

Minutes of public meeting of the PFAS Scientific Advisory Panel on Teams

10:00 on 18 November 2025

Panel Members present: Dr Steve Hajioff – Independent Chair
Dr Tony Fletcher – PFAS and Health member
Professor Ian Cousins – PFAS and Environment member

In attendance: Standing Observer (Regulation) - Kelly Whitehead - Group Director of Regulation, Infrastructure and Environment Department
Programme support team from I&E

Welcome:

The Chair welcomed everyone to the Panel meeting and reminded people the meeting was being recorded.

Introductions

The Chair and Panel members introduced themselves.

Dr Steve Hajioff, Independent Panel Chair: A retired Director of Public Health from an area of London with two major international airports and a variety of other environmental hazards and challenges, with 35 years in clinical medicine. An expert on translating science into policy, he has worked with Nice, the Greater London Authority, the EU, WHO and World Bank, several UK government departments and several international governments. Dr Hajioff has also worked extensively in the pharmaceutical industry.

Dr Tony Fletcher, PFAS and Health Panel Member: Environmental Epidemiologist at the London School of Hygiene and Tropical Medicine, working on PFAS since 2006 and member of the panel with experience of epidemiological studies on the health effects of PFAS in contaminated communities in West Virginia in the United States, in the Veneto region, in Italy, and in Ronneby, and is the health expert on the panel.

Professor Ian Cousins, PFAS and Environment Panel Member: A Professor in Environmental Chemistry at Stockholm University, an expert on PFAS, appointed as the environmental expert on this Panel and whose expertise on PFAS is on the sources, transport, fate, and exposure of PFAS.

Kelly Whitehead, Group Director for Regulation in the Infrastructure and Environment Department, leading on the Water Quality and Safety Programme, coordinating Government's response.

Declaration of Interests

- No new interests declared.

Minutes

Minutes from 11 November were not ready for approval and will be taken in December meeting.

Matters Arising

- Nothing to report

Additional Findings Since the Last Meeting

Tony reported attending a recent webinar organised by the European Food Safety Authority (EFSA) on PFAS, which included contributions from the European Chemicals Agency, the EU, EFSA, and the European Environment Agency. He noted that the session was highly intensive, covering a wide range of activities across the EU. Tony mentioned that the presentations and summaries from the webinar would be made available in due course and promised to share the link when it becomes publicly accessible. He emphasised that while he could not summarise the extensive information presented, some aspects were relevant to their work, and he would follow up on specific reports and references.

Following this, Ian shared that he had been in Brussels on Friday engaging with the European Commission, specifically DG Environment and DG Grow, regarding PFAS-related issues. His discussions focused on ensuring that the restriction proposal for PFAS remains on track despite resistance, particularly concerning the phasing out of fluoropolymers and fluorinated gases, which degrade into trifluoroacetic acid. Ian explained his efforts to collaborate with other scientists to advocate for science-based decisions and clarify the scientific concerns surrounding these substances.

Steve concluded by informing the group about two upcoming documentaries on PFAS—one for television and one for radio. While details remain unclear, and it is not yet known whether Jersey will be featured, Steve assured the team that updates would be provided as more information becomes available.

Discussions and Recommendations

The meeting transitioned to item five, which Steve noted would form the main focus of the session. He reminded attendees that draft summaries of discussions since the last interim report had been circulated. Steve explained that a few additional points raised by Ian would be incorporated into the final report, specifically relating to the energy footprint of various technologies. Ian emphasised that energy consumption is a significant drawback for some technologies, as it impacts both feasibility and cost considerations. Steve acknowledged this and apologised for not including these points in the initial summary, assuring that they would be added.

Steve then outlined the purpose of the summary document, stating that it consolidates key insights from expert consultations, literature reviews, and internal discussions, organised by section. He proposed a revised running order for the meeting to allow for natural breaks: starting with soil, non-drinking water, and biosolids, followed by food, borehole water treatment, home water treatment, and finally destruction and disposal. Ian agreed with the approach, and the group prepared to proceed accordingly.

