EEB submission to the REACH restriction on the use of per- and polyfluoroalkyl substances (PFASs) in firefighting foams

04/08/2022

General comments

The European Environmental Bureau (EEB) would like to provide comments to strengthen the restriction proposal on the following topics. This contribution builds on and refers to our earlier contribution on 24th May 2022, referenced as comment #3566 in ECHA's compilation.

1 Need for justification of the "Seveso derogation"

ECHA's Annex XV dossier proposes in condition 3(e) a 10-year transition period for both lower and upper tier installations covered by the Seveso directive,[1] instead of the standard 18-month derogation period applying otherwise (condition 3(a)).
EEB's has been generally sceptical regarding the present dossier's usefulness and provisions, taking into account the RAC's and SEAC's final opinion of the PFHxA proposal.[2] Within this criticism, the Seveso derogation is of particular concern because of the additional emissions it will lead to. In section 3 of contribution #3566, we have calculated that additional emissions of the order of 2 000 tons of AFFFs should be expected because of this derogation, based on ECHA's own figures.

In particular, we would like to raise attention to the following aspects:

1) That the link to the Seveso directive appears to originate in suggestions and wishes from industrial players;
2) That ECHA's perceived uncertainties regarding performance of FFFs led to excessive broadening of the derogation (as compared to as the "large tanks derogation" of the PFHxA proposal)[3];
3) The confirmed need to justify any derogation proposed.

1.1 Industrial origins of the Seveso derogation

In the following, we refer to section 8 of contribution #3566. The last five bullet points of that section detail how doubts around FFF's performance 5 years ago have led to a broad derogation for entire industrial sectors. This broadening is inconsistent with at least the four following facts:

- That FFF's performance has kept improving, as well as firefighters' knowledge on how to use them to their best performance;

[1] More precisely, the "Seveso III Directive", i.e. Directive 2012/18/EU.
[2] See EEB's contribution #3566 as well as a joint NGO letter addressed to ECHA, available here.
[3] Condition 7(a) of SEAC's opinion, available here. This derogation was not supported by RAC.

- That the PFHxA restriction procedure (the dossier, the consultations and the opinion) do not perceive any need for such a derogation, despite the fact that the object of both restrictions is practically identical;
- That other legislators have decided for substantially faster phase-outs[4];
- That many operators of Seveso installations do not rely on AFFFs.

1.2 Excessive broadening

In the Annex XV dossier, some explanations are provided on the Seveso derogation in section 2.8.1, with textual repetitions in section 2.8.2.
Although they contain little detail on ECHA's reasoning, these explanations reveal a general "when in doubt, derogate" approach, as well as excessive reliance on stakeholder opinions, instead of on expert opinions not tainted by commercial interests.
Section 2.8.2 first mentions that *[10 or 12 years] would be required [...] for large atmospheric storage tanks (LAST) and for [...] fire scenarios [...] involving different types of flammable liquids.* A footnote explains that LASTs are tanks with a diameter *greater than 40m*. LASTs being circular, this corresponds to a surface area ($A = ¼\pi d^2$) of 1257 m^2. Note that this definition is much more stringent than the "large tanks derogation" in SEAC's final opinion on the PFHxA restriction, which sets the limit at 400 m^2 and therefore includes many tanks of intermediate size.
Section 2.8.2 then continues as follows:

To cover <u>all the sites</u> likely to face such hazardous fire scenarios, the Dossier Submitter suggest defining them as the establishments subject to the Seveso III Directive (tier 1 and tier 2) instead of using a threshold based on e.g. tank size or bund area size, which <u>might be too restrictive</u> and <u>could omit</u> several relevant industries and sites. **[emphasis added]**

