



# AFFF Update . . .

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## **Europe and Canada to Ban Use of PFOS Foams**

The European Union (EU) and Canada are both proposing to ban the use of existing stocks of PFOS-based fire fighting foams within 5 years as part of broader PFOS regulations. 3M produced the vast majority of PFOS-based foam agents until it stopped production in 2002. These regulations will not impact the use of telomer-based foam agents manufactured by companies such as Ansul and Kidde, as they do not contain PFOS.

The amount of PFOS-based foam concentrate that will have to be removed from service, should it not be used by that date, could be significant. A study by Hughes Associates of AFFF inventories in the United States (US) showed that there were 4.5 million gallons of PFOS-based AFFF concentrate in stock in 2004. US regulations prohibit the manufacture of new PFOS-based foam agents, but do not restrict the use of existing stocks.

One positive outcome of these restrictions will be that once all PFOS-based foam stocks are removed from service, a major fire such as the one that occurred in Buncefield, England in December 2005 would no longer result in PFOS contaminated wastewater. A substantial quantity of the foam used at Buncefield was of the PFOS type.

### **European Union**

A new EU directive was published in December on perfluorooctane sulfonate (PFOS), a substance that is considered by regulatory authorities to be persistent, toxic, and bioaccumulative (PBT).

Under the directive, PFOS may not be placed on the market or used as a substance or constituent in a concentration equal to or higher than 0.005% by mass. The directive also outlaws the sale of PFOS or its use in semi-finished products or articles if the concentration of PFOS is equal to or higher than 0.1% by mass or, for textiles or other coated materials, if the amount of PFOS is equal to or higher than 1 µg/m<sup>2</sup> of the coated material.

### **Exemption for Fire Fighting Foams Not Needed**

Exemptions were included for uses of PFOS where no acceptable alternatives exist, including photoresists, photographic coatings, and chromium plating. The original European Commission proposal released in December 2005 included an exemption for fire fighting foams, but the exemption was subsequently determined to be unnecessary because alternative telomer-based foam agents are available that do not contain PFOS and provide an equivalent level of fire protection.

The final EU directive now stipulates that existing stocks of PFOS-based foam agents, the majority of which were produced by 3M, be removed from service by June 27, 2011. To facilitate tracking and adherence to the directive, EU Member States must provide the Commission with an inventory of existing stocks of PFOS-based foam agents by December 27, 2008.

### **No Control Measures on PFOA**

There were proposals to include perfluorooctanoic acid (PFOA) in the PFOS directive. However, the Commission decided to keep under

review the ongoing risk assessment activities related to PFOA and could propose measures in the future to reduce any identified risks. It is worth reiterating that in October 2003 a workgroup of the United States Environmental Protection Agency (EPA) determined that telomer-based AFFF is not likely to be a source of PFOA in the environment. EPA concluded that existing data "provided no evidence that these fluorosurfactants biodegrade into PFOA or its homologs..."

An influence in the EPA workgroup decision was a report by Dr. Jennifer Field of Oregon State University that contained data on fluorosurfactants in groundwater at three military sites where AFFF was used to train fire responders. Dr. Field concluded that the 6:2 fluorotelomer sulfonate was likely the primary breakdown product of the six-carbon fluorosurfactants contained in telomer-based AFFF. It is well known and documented that the 6:2 fluorotelomer backbone is the primary building block for currently manufactured fluorotelomer surfactants.

### **6:2 Fluorotelomer Sulfonate Is Not PFOS**

There have been statements in some recent articles that the 6:2 fluorotelomer sulfonate (6:2 FtS) is similar to PFOS in chemical structure and is therefore likely to be similar in biological toxicity and bioaccumulation. This is simply not true. The 6:2 FtS has six fluorinated carbons, not eight like PFOS. It is not fully fluorinated as it has an ethylene spacer between the fluorocarbon chain and the functional end group. These two elements alone provide some very significant differences in chemical properties.

Recently, a number of toxicology, ecotoxicology and biodegradation studies were performed on specific AFFF fluorosurfactants that are likely to biodegrade to the 6:2 FtS. Results show that these fluorosurfactants are low in acute and subchronic toxicity, low in aquatic toxicity, negative for genetic and developmental toxicity, and do not bioconcentrate in fish. These and other data provide

strong evidence that currently used AFFF-type fluorosurfactants behave much differently than PFOS in both biological and environmental systems.

### **Canada**

A proposed regulation was published by Environment Canada in December that would prohibit the manufacture, use, sale, and import of PFOS or products containing PFOS. Similar to the EU directive, existing stocks of PFOS-based AFFF would have to be removed from service 5 years after the regulation comes into force. During the 5-year exemption period, those stocks could not be used for testing or training purposes. (In other words, they could only be used to extinguish emergency fires.) The final regulation is expected to be published in 2007.

### **Summary and Conclusions**

Purchasers and users of fire fighting foams in Europe and Canada should be aware that they will be required to stop using stocks of PFOS-based AFFF, the majority of which were produced by 3M, within the next five years (2011-2012). These restrictions do not impact the use of telomer-based AFFF. Current regulations in the United States do not restrict the use of existing stocks of PFOS-based AFFF.

Telomer-based AFFF agents are the most effective agents currently available to fight Class B flammable liquid fires, providing the benefits of rapid extinguishment and protection against vapor release. They do not contain or breakdown into perfluoroalkyl sulfonates such as PFOS and are not likely to be significant sources of perfluoroalkyl carboxylates such as PFOA. They contain fluorosurfactants that are persistent (which is a characteristic of fluorine-containing materials), but are not generally considered to be significant environmental toxins. They are not currently being considered for regulation by environmental authorities in the US, Europe, or Canada and are expected to be available to serve critical fire protection and life safety applications for the foreseeable future.



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