The session opened with Steve introducing the agenda on soil, non-drinking water, and biosolids, noting he had prepared guiding questions. He began by asking about the group's appetite for technology readiness levels (TRLs) in separation and containment interventions—whether mature, proven technologies should be prioritised or if emerging solutions could be considered. Ian responded that the preference should be for high-TRL technologies (levels 8–9) that are operational and effective now, emphasising that cost is the main drawback and a political decision. He outlined options such as soil washing, which requires building a dedicated plant and is expensive, and immobilisation using sorbents, which is cheaper and widely used internationally. Ian noted that immobilisation reduces PFAS availability in soil and groundwater but requires ongoing monitoring and periodic sorbent replacement. He referenced trials in Sweden, Norway, and Australia, highlighting that pump-and-treat systems for groundwater are effective but costly due to prolonged pumping and subsequent treatment with activated carbon or ion exchange resins. He stressed that in-situ destruction technologies are not yet viable, meaning contaminated soil or water must be removed for treatment.

Steve summarised that the group appears risk-averse, favouring proven solutions. Tony added that treatment decisions depend on land use, distinguishing between agricultural land and areas like airport runways. This led to a structured review of land categories and acceptable PFAS thresholds. Ian referenced Flemish guidelines as the most comprehensive in Europe, proposing 4 µg/kg for agricultural land to protect the food chain, noting background levels typically range from 0.1 to 1 µg/kg due to atmospheric deposition. Tony agreed these values seem strict but reasonable, though he stressed the need for clarity on whether thresholds apply to individual PFAS or sums of multiple compounds. The group tentatively agreed to adopt Flemish values, focusing on the sum of four major PFAS for simplicity and consistency with water guidelines.

For sensitive land, such as water protection zones, the group wanted to follow the Flemish guidelines and believed that that threshold was lower, at threshold 1 µg/kg, reflecting minimal human exposure risk [the actual Flemish recommendation is the same as that for agricultural land] The panel resolved to apply the threshold from the Flemish guidance. Land for human habitation was discussed next, with Flemish guidance suggesting 8 µg/kg due to fewer exposure pathways compared to agricultural land. Steve and Ian explored the rationale, noting that livestock-driven biomagnification likely explains the lower agricultural threshold. Tony highlighted the importance of specifying which PFAS are included in calculations, and the group agreed to clarify this in the final report. Industrial land has the same threshold in the Flemish guideline, for other land types, a threshold of 20 µg/kg was considered, given reduced exposure pathways. The group agreed that the thresholds be those from the Flemish recommendations and should apply to the sum of four key PFAS associated with AFFF contamination, aligning with the remit of the commission.

The conversation then shifted to water. Ian explained that European surface water guidelines (.65 ng/L) are unrealistically low and unenforceable, as rainwater alone exceeds these levels. Steve proposed not setting a strict contamination threshold for surface water but instead recommending a trigger level for source investigation, tentatively set at 10 ng/L for the sum of four PFAS. The same approach was agreed for groundwater, except where water is used for human consumption, which will be addressed separately. The group acknowledged that these recommendations aim to identify contamination sources rather than mandate treatment. Tony noted that recent European

Environment Agency data show average PFAS levels in surface waters have declined from 10 ng/L to 5 ng/L over five years, but still exceed the EQS, reinforcing the impracticality of current European standards.

On treatment technologies for contaminated environmental waters, Ian confirmed there is no universal solution, but mature options such as granular activated carbon (GAC), ion exchange resins, and foam fractionation should be prioritised. Site-specific conditions will dictate the choice, and recommendations will emphasise high-TRL interventions. Membrane technologies like nanofiltration and reverse osmosis were noted as alternatives, primarily for drinking water, but their energy intensity limits broader application. Ian highlighted that bespoke treatment trains combining these technologies are common internationally, citing examples from Australia where ion exchange and soil washing plants operate continuously to remediate hotspots.