This is where ECHA's logic becomes difficult to follow: based on a definition of large tanks of 1257 m^2, ECHA argues that a less stringent definition (likely the one from the PFHxA restriction opinion, i.e. 400 m^2) *might be* too stringent, and therefore all size constraints on tank size are lifted.
Note that ECHA does not detail the underlying arguments for their doubt, i.e. for the wording "might" and "could".
The only remaining size threshold for fuel storage is now that of the lower tier of the Seveso III directive, i.e. 2500 tonnes.[5] Let us compare this threshold to both definitions of large tanks, ECHA's in section 2.8.2 and the one from SEAC's final opinion on the PFHxA restriction.
Many fuel storage tanks, especially the smaller ones, have a height of similar dimensions to the diameter. In the case of such a "square" tank, what would be the new diameter limit? Applying geometric formula (1) for a cylinder and physics formula (2)[6], one can easily derive equation (3).

$$V = A \cdot h = \frac{1}{4} \cdot \pi \cdot d^2 \ (Formula\ 1)$$

$$V = \frac{m}{\rho} \ (Formula\ 2)$$

[4] See also section 7 of contribution #3566.
[5] Seveso III directive, annex I, part 2, item 34.
[6] Where *V* represents the volume, *A* the surface area, *h* the height, *d* the diameter, *m* the mass of fuel stores (relevant for the Seveso thresholds) and *ρ* the density of the fuels. As most fuels display densities ranging between 0.7-0.9 kg/L, we used a value of 0.8 kg/L.

$$d = \sqrt[3]{\frac{4m}{\pi\rho}} \, (Equation\ 3)$$

The numerical application in equation (3) yields d = 15.8 m, corresponding to A = 197 m^2.

Where the large tanks derogation allows only use on those tanks (and their bunded areas), the present derogation applies to the whole site, independent of tank size, and with a very low size threshold.

	Large tanks derogation (PFHxA final opinion)	**Seveso derogation (this proposal)**
Condition for derogation	Use on tanks of >400 m^2 only	Use on any tank on a site storing more than what fits in a single tank of > ca. 200 m^2

In other words, **ECHA has massively expanded a derogation proposed by a scientific committee after public consultation, with the likely effect of watering it down**, by simply stating that anything stricter *might* or *could* be too restrictive – without much of an explanation.

1.3 When in doubt, don't derogate

ECHA's "when in doubt, derogate" approach is at odds with existing guidance and judgements of the ECJ. ECHA's 2007 **guidance on restriction dossiers**[7] states in the chapter on derogations (p. 59) that *Derogation is justified if the benefits outweigh the drawbacks*. However, ECHA's dossier hardly matches that requirement, certainly not for the massive expansion of the derogation described above. Benefits of this derogation for use on small sites and small tanks in large sites, or on chemical sites with low diversity of flammable liquids are not at all addressed. Benefits for borderline cases (i.e. on large tanks, possibly on large storage sites, or on chemical sites with high diversity) are not assessed quantitively nor explained qualitatively in any appreciable level of detail (see also section 2, specific question 8). On the other hand, drawbacks are addressed and quantified in the dossier, i.e. the expected emissions stemming from uses on Seveso sites.

The **European Court of Justice's recent judgment C-389/19** confirms how decisions should be made under uncertainty. Judgment C-389/19 confirms the findings of an earlier case, T-837/16, and rejects an appeal against the latter. The said judgements apply to an authorisation case (lead chromate) rather than restriction, and to the Commission's decision powers rather than ECHA's proposal drafting. Nevertheless, several statements of these judgements appear useful to us for the present case as well, as restrictions and authorisations both serve the stated objectives of REACH and as Annex XV dossiers provide the argumentative basis for scientific opinions, which in turn are supposed to guide the Commission's decisions.

- Paragraph 91 of T-837/16 contends that availability of alternatives was demonstrated by the fact that several countries had phased out the substances under authorisation. Likewise, some legislators have decided to ban the use of AFFFs and have set short timelines for this transition (see table in Annex). ECHA's present dossier disregards this demonstration of availability of alternatives.
- Both judgements deal with the question of acceptable loss of performance. In several ways, FFFs present different characteristic compared to AFFFs; some of these different may be regarded as "loss of performance" – with its concomitant safety aspects. The ECJ confirms[8] the necessity to

[7] Available here.
[8] C-389/19, paragraphs 49 and 56.

define an acceptable level of loss of technical performance; ECHA's dossier rather suggests that a zero-loss condition has been set.

- Various passages in both judgments indicate:
    - that it is the decision maker's duty to ascertain lack of availability of alternatives before granting an authorisation;
    - that if they have a duty of due diligence to critically assess arguments brought forward and cases of alternatives in practical use;
    - that a more granular analysis is needed of properties required to fulfil specific functions in a variety of uses;
    - that continued use should be limited as much as possible to those cases where the necessity of the continued use has been demonstrated.

Specific comments

2 Question 1: Status of substitution

2.1 Portable extinguishers for class B fires

Appendix B.9.1 states on p. 339 that "[according to Eurofeu], a 5-year transition period would be necessary to achieve the expected minimum performance levels", and that "the UK Fire Industry Association indicated that there are no fluorine-free alternatives which can currently meet the fire performance requirements of EN3". Both statements need refinement.

The Eurofeu statement is vague, as "expected" raises the question who would expect the performance, and what that performance would be. The UK FIA statement is clear, but it is inaccurate.

Producers of extinguishers such as Gloria, Bavaria, Saval, Sicli, Mobiak, Minimax (links show illustrative examples) actively market their fluorine-free extinguishers, their suitability for the task, and their certification under standard EN3.

Dutch ecolabel Milieukeur has recently updated their certification criteria to exclude fluorinated foams; their label holder database reveals a wealth of certified providers.

As fluorine-free extinguishers certified for class B fires are marketed by many of the leading brands, in various countries, ECHA should not assume insufficient availability unless there is convincing and independent data. Any statement by industry associations insinuating insufficient supply should be scrutinised for a potential breach of competition law, notably with respect to TFEU Art. 101 (1.b).[9]

2.2 Tanks and flammable liquids in the transportation sector (rail and road)

We refer the reader to our earlier contribution to this public consultation, comment #3566, section 5. According to a number of practical cases and other legislators, alternatives are available and useable for all types of fuels; i.e. also for rail and road fuels. Higher volatility or polarity fuels may in some cases indeed require larger quantities of foam (the opposite tendency having been observed as well) – however this does not disqualify any FFF from being a viable alternative. (see also section 1.3).

[9] Such a statement would indeed constitute an agreement between undertakings having as its effect a restriction of the internal market.

It is not clear why ECHA's question singles out rail and road and stresses "the transportation sector", rather than "fuel storage". Our interpretation is that the question relates to the use in railway tunnels, relating to footnote 12 in Annex A.2.3.6, which has likely been extended to road tunnels.

Road tunnels often use fixed fire fighting systems (FFFSs).[10] Water mist and deluge systems typically discharge only water, without adding foam. A not-so-recent report revealed that AFFF were only used in one of the cases they studied while other systems used water.[11] The same report also mentions foam systems and the toxicological and slipping hazards from foams; the guidance recommends that such systems only be used after all people have been rescued.

Where foams are used, these are in practice AFFFs or FFFs. To give some evidence of the suitability of FFFs, equipment provider Rosenbauer mentions "foam" and "fluorine free foaming agent" in their brochure[12]. Another concrete example of a major road tunnel operating with fluorine-free foams is the Jagdberg Tunnel in Germany. This tunnel was equipped as of its construction in 2014 with a compressed air foam system.[13] The system operated from the beginning on a fluorine-free foam.[14] A real fire incident in 2016 involving two lorries was described in a Dutch firefighting blog as being contained successfully and rapidly, with only minor costs and disruption to circulation.[15]

A similar example is a recently built rail tunnel in the Antwerp harbour,[16] equipped equally with a FFFS and running on FFF.[17]

Neither the PFHxA consultation nor any of the more proactive legislators around the world (see Annex) have given rail and road services any particular attention.

2.3 High-temperature climate conditions within the EU (e.g. climate-change induced heatwaves)

It is unclear to us what this relates to, as neither the dossier itself nor its annex and appendix refer to any impact of high-temperature climate conditions.

2.4 Availability of sufficient quantities of alternatives for the replacement of stocks.

The fluorinated surfactant market in Europe is dominated to almost 90% by a single compound, EC 252-046-8.[18] This is not an ideal situation in terms of supply chain resilience, and therefore of availability.

The siloxane or hydrocarbon surfactants used in FFFs are generally non-disclosed, and more difficult to infer from registration data.

[10] Although these are not expressly mandated by the European Tunnel Directive 2005/54/EC. Many tunnels (whether under that directive or not, i.e. longer or shorter than 500 m) are rather equipped with hoses, can be entered by trucks or use ventilation to delay build-up of smoke and high temperatures.

[11] SOLIT 2012 Safety of Life in Tunnels, available here.

[12] Rosenbauer RPE tunnel protection system, available here.

[13] As can be seen from the date of this article and the acknowledgement of OneSeven as the equipment supplier.

[14] As can be seen from this presentation, slide 10.

[15] Firex blog

[16] The Liefkenshoek tunnel was opened in 2014; the FFFS is described in this article.

[17] Tyco Hotfoam™ 2% is a fluorine-free formulation, according to its data sheet.

[18] Based on data from the Wood 2020 report, see EEB's contribution #3566 to this public consultation, section 12.

However, it should be remembered[19] that AFFFs do not only contain fluorinated surfactants, but also (and actually mostly) hydrocarbon surfactants. As such, the difference between an AFFF and an FFF is mostly the absence of the fluorosurfactants in the FFF.[20]

Finally, some information is available from surfactant manufacturers. As an example, Enaspol's offering of surfactants for fire-fighting foams (not specified if AFFF or FFF) contains more than 20 hydrocarbon surfactants, mostly rather classical sulphates of C8-C16 alkanes or olefins, potentially with an oligoglycol chain. The offering of PCC, another supplier for the same market, contains a list of six hydrocarbon surfactants.

Any claim of insufficient supply is therefore not very plausible and should only be taken at face value if backed up by solid evidence and valid reasoning, and if it applies to a large number of the players on the market.

3 Question 4: Cost estimates

Table 7 in the Annex XV dossier, section 2.5, estimates that ca. 6000 tons of PFAS emissions are avoided over 30 years, with rather small variations across the restriction options (ROs) considered. This figure is consistent with EEB's statement[21] that ECHA's proposal will lead to ca. 2000 tons of unnecessary emissions of PFAS as compared to the conditions proposed by SEAC in their opinion on the PFHxA restriction. Portraying emissions avoided only, instead of comparing them to emissions tolerated, is unfortunate, but indeed the logical consequence of not considering any RO linked to the PFHxA proposal.

None of the options considered evaluate the costs and benefits of proper disposal of firewater. We encourage ECHA to equally consider these impacts as well, and to update cost and benefit calculations accordingly, (see also our answer on Question 8, in section 5).

4 Question 5: cost of risk management measures

We would like to point out another cost linked to incineration, namely a **climate cost**. Where a dilute aqueous solution containing PFAS is incinerated (be it a cement kiln or a hazardous waste incinerator), a highly endothermic physical phase change takes place: water is heated from ca. 20 °C to 100 °C and then vaporised; this requires an energy input of ca. 2500 kJ/L[22] or 0.7 kWh.[23] This amount of energy is lost in most cases, and cannot be used for steam generation in energy recovery plants, except as low-temperature heat where heat from condensation is recovered. Depending on the energy mix of the country in question, incinerating 1 m^3 of fire-fighting water will correspond to extra CO_2 emissions of 100-200 kg – corresponding to a climate cost of tens of euros.[24] The techniques described in Appendix 3 to concentrate PFAS to higher concentrations are applicable to solutions of initially higher concentrations.

[19] This is described rather clearly by Dynax, a top supplier of fluorosurfactants.

[20] If a baker claimed that they can only make bread containing nuts because they don't have enough non-nuts available, one should get worried.

