Concawe/Nicole Technical Report on PFAS

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INTRODUCTION

Poly- and perfluoroalkyl substances (PFAS) have been used since the 1970's for a wide range of domestic and commercial applications, including the formulation of Aqueous Film Forming Foams (AFFF) used for fighting Class B (liquid hydrocarbon) fires. Recently PFAS have emerged as a group of Constituents of Potential Concern (COPC), with an increasing regulatory focus regarding use, clean-up and protection of human health and the environment.

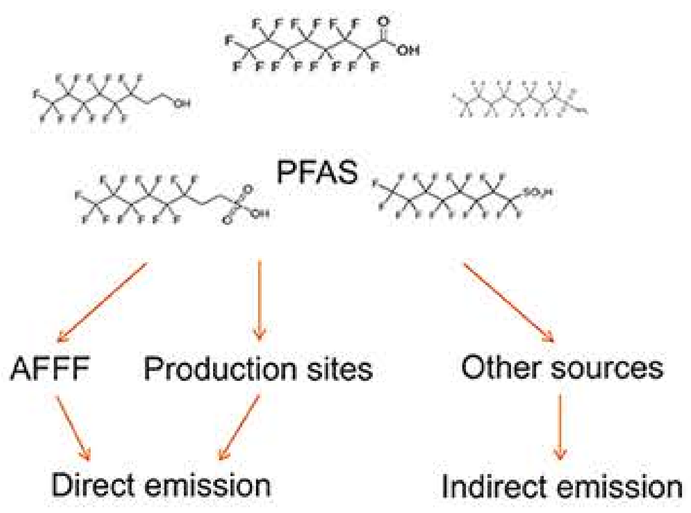
For this reason Concawe, which undertakes environmental research on behalf of the European petroleum refining industry, has completed comprehensive review of published literature on the environmental fate and effects of PFAS. The document aims to help Concawe members understand and manage environmental and human health risks associated with current and legacy formulations of PFAS-based class B fire-fighting foams.

PFAS – FROM APPLICATION TO REMEDIATION

Since the chemistry and behavior of PFAS are complex, and the group of PFAS consists of thousands of compounds, information from about 200 references has been combined into one concise overview containing the relevant information for site owners to assess the environmental impacts of (historical) AFFF use at their sites.

For instance, AFFF containing the long chain PFAS compound perfluorooctane sulfonic acid (PFOS) was prescribed as the preferred fire-fighting foam from the 1970s to the year 2000. Since 2000, however, it has been recognized that long chain PFAS, especially PFOS, poses a threat to the environment and to human health. And in 2009, PFOS was added to Annex B of the Stockholm Convention on Persistent Organic Pollutants (POPs), meaning that measures must be taken to restrict its production and use.

Due to the direct application of AFFF to the environment during fire-fighting, besides production sites, AFFF is one of the major PFAS sources to the environment. Other emissions may arise from landfills (degradation of PFAS containing products, like carpets, apparel, packaging), wastewater treatment facilities (PFAS are not biodegradable).



The review describes a broad group of ~50 PFAS, yet it is recognized that this is only a small part of the total amount of PFAS possibly present at AFFF sites. Precursors degrading into PFAA's (perfluoroalkyl acids) as dead-end daughter products may form a long-term source of PFAS into the environment.

PFAS behave differently than other well-known contaminants, and research about these contaminants is evolving quickly. A very low European target level for surface water has been set, and drinking water target values tend to decrease.

The report is available at: https://www.concawe.eu/publication/environmental-fate-and-effects-of-poly-and-perfluoroalkyl-substances-pfas-report-no-816/

To manage PFAS related sites, the report gives a comprehensive overview of regulations, toxicity data, environmental fate and transport properties, sampling and analytical techniques and remediation.

The report builds upon an extensive search of reviewed literature, and is an objective technical reference.

IMPLICATIONS FOR FIRE-FIGHTING FOAM USERS

It is important that users of class B fire-fighting foams understand and manage both environmental and fire safety aspects of foam use. Short-chained fluorinated foams cannot degrade to PFOS or PFOA and they seem to be of less concern from an environmental standpoint. It should be noted, however, that there is still uncertainty about their properties. Low environmental concentrations limits have been set for short-chain PFAS in several EU countries due to their persistence. Where possible, water containing PFAS-based fire-fighting foam residues should be captured for treatment and not discharged into the environment.

Alternative fluorine-free foams exist and are improving but need demonstrated effectiveness for major tank fires.

FOAM STOCKS

An assessment of site foam stocks is recommended to ensure that any legacy stocks containing >0.001 wt% PFOS (banned for use in the EU since June 2011) are set aside for safe disposal by high temperature incineration. A similar assessment should be completed for foam stocks that may be brought to site from third parties in the event of an emergency. At locations where fluorochemical- based foams have been used for fire-fighting or fire-fighting training, users should consider how to manage the potential issues.