Finally, the group addressed biosolids management. Steve outlined three scenarios: restricting application to certain land types, applying based on soil thresholds, or destroying biosolids. Landfilling was ruled out due to local constraints. Ian favoured the second option as an interim measure, combined with ongoing monitoring to track PFAS accumulation and inform future decisions. He cautioned that limited land availability in Jersey and enforcement challenges could complicate implementation. Tony confirmed that biosolids are currently applied to both agricultural and other land. The group agreed on two recommendations: (1) biosolids should only be applied where resulting soil concentrations remain below the threshold for that land type, and (2) a monitoring program should assess long-term trends and guide planning for potential destruction technologies. Ian noted that international practices vary widely, from unrestricted land application to complete prohibition, underscoring the need for a pragmatic, precautionary approach. The discussion acknowledged that destruction options such as pyrolysis or gasification require significant capital investment and carry uncertainties around emissions and occupational exposure, particularly given the proximity of Jersey's wastewater treatment plant to populated areas. The meeting concluded with consensus to adopt Flemish thresholds provisionally, subject to further data review and feasibility considerations, and to recommend a phased approach balancing environmental protection with practical constraints.

Food

The discussion on food began with Steve introducing three key questions, including one raised earlier by Ian. Steve referenced Tony's analysis on PFAS intake from water as a proportion of the EFSA tolerable weekly intake (TWI). Using Tony's calculations, Steve noted that at 10 ng/L in drinking water, weekly PFAS intake would be approximately 1.4 ng/kg body weight, leaving about 3 ng/kg/week for food while remaining under EFSA's threshold. At the future target of 4 ng/L, water contribution would drop to 0.6 ng/kg/week, increasing the margin for food intake. Steve asked at what PFAS level in food the group might need to reconsider the recommended water limit of 4 ng/L.

Tony confirmed that earlier assumptions about water contributing only 20% of total PFAS intake relative to food are outdated, as food contributions have declined over time. He emphasised that current water and food levels are well below EFSA's TWI, meaning the safety factors previously applied to water guidelines are no longer critical. Steve reassured listeners that the panel will not raise the water guideline above 4 ng/L. He concluded that with food levels trending lower, the water limit is not at risk of breaching EFSA thresholds. Tony added that while average intake estimates for the UK population are informative, they carry uncertainty due to variability in food measurements and limited sample sizes. He suggested comparing local Jersey data with UK averages for similar food categories, including locally produced eggs, fish, meat, and milk, to validate assumptions.

The panel agreed that as long as the composite food basket does not exceed approximately 3 ng/kg/week at current water levels and 3.8 ng/kg/week at future water targets, there is no need to

revise drinking water recommendations. Tony noted that specific food items might warrant closer scrutiny if they disproportionately contribute to PFAS intake, though current data do not identify any clear outliers. This led to Steve's second question: whether residents in contaminated areas should keep backyard chickens. Ian advised against it, citing evidence from Flanders where eggs from free-ranging chickens near contamination hotspots showed very high PFAS levels. Tony concurred, explaining that chickens confined indoors and fed commercial feed pose less risk, whereas those foraging in contaminated soil are likely to ingest PFAS via earthworms. Steve highlighted biomagnification through worms as a plausible mechanism. Ian added that organic eggs often contain higher PFAS levels due to fish meal in organic feed, a counterintuitive finding that underscores complexity in exposure pathways.

The third question concerned freshwater fish consumption. Ian explained that freshwater fish can be a significant PFAS exposure source, with advisories in Sweden warning that a single fish could equal months of exposure from drinking water at 40 ng/L. However, Kelly Whitehead clarified that Jersey does not produce freshwater fish for consumption; local ponds support recreational angling only, and most clubs enforce no-kill policies. Imported freshwater fish, primarily from the UK, is the main source for consumers. The group agreed that formal recommendations are unnecessary but suggested providing informational guidance on PFAS risks in freshwater fish, particularly noting biomagnification in predatory species like pike. Steve observed that UK food basket data did not show high PFAS levels in freshwater fish, likely because most are farmed, which generally results in lower contamination than wild-caught fish. The panel concluded that further analysis of UK data will determine whether advisories on consumption frequency are warranted.

The discussion closed with consensus on key points: (1) current and projected water limits remain appropriate provided food intake stays within EFSA-derived thresholds; (2) backyard chickens in contaminated areas should be discouraged unless kept indoors and fed uncontaminated commercial feed; and (3) freshwater fish consumption is not a major concern locally but should be addressed through public information, emphasising biomagnification risks and confirming angling policies. No additional food-related issues were raised.

Boreholes and other private water supplies

The discussion on borehole water and private supplies began with Steve outlining three key questions: whether to recommend target PFAS concentrations for borehole water used by multiple households, for single-household supplies, and whether to advise specific treatment technologies. Steve noted that borehole supplies are currently outside Jersey's statutory water regulations, which raises questions about liability and enforcement. He suggested that any recommendation would likely be advisory rather than mandatory, given the absence of a legal framework.

For boreholes serving multiple households, Steve asked if the panel should recommend maintaining PFAS levels at the same threshold as public drinking water (currently 4 ng/L for the sum of four PFAS). Tony supported setting an aspirational target aligned with mains water standards but emphasised that it should remain advisory due to cost and proportionality concerns. He highlighted that reducing PFAS from 5 ng/L to 4 ng/L in a shared borehole could impose disproportionate financial burdens on landowners and users. The group agreed that recommendations should be framed as guidance rather than enforceable limits, recognising that any disputes would likely be civil matters between households and borehole owners.

The conversation then turned to single-household boreholes and wells. Steve asked whether similar thresholds should apply. Tony queried whether borehole owners supplying multiple households have any legal obligation to provide wholesome water, as in UK law. Steve confirmed that Jersey law does not impose such obligations, reinforcing the advisory nature of any recommendations. Ian

raised a hypothetical concern about households discharging contaminated borehole water into the wastewater system, potentially introducing PFAS into municipal treatment processes. Kelly Whitehead explained that there is no licensing system for private supplies and no comprehensive data on borehole use or sewerage connections. She noted that while some borehole users may also discharge to foul mains, this is not systematically tracked. The panel agreed that any contribution to wastewater PFAS levels from private boreholes would likely be minimal and not a regulatory priority. Ian concluded that treatment decisions for single-household boreholes should remain a matter of personal choice, supported by clear public information rather than prescriptive rules.

The third question addressed treatment technologies for contaminated private water supplies. Steve asked whether the panel should recommend specific technologies or adopt a case-by-case approach. Ian advised against prescribing fixed solutions, noting that technology evolves rapidly and recommendations could become outdated. The group agreed that treatment should be tailored to site-specific conditions, including water chemistry, contamination levels, and supply capacity. However, they endorsed high-TRL (Technology Readiness Level) interventions currently available on the market, including granular activated carbon (GAC), ion exchange resins, reverse osmosis (RO), and nanofiltration. Ian observed that RO is generally the most effective for PFAS removal, offering high efficiency and a compact footprint, though it carries drawbacks such as energy demand and wastewater generation. Steve added that RO's suitability depends on water availability; if a borehole comfortably meets household needs, RO is viable, but if water scarcity would result from 20% or more wastage, alternative technologies should be considered. The panel agreed to include these considerations in guidance, emphasising flexibility and proportionality.

The panel reached a clear consensus on three key points regarding borehole water and private supplies:

First, for boreholes serving multiple households, the group agreed to recommend maintaining PFAS concentrations at the same threshold as public drinking water—currently 4 ng/L for the sum of four PFAS—while emphasising that this should remain advisory rather than mandatory due to cost, proportionality, and the absence of a legal framework.

Second, for single-household boreholes and wells, the panel decided not to set formal thresholds, instead advocating for an information-based approach that enables individuals to make informed choices without imposing regulