Nuclear Industry Association Response to the Environmental Audit Committee's 'Addressing the Risks from Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)' Inquiry.

The Nuclear Industry Association (NIA) welcomes the opportunity to respond to the Environmental Audit Committee's 'Addressing the risks from Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)' inquiry.

The NIA is the trade association and representative body for the civil nuclear industry in the UK. We represent more than 300 companies operating across all aspects of the nuclear fuel cycle, including the current and prospective operators of nuclear power stations, international designers, and vendors of nuclear power stations, and those engaged in decommissioning, waste management and nuclear liabilities management. Members also include nuclear equipment suppliers, engineering and construction firms, nuclear research organisations, and legal, financial and consultancy companies.

Executive summary

PFAS are crucial for nuclear power plants, fuel enrichment facilities and decommissioning operations, which in turn are essential for realising the Government's net zero and energy security objectives. In the nuclear industry, there are currently no adequate replacements that could offer the same performance and reliability as PFAS. Nuclear power plants in particular have many moving parts that must operate safely for decades in harsh conditions, including high temperatures, pressures, radiation, and interfaces with corrosive substances.

The industry is certainly open to alternatives, but under the very strict regulatory regimes to which nuclear is subject, any alternatives would need to be developed, tested and proven that they would be safe for decades, in a rigorous and lengthy process.

Moreover, the use of PFAS on nuclear sites is also carefully tracked and managed throughout their operational life. The materials will not end up where they could bio-accumulate, which the industry recognises is an overarching concern more generally in other areas around the use of PFAs.

For nuclear use, we therefore encourage a pragmatic approach to the use of PFAS, given the industry's demand for high safety performance and its rigorous approach to ensuring these materials do not pose an environmental hazard throughout their lifecycle.

Understanding the threats and benefits from using Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

1. **What benefits do PFAS provide and how widely are they used?**
    a. In the nuclear industry, the main category of PFAS materials used are fluoropolymers, which have a proven track record in terms of their thermal properties, chemical resistance, radiological properties, and low friction values.
        i. Their use has been subject to Engineering Substantiation, and their properties have been utilised positively in Safety Case documentation.
        ii. They are widely used in the nuclear industry, as their properties ensure that they remain functional in environments where easy replacement is difficult or near impossible.

b. The nuclear industry cannot replace such materials with alternatives unless they have been proven to function in that capacity over the time periods needed.
    i. The concept of replacing a proven polymeric PFAS with a replacement that subsequently fails in service would not be permitted within the requirements of Nuclear Site operations.
    ii. There is also a clear need for this technical underpinning and an implied long timescale to implementation of any new materials.
c. In addition to the critical applications – PPE, seals, O-Rings, gaskets, bearings, valve bodies, hoses, tank liners, and piping – there are certain applications such as sample containers, where the use of a PFAS material such as PTFE is written into the formal specification for the container.
d. It is important to note that the industry recognises and understands the bio-accumulation problems associated with the low molecular weight PFAS compounds.
    i. The nuclear industry is open to using alternatives to PFAS, but it is important to remember that the industry operates in a highly regulated environment where safe and stable operations are paramount to ensure safety and security is maintained.
    ii. Using alternatives to PFAS would need to be agreed with the Office for Nuclear Regulation who would need to be convinced that the alternative would not increase risks to safe and stable operations.

2. **To what extent are UK health and environmental regulators equipped to detect, monitor and understand the risks posed by PFAS?**
    a. No comment

3. **How developed is the UK's research base on the science of PFAS and the technology required to monitor their current and future impact?**
    a. Academic studies on the effects of radiation in relation to PFAS are very limited.
        i. To address this problem, Sellafield Ltd. has initiated a PhD into radiation degradation of PFAS and particularly fluoropolymer PFAS.

4. **How sophisticated is current knowledge of how and where PFAS enter the supply chain?**
    a. The nuclear industry has a good to excellent understanding on where the critical polymeric PFAS materials they use originate from.
        i. For example at Sellafield Ltd., most of the polymeric PFAS materials they use originate from polymerisation processes and plants outside of the UK, and are imported into the UK from the EU, the USA and other major manufacturing bases.
    b. The nuclear industry also has excellent waste management and waste hierarchy, which means these materials will not end up where they could bio-accumulate – like all materials on nuclear sites, they are strictly tracked and carefully managed through the end of their operational life.

5. **What is the current understanding of how PFAS are made and then used in terms of product ranges, and geographical and socioeconomic distribution?**

a. The mechanisms for manufacture are well known, although some processes may contain proprietary information. The use of short chain PFAS materials in the production of fluoropolymers is well known – these are now being phased out.
b. With respect to polymeric PFAS the fundamentals of the processes for the manufacture of the base polymers are reasonably well understood - although all commercial processes will contain proprietary information.
c. To our knowledge, the majority of fluoropolymers used in the UK originate from outside of the UK and are imported into the UK either as base polymers for further compounding inside the UK, or they are imported into the UK as finished products e.g. O-rings, PTFE tape, gaskets etc.
d. We are aware of only one polymerisation manufacturer of fluoropolymers in the UK.

6. **To what extent are the Environment Agency, and other relevant UK bodies and research institutions, resourced to understand the current threat posed by PFAS and to monitor their impact going forward?**
    a. No comment

<u>The current status of measures to address PFAS</u>

7. **What are the current technologies and solutions to treat PFAS pollution, how cost effective and efficient are they and do they create additional risks?**
    a. No comment

8. **How well equipped is the UK's research and development base to improve existing approaches to dealing with PFAS? Is the current regulatory regime for PFAS fit for purpose?**
    a. No comment

9. **Is the current regulatory regime for the use and disposal of PFAS, including UK registration, evaluation, authorisation and restriction of chemicals (UK REACH), adequate? If not, how can it be improved?**
    a. The regulatory regime is adequate, if sufficient studies are also in place to determine limits where these do not exist at present.
        i. So far, the main focus has been on the short-chain PFAS materials. It will not be sufficient if it extends to polymeric PFAS.

10. **Is a precautionary approach to PFAS desirable or is an approach that uses regulation to assess their benefits and risks more appropriate?**
    a. We encourage UK to adopt the approach that uses regulation to assess the benefits and risks associated PFAS. This focuses on the requirement to understand the material in context, rather than adopting a blanket ban.

11. **Is there any regulatory divergence across the UK in terms of PFAS? If so, what are the implications, and is there a need for a more joined-up approach?**
    a. No comment

12. **How do other jurisdictions around the world, including the EU and US, regulate PFAS use and disposal, and what lessons, if any, can the UK learn? What lessons can the UK learn from other countries on how they monitor and treat PFAS?**
    a. The EU Regulatory process is starting with 10,000 PFAS materials, and the default position is 'Banned after legislation enacted unless derogation granted'. The derogations are based on end use, rather than the chemical itself, so the exact same PFAS materials could have different derogations in different sectors. Derogations only act as a delay as they permit further time to develop alternatives, but the materials will still be banned at the end of this period.
    b. The US Regulatory position is fragmented, as there is no one Federal position. Instead, *ca*. 30 States have varying degrees of regulation. Typically, this involves labelling of 'PFAS intentionally added' by 2026, with progressive bans for non-exempt materials by 2032.
    c. Canada has adopted a progressive ban on short-chain PFAS materials. This does not currently include fluoropolymers, which will be considered at a later date.

13. **What lessons can the UK learn from other countries in terms of resourcing and supporting the detection, monitoring and treatment of PFAS pollution?**
    a. Resourcing and supporting of these activities is going to be more costly and take more time than originally envisaged. The ubiquitous nature of the 'forever chemicals' and their very low limits for regulation (ppb-ppt) mean that there will be a significant cost on their deployment.

14. **How does the UK compare to other countries in terms of funding research and new technologies to improve outcomes?**
    a. No comment

Further Information

The NIA is happy to provide more context, or any clarifications desired on the content of our response and to ask our members where appropriate for additional information that may be useful.

Please contact Elisabeth Roden, Policy Analyst for the Nuclear Industry Association, at elisabeth.roden@niauk.org to do this.