[21] See section 3 of our earlier contribution #3566.

[22] Based on a heat capacity of 75 $J \cdot mol^{-1} \cdot K^{-1}$ and a temperature difference of 80 K (from 20 °C to 1000 °C) and a heat of vaporisation of 40.6 $kJ \cdot mol^{-1}$. 1 L or 1 kg water corresponds to roughly 55 mol.

[23] Appendix 2.3 (p. 29) acknowledges the energy need for vaporisation, but does not quantify it .It should be noted that the amount of water vaporised in incineration of a concentrate is orders magnitude lower than that in incineration of fire-figting water.

[24] Using either the German UBA's often-cited environmental cost of 180 €/tonCO_2eq.

Based on the data in table 2, p. 35 of the dossier, the broad Seveso derogation leads to excess emissions of 2000 t of PFAS, over its entire duration. As emissions in table 2 stem mostly from fire-fighting water, and assuming conservatively a concentration of 1 µg/L, this amounts to a total amount of fire-fighting water of $2 \cdot 10^{12}$ m³![25] Using the climate cost above, this would lead to a **climate cost of 20 000 billion euros**.
This breath-taking figure shows that ECHA's proposal, allowing the continued use of PFAS esp. in Seveso installations without considering any options at or above the level of protection of the PFHxA opinion is essentially not a solution:

- either PFAS continue to be emitted because of inappropriate treatment of fire-fighting water;
- or their proper treatment leads to enormous climate cost.

Preventing pollution at source is a principle in the European treaties.[26] Instead of undercutting earlier scientific opinions at the cost of the environment, planetary, and people's health, ECHA should increase their ambition to do what is technically feasible: any solution less protective than what the PFHxA opinion proposes does not meet that criterion.
On a side-note, it should be added that incineration at too low temperatures[27] adds yet another considerable (although magnitudes lower) climate cost. As described in Appendix 2, incineration under municipal waste incineration conditions (around 850 °C) can lead to emission of potent greenhouse gases such as CF_4 and C_2F_6. These PFCs and related HFCs typically have global warming potentials (GWPs) of 5000-10000.[28] A popular fluorosurfactant like EC 252-046-8 consists of ca. 50% of a perfluorinated moiety: 2000 tons of emitted fluorosurfactants could therefore lead to emission of ca. 1000 tons of HFCs or PFCs, corresponding to 5-10 Mt of CO_2 equivalents, or a climate cost of 1000-2000 M€.

5 Question 8: Fate of fire-fighting water

We support ECHA's interpretation in Appendix 3, section 3.1.c, that most fire-fighting water is not treated using techniques capable of removing and destroying PFAS but sent to urban or industrial waste water treatment plants – or indeed simply lost to permeable soil.
Indeed, the absence of information on quantitative better destruction methods should be assumed to correspond to this worst-case scenario. We would like to point out that the Annex XV report mentions that trade bodies have issued guidance with "an emphasis on incineration"[29], recognising the suitability of other suitable techniques, but clearly not promoting treatment in simple waste water treatment plants. ECHA's dossier appears to overlook that industrial guidance is very different from industrial reality.
ECHA's proposal appears to neglect the most important emission pathway:

- Condition 4.d in turn stipulates treatment methods for waste containing more than 1 ppm of PFAS. Most fire water would likely not reach the concentration threshold of 1 ppm. Appendix 3.1.a (p. 32)

[25] The concentration of PFAS of 1 µg/L equates to 10^{-9} kg/L. Total emissions are 2000 t = $2 \cdot 10^6$ kg. Dividing the latter by the former yields the value of $2 \cdot 10^{15}$ L = $2 \cdot 10^{12}$ m³.
[26] TFEU Art. 191 (2).
[27] The legal obligation to incinerate hazardous waste at temperatures of at least 1100 °C only applies if the halogen content is above 1% (Industrial Emissions Directive, Art. 50 (2), 3rd subparagraph). This is the case for a foam concentrate, but certainly not for fire-fighting water.
[28] See F-gas regulation (517/2014), annex I.
[29] Annex XV dossier, section 2.2.2, p. 49.

mentions concentrations in the range of ng/L, i.e. ppt.[30] This means condition 4.d would generally not apply to fire-fighting water.

- condition 5 of ECHA's proposal only applies to *firefighting foam concentrates*, but not to fire-water;
- condition 6 in turn only applies to the labelling of containers containing runoffs (or other wastes), but not to the waste treatment method.

In other words, proper fire water treatment would not be tackled with this restriction proposal. Other proposed conditions do not attempt to address the problem either. Consequently, it may be assumed that PFAS used would largely end up in the environment.
Please see also our answer in on Question 4, in section 2.

6 Question 9: incineration capacity

Is important to note that incinerating retired foam stock and incinerating fire-water are two entirely different questions, as 1 kg of PFAS corresponds to a few kilograms of concentrate, but easily to a million or even a billion litres of fire-water.[31] As described in our answer to question 8 (section 5), incinerating fire-fighting water as such is practically inconceivable and would lead to enormous climate costs. For this reason, it is always largely preferable to incinerate 1 kg of unused AFFF concentrate than to use it and deal with the firefighting water afterwards.
However, incinerating concentrates[32] in cement kilns does not appear to be any problem with existing capacity. European cement production amounted to ca. 250 Mt in 2020[33]. More than 40% of the fuel input was obtained from waste and biomass.[34] According to data from the 2013 CLM BREF,[35] only 17% of fuel input was from wastes (section 1.3.3.3 and table 1.21 – showing the diversity of waste fuels used), and total waste amounts were of the order of 6 Gt.[36] This figure is presently likely of the order of 12-15 Gt. Incinerating 50 000 or 250 000 tons of foam concentrates is hardly an issue when 12 000 000 000 tons of waste fuels are incinerated anyway.
The topic of emissions of hydrogen fluoride from cement processes is detailed in the CLM BREF in section 1.3.4.8.2. We encourage ECHA and its committees to take this information into account.

7 Question 10: Enforcement

We would like to provide further arguments on enforcement, complementing content submitted earlier, in contribution #3566.
Regarding management plans and enforceability, inspiration from the provisions of PFHxA restriction proposal, and the final opinion on that proposal would improve the present dossier. and decrease the risk of inconsistencies between proposals and of watering down the PFHxA restriction's implementation into legal text.

[30] The much-cited Concawe 2020 report assumes concentrations of the order of 2 mg/L (section 4.3) – close to, but slightly above the threshold.
[31] Based on typical concentrations of the order of ng/L, according to appendix 3.1.a.
[32] Current stocks appear to be of the order of tens to hundreds of thousands of tons (annex B.9.3.2, footnote 39).
[33] According to Cembureau's key facts and figures, available here.
[34] Also according to a Cembureau report, available here.
[35] Cement, Lime and Magnesium Oxide best Available Techniques Reference document, available here.
[36] At cement production volumes of 267 Mt/y.

The comparison in your letter on the 'PFAS management plan' disregards the relevant counterpart in the PFHxA proposal. Both text proposals are reproduced in the following table (emphasis added).

PFHxA proposal	**ECHA's proposal**
Condition 11	Condition 4(c)
From (**entry into force + 36 months**), a natural or legal person benefiting from the derogation in paragraph 7(a) shall provide by 31 January of each calendar year a **report to the European Chemicals Agency** containing: (a) a description of **their efforts on substitution** of firefighting foams that contain PFHxA, its salts and PFHxA-related substances; (b) quantities they used in the previous year of firefighting foams that contain PFHxA, its salts and PFHxA-related substances per sector specifying: (i) share in training and in operation (ii) whether emission was contained, collected and disposed safely or emitted into the environment. The European Chemicals Agency shall consolidate and forward the data to the Commission by 31 March every year.	***Six months after entry into force*** *users […] shall establish a site-specific 'PFAS-containing firefighting foams management plan' which shall include:* *i. a* ***justification for the use*** *of each firefighting foam concentrate where the concentration of total PFASs is greater than 1 ppm (including an assessment of the technical and economic feasibility of alternatives).* *ii. details of the conditions of use and disposal of each PFAS containing foam used on site specifying how paragraph 4(b) is achieved (including plans for the containment, treatment and appropriate disposal of liquid and solid wastes arising in the event of foam use, routine cleaning and maintenance of equipment or in the event of accidental leakage/spillage of foam).* *iii. The management plan shall be reviewed at least annually and be* ***kept available for inspection by enforcement authorities on request****.*

ECHA's proposed provision applies to all uses, whereas the PFHxA provision only applies to the large tanks derogation. The report/management plan are relatively similar in content under both proposals.

However, most notably the PFHxA proposal fares much better regarding enforceability and transparency. In this case, both ECHA and the Commission will be able to monitor, year by year, efforts made and concrete advances in site conversions. Citizens and NGOs would be able to access this environmentally relevant data. In contrast, the ECHA's proposal's provisions are much weaker: inspectors will only be shown the management plan on request; no information will be available by default to ECHA, the Commission, environmental authorities, citizens, or NGOs.

We urge ECHA, RAC, and SEAC members to consider strengthening provisions on enforceability, transparency, and implementation by implementing wording taken from the PFHxA restriction final opinion, and applying it to all uses after a short transition period, e.g. 1 year.

8 Annex: overview of measures in other legislations

DL = deadline

Ext = latest possible extension

OER = open-ended derogation

NA = not applicable

Dates are given as years only, for reasons of concision.

Legislator	Date of decision	Overall DL	Refineries		Fuel storage		Chemical		"Other Seveso" class B fire		Reference
			DL	Ext	DL	Ext	DL	Ext	DL	Ext	
USA											
California	2020	2022	2028	2032	2028	2032	2024(1)	NA	2024(1)	NA	Senate Bill No. 1044
Colorado	2019	2021(5)	OER	NA	OER	NA	OER	NA	2021(2)	NA	House Bill 19-1279,
Connecticut	2021	2021	2021	2023	2021	2023	2021	2023	2021	2023	Public Act No. 21-191
Illinois	2021	2025	2025	2027	2025	2027	2025	2027	2025	2027(3)	Senate Bill 561
Maine	2021	2022(5)	(4)		2025	NA	(4)		2022	NA	HP 1115 LD 1505
New York	2019	2021(5)	2021	OED(6)	2021	OED(6)	2021	OED(6)	2021	OED(6)	Senate Bill 7167
Washington	2019	2020(5)	2024	2028	2024	2028	2024	2028	2020	NA	ESSB 6413
Australia											
New South Wales	2021	2022	OED(7)	NA	OED(7)	NA	OED(7)	NA	OED(7)	NA	2021/80
Queensland	2016	2016	2016	OED	2016	OED	2016	OED	2016	OED	Operational policy
South Australia		2018	2018	OED	2018	OED	2018	OED	2018	OED	Consolidated policy

Remarks:

(1) by virtue of a derogation (section 2, 13061, (b.3)) for operators using fixed suppression and containment systems.

(2) For example, a site using flammable solvents for cleaning purposes would not be derogated in Colorado.

(3) This derogation is based on the condition a fixed foam system.

(4) This state appears not to host any refineries and no large-scale chemical plants. The bill does not provide any derogation for such facilities.

(5) This legislation prohibits distribution and sales, but not use.

(6) Section 1, (3.B.1) allows the Office of Fire Prevention and Control to issue exemptions where AFFF would remain allowed beyond 2021. We are not aware of any such rules being issued. Such rules must be reassessed every two years.

(7) This legislation exempts uses of AFFFs on fires that are or potentially become catastrophic. The law defines "catastrophic fires" as fires "involving a combustible accelerant, including petrol, kerosene, oil, tar, paint or polar solvents including ethanol" – essentially any liquid fire, no matter its size.