A 24-Month Combined Chronic Toxicity/Carcinogenicity Study of Perfuorohexanoic Acid (PFHxA) in Rats, H. Iwai, M. Shinohara, J. Kirkpatrick, J.E. Klaunig, Poster Session, Society of Toxicologic Pathology, June 2011
[12] Extinguishment and Burnback Tests of Fluorinated and Fluorine-free Firefighting Foams with and without Film Formation, Bradley Williams, Timothy Murray, Christopher Butterworth, Zachary Burger, Ronald Sheinson, James Fleming, Clarence Whitehurst, and John Farley, Naval Research Laboratory, Washington, DC, presented on March 25, 2011, at the SUPDET Conference