APP203827 Proposal to amend the Fire Fighting Chemicals Group Standard 2017

Submission Reference no: 10

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Overall Position: Support in Part

Overall Notes:

Clause
What is the reason for making the submission?
Notes
The Fire Protection Association (the FPA), is the pre-eminent trade organisation representing the Fire Protection Industry with detailed knowledge of fire protection technology. The FPA is making this submission to ensure that an informed decision is made to meet the challenges of preserving the safety of the public, the built environment and the natural environment from the direct and environmental impacts of fire and firefighting. FPA comments are with respect to fixed fire protection systems. Organisations such as Fire and Emergency New Zealand are better suited to comment on the impact of this proposal on manual fire-fighting operations.

Clause
Do you wish to speak at a hearing?
Position
Yes
Notes
The FPA would like to speak in the hearing to ensure appropriate subject matter experts can relay more specific details about this submission to ensure the committee is fully informed.

Clause
What is your preferred outcome of this consultation?
Notes
The FPA strongly recommends that the proposed removal of C6 fluorotelomer agents in certain high challenge applications is delayed, where there are no viable alternatives, until it can be demonstrated that viable alternatives can be supplied, installed and relied on to do the same job as existing systems. The FPA notes that new and better technology is emerging to protect against challenging flammable and combustible liquid fires

Clause
Do you consider there are any applications for which fluorine-free foams are not suitable or do not have relevant approvals? If yes, please specifiy.
Position
Yes
Notes
The FPA do not believe that fluorine free foam agents are currently suited or proven to protect several particularly challenging risks , including in the aviation sector, petroleum storage and transfer sectors, and dangerous goods storage warehouses. Environmental contamination can be countered in the main by changing practices related to firefighting foam training and system testing. The consequences of unreliable fire protection should be considered with environmental consequences. Fluorine free foams do not have the same ability to suppress flammable vapours, shed flammable fuel and spread over flammable liquid surfaces compared to C6 fluorotelomer foam solutions. The FPA note that for effective fire-fighting, fluorine free foams are less forgiving than C6 fluorotelomer foams. C6 fluorotelomer foams are easier to apply, have a wider variety of delivery methods, and will spread across a flammable liquid surface more readily than fluorine free foams. If a suitable fluorine free foam can be sourced that is suitable for the hazard, replacement of a C6 fluorotelomer is not simply a case of draining and cleaning an existing system but will require significant engineering, with potential increases in concentrate storage volumes, changes in

proportioning equipment, increased water supply storage and pumping capacities and replacement of discharge devices. This will lead to significant costs to end users. Some manufacturers are claiming that their Fluorine free foam agents can be “dropped in” to replace C6 fluorotelomer foam concentrates, but cannot present evidence that testing has been carried out to validate these claims.

Clause
What do you think of the practicality of these disposal provisions, in terms of the resources and costs involved?
Notes
The practicality of cleaning systems containing PFAS cannot be established unless the proposed allowable limits of fluorinated organic compounds is published. If the limits are extremely low, cleaning could entail dismantling of piping systems, etc., which could be extremely expensive. We are aware of at least one significant system where the piping is encased in the building’s concrete floor, thereby potentially requiring trenching and remediation, should the limits be too low. The cost of this work would likely to be in the millions. If the allowable limits of trace elements of the fluorinated chemicals are set too low, then the costs to clean will become excessive. Traces may be trapped in “dead end” components such as in pressure gauges and between flanges and gaskets. Foam storage bladders will also need to be replaced. Disposal of liquid contaminated by PFAS to the same standard as PFOS will be extremely expensive. The FPA currently understand that currently there are no suitable disposal facilities within New Zealand, meaning that this will require that New Zealand exports essentially large volumes of water for cement kiln, plasma arc or thermal destruction.

Clause
Would your business be able to contain all foam wastes?
Notes
Disposal of liquid contaminated by PFAS to the same standard as PFOS will be extremely expensive. The FPA currently understand that currently there are no suitable disposal facilities within New Zealand, meaning that this will require that New Zealand exports essentially large volumes of water for cement kiln, plasma arc or thermal destruction

Clause
If not, is this due to cost or practical difficulties?
Position
Cost - please specify
Notes
While not directly impacting the FPA, it is noted that there is a limited market for containing foam wastes. A lack of competition and facilities could lead to high pricing.

Clause
Do you have any concerns about fluorine-free foams potentially containing other persistent, toxic and/or bioaccumulative compounds?
Position
Yes - please specify
Notes
While fluorine-free foams do not contain persistent toxic and/or bioaccumulative compound, the FPA notes that fluorine free foams are significantly and acutely more ecotoxic than fluorinated agents. The FPA notes also that they may not be persistent and may disperse quickly. While F3 foams are typically 100% bio-degradable and are therefore not persistent in the environment, it should be noted, that the short term environmental impacts of many F3 foams have been shown to be an order of magnitude higher in short term aquatic toxicity than C6 foams. Evidence suggests, when unsuited to the application, they are slower to extinguish volatile fuels, so more foam is likely to be used, raising BOD levels. Combined these factors could cause more short term adverse impacts on fish, other aquatic organisms and particularly in small or isolated water bodies. It is therefore important to remember that all foams pollute (regardless of the type of foam being used) and that their use should be minimised, collected and managed to reduce environmental impacts

Clause
Do you agree with phasing out C6 AFFF at the same timeframe as C8 AFFF?
Notes
Protecting people, property and the environment from fire requires a balance of all factors. While foam agents may have toxic impact, the run-off water and atmospheric smoke discharges from a fire are also harmful to the environment and in some cases as or more toxic. This fact needs to be recognised in any regulation. A very graphic and recent example is the smoke and millions of litres of contaminated water discharged from the New Zealand International Conference Centre fire. Considerations in protecting the environment need to consider the need to effectively extinguish any fire as quickly and safely as possible as well as minimising extended discharges of contaminants during a fire. The FPA do not agree that phasing out C6 fluorotelomer agents at the same time as C8 agents is sound. This exceeds the requirements of the Stockholm Convention and fails to recognise that modern C6 fluorotelomer concentrates PFOS free. While C6 foams do contain trace levels of PFOA which are unavoidably produced by the manufacturing process but are acceptable under Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation (EU) 2017/1000. C6 foams are persistent but are neither bio-accumulative, nor toxic and are of low concern to human health and the environment

Clause
Which is your preferred option?
Position
Grant permissions to continue to use C6 foams
Notes
The FPA preferred option is to allow the use of C6 fluorotelomer agents, adopting the “State of Washington” approach in high challenge risks where there are no viable alternatives. The FPA does agree that they should be phased out but only when sound alternatives are available These alternatives need to have been demonstrated as being fit for purpose following robust fire testing with type approvals, listings and certifications in place.

Clause
What are your reasons?
Notes
In addition to the time to develop appropriate fit-for-purpose alternatives to C6 fluorotelomer foam systems, the phase out program needs to reflect the time involved to design, install and commission alternative systems, noting that in most cases, replacing C6 fluorotelomer foam concentrate cannot be done by simply “dropping in” an alternative concentrate.

Clause
Can you estimate the cost to your business of phasing out C6 AFFF?
Position
No
Notes
While the FPA is not directly impacted, the costs required to phase out C6 fluorotelomer agents will be considerable in many cases. One example is where aircraft hangars are protected by floor mounted grate nozzles. These nozzles are not an air aspirating nozzle and therefore may not be able to be used with fluorine free foam concentrates, which may require aspirating discharge devices. The FPA address these concerns in more detail in the response to question 15.

Clause
Do you have any other comments to make about the proposed amendments?
Notes
15.1 Introduction The FPA is committed to preserving life, property and the environment. To that effect, it is broadly supportive of the proposals to remove fluorinated foam agents from New Zealand. However, to do so, it is essential that the ability to effectively control the fire and impact of fire is not impaired, especially in high risk environments. An uncontrolled significant fire can also have a devastating impact on the environment. Examples include Sandoz Fire in Basel, Switzerland which set back the environmental remediation of the Rhine River by 10 years and, closer to home, we note that the ongoing health issues caused by the ICI (NZ) Limited fire of 1984 (which are still reported in the press). Even relatively innocuous materials such as cheese and butter can have significant impact on the environment should they be involved in a fire. A report on the Icepak New Zealand Limited fire, of 2008, indicates that the facility owners were not prepared to protect against the run-off from a fire and that Environment Waikato had to deploy resources to prevent the run-off water entering the water ways. Factors that prevented worse damage and made handling the environmental impact “relatively straightforward” included that the site was near Hamilton and so had necessary resources available. These factors included Icepak owned open land adjacent to the runoff flow path, a digger was on hand, the weather was dry and there were no fire hydrants to supply water to fight the fire, so there was less water run off to cope with. The probability of a challenging fire is low but the impact on the environment can be high. In turn, the probability that foam agents outside a fire will enter the environment is also low but the potential impact if effective firefighting is not possible can be extremely high. In most cases, the design of foam systems will have considered the need to contain the run-off foam solutions. However, if the fire is not controlled, there is a high probability that the containment provisions will be overwhelmed. It is essential that any changes to the Fire Fighting Chemicals Group Standard adopts a balanced approach to not only protecting the environment from the impact of the firefighting foam agents but also from the potential run-off water and atmospheric discharge from a fire. 15.2 Phase-Out of Ozone Depleting Substances – Lessons Learnt Previously, the FPA has shown environmental stewardship in managing the withdrawal of Ozone Depleting Substances used in the fire protection industry including Halon 1301 and Halon 1211, in accordance with the provisions of the Montreal Protocol of 1987. However, the FPA fears that some of the issues that arose in that program may occur with the replacement of C6 foam concentrates, if potential replacement concentrates are not fully developed. Halon 1301 systems were widely used to protect electronic data processing facilities, as the gas was very effective in extinguishing fires, while not posing a significant hazard to the occupants of any room exposed to a system discharge. However, the gas had a high ozone depleting potential and was withdrawn from the market, following the Montreal Protocol. At the time of withdrawal the only viable replacement agent was carbon dioxide which could have fatal consequences should it have been discharged into an occupied room. The Fire Protection Industry responded to the Montreal Protocol by developing replacement agents which would not have an unacceptable adverse impact on the safety of the occupants of a room, while providing effective fire protection. Two paths were followed: • Chemical agents such as HFC 227ea; and • Inerting agents such as Inert Gas IG-55 and IG-541. The chemical agents were effective in suppressing fire and had zero ozone depleting potential, which resulted in their widespread use throughout the world. However, the global warming potential and long atmospheric lifetime of the first-generation chemical agents such as HFC 227 had not been considered, which resulted in a different set of adverse environmental issues to that the agents were designed to solve. In some jurisdictions, this resulted in further restrictions on the use of these agents with additional costs to the end user and therefore ultimately to the public. HFC 227ea is said to have a Global Warming Potential at 3500, over a 100 year time horizon, compared to CO_2 with a reference value of 1. The adverse environmental impacts of these first-generation agents were not widely reported by the manufacturers to the fire protection industry. The FPA also notes that

while the Halon fire protection agents have been in the process of being phased out since the early 1990's, they have not been entirely removed from use. Some essential users (including the sectors of the aviation industry) still do not have acceptable alternatives. An example of this is in the continued use of Halon 1211 and 1301 in some aircraft due to the significant cost to reengineer discharge systems and to test and validate the replacements will work as effectively as well as the significant cost to recertify existing aircraft. The FPA has worked and continues to work with industry on collection and safe disposal and has a proven track record working with the EPA and Ministry for the Environment in managing existing installations. The FPA have also been instrumental documenting all systems and owners of Halon and following up for replacement and or safe disposal rather than the Ministry needing to deal with multiple owners. The FPA is best placed to carry out similar functions managing and the removal and disposal of existing foam systems in realistic time frames based on risk factors to the environment and economy. 15.3 Use of Fluorinated Foam Agents Fluorinated foam agents are used in a significant number of sites where there would be a significant impact if a fire occurs. These sites usually have strict controls in place to ensure that the probability of a fire occurring is low and usually have containment facilities to minimise the probability of run-off water, including foam solution, entering the waterways. Fluorinated foam concentrates are employed in fixed fire protection installations used to reduce the impact of fire in facilities such as: • Military and civil aviation aircraft hangars; • Dangerous goods storage warehouses; and • Petrochemical facilities. The FPA does not believe that in such applications that the use of foam concentrates have been sufficiently developed and robust fire tested with listed proportioning and discharge equipment to demonstrate that they are fit for purpose. 15.4 Replacement of C6 fluorotelomer Foam Concentrates There will be significant issues, in most cases, in replacing C6 fluorotelomer foam concentrates with alternative agents. In many cases, the fluorine free foam agents will also have significantly greater viscosity, thereby requiring new foam proportioning equipment. The C6 foam solution is usually discharged through non-air-aspirating devices. This includes normal sprinkler heads and floor grate nozzles. Fluorine foam agents require air-aspirating nozzles to generate a foam blanket. These are not available to replace closed sprinkler heads, nor floor grate nozzles. A foam system requires the use of listed components where the system is tested as a sum of the components and not individual items. Therefore, a foam proportioner is tested with a foam concentrate to ensure that the two system components are compatible with each other and are fit-for-purpose. A significant exception to this is "Mil Spec" foam, where US Military Specifications are written to ensure that various fluorinated foam concentrates approved for US Military use are compatible with each other. In many cases, the discharge rates for fluorine free foam agents is higher than that required for C6 agents. This in turn will require that the foam concentrate storage tank volumes be increased. In most cases, replacement of C6 foam agents is not a "drop-in" activity, where the tanks and pipework are drained, cleaned and refilled. In most cases, the replacement will entail a significant redesign, physical installation works and recommissioning. The costs to New Zealand to carry out this work should not be under-estimated. WorkSafe New Zealand are currently reviewing several complexes which manufacture, process or store flammable liquids. This is resulting in the retrofitting of fixed foam fire protection systems to these complexes, with considerable capital outlay. In some cases, the costs of installing systems have made the facility economically marginal. Should it be necessary to re-engineer the systems, this could make the facilities economically not viable. 15.5 Efficacy of Fluorine Free Foam Agents The FPA is concerned that the efficacy of fluorine free foam agents has not yet been established. For example, in the aviation sector, events have shown that fluorine free foam agents do not appear to be effective. Emirates Flight 521 crashed on landing at Dubai in August 2016. There was an explosion and a fire 9 minutes after the plane came to rest. The fire burnt for 16 hours despite the application of fluorine free foam. It appears that the foam was ineffective in controlling and extinguishing this fire. This incident can be compared with the 2013 Asiana Airlines crash in San Francisco, where it is reported that MilSpec AFFF foam rapidly extinguished fuselage fires, preventing escalation. There were 3 fatalities and 187 injuries, with 307 passengers aboard. The FPA is also aware of demonstrations being delayed due to environmental conditions not being conducive to successful results During a 2016 conference in Singapore , a fire test of a fluorine free agent, intended to be a conference highlight, was replaced by a C6 fluorinate agent at the last minute because "too many environmental factors were not under our control to do F3." Apparently, it was too hot at 320C for the tests to be effective. Fluorine free foam agents do not appear to have the characteristics that make fluorinated foams so effective and particularly the ability to spread and form a film on top of the fuel, preventing the combustion of flammable vapours. As technology develops and full-scale fire testing is carried out, it is possible that fluorine free foams will be developed that are as effective as fluorinated foams. Foam manufacturers desire to protect their market share and are investing in developing alternative agents, being cognisant of the need to develop environmentally friendly alternatives. As research and development is confidential to the manufacturers, it is difficult to determine when effective agents will be available. This could also have a consequential effect that manufacturers may supersede and discontinue first generation fluorine free foams as subsequent generation product with better performance is developed. This could leave early adopters who replace current fluorinated foam systems with new fluorine free foam systems in the position of having a foam system that becomes unsupported and needs to be replaced again. The FPA does not believe that there is enough evidence to demonstrate that C6 agents can be replaced in the aviation, petrochemical industries and dangerous goods storage warehouses with fluorine free foam systems. The consequences of the inability to control a flammable liquid fire could be catastrophic to both the economy and the environment, with consequential risk to fire fighters. In summary, due to fluorine free concentrates not being as effective as C6 AFFF substances in terms of fire suppression, lives could be put at risk if a challenging hydrocarbon fire occurs, such as the case of a major aviation incident. This would mean that both passengers and rescue crews lives will be put severely at risk. 15.6 Insurance Issues Insurers are increasingly focused on evaluating risks and reviewing risk management when deciding whether not to accept risks and on what terms. In respect of high value, challenging risks that are not able to be effectively protected with fluorine free foam agents, it is likely that the insurers will not offer terms to protect against the risk of fire. This may leave sectors of industry, along with some government departments, vulnerable to losses from a fire. Effectively they may not be able to mitigate the risks using effective fire protection and may not be able to mitigate the losses by insuring against them. The economic impact could see some industries cease to operate in New Zealand and move operations off-shore where alternative fire protection prevails and consequently insurance can be obtained. 15.7 Cost Benefit Analysis We note that the discussion document is silent whether any cost-benefit analysis has been prepared, which would weigh the costs of removal of C6 foam agents (allowing for the consequences of ineffective fire control,) against the perceived benefits, which will include a reduced health risk from ground water contamination. The cost benefit analysis should consider the actual risk of a perhaps acute but infrequent contamination against the risks of not having a suitable foam concentrate available to control any fire. 15.8 Recommendation The FPA is strongly of the opinion that a total phase out of C6 fluorotelomer agents at this time is not desirable and is premature. The required technology has not been developed sufficiently to replace them for the types of

hazards they protect and that the program for the availability of effective alternative agents has not been determined. The FPA is supportive of the generic proposals, noting that they should be modified to reflect the pragmatism of the State of Washington laws, where the use of C6 foams is restricted to specified risks, until it can be demonstrated that that replacement agents are fit-for-purpose This is substantively the same as the proposed Option 2 for the proposed phase out of 'modern' fluorotelomer foams, with the exception that the phase out period will not be notified but will be subject to the development of an effective replacement agent. The FPA considers that it would be preferable that resources are invested into ensuring that should a low-probability event occur, resulting in discharge of a foam system, that the foam solution and run-off water are contained thereby reducing the probability that they enter the waterway system. The FPA is supportive of the need to preclude the use of C6 fluorotelomer foam agents for training purposes, and for the use of fluorine free foam agents where it has been demonstrated that they are fit for purpose. About the Fire Protection Association Formed in 1975, the Fire Protection Association New Zealand Inc (FPA) is New Zealand's peak body for fire safety. We provide information, services and education to the fire protection industry and the community at large. Our mission is to be the voice of the Fire Protection community and to continually expand professional expertise to reduce the impact of fire in New Zealand. As a not-for-profit member body, the FPA works with our members, government and the wider community for continuous improvement in regulations, standards, education, awareness, products and services for the protection of life, property and the environment from fire. FPA through the national office as well as a range of technical committees and special interest groups plays a pivotal role in providing authoritative advice and information on all aspects of fire safety and emergency management through a range of services to industry, commerce and the community at large. It also provides an important forum for bringing together practitioners and professionals who deliver a broad range of fire protection products and services. One of FPA's main strengths is its membership base and its extensive diversity. This provides a wide perspective and enables FPA New Zealand to reach and represent all sectors of our industry as well as others with a responsibility for, or interest in, protecting the community and workplace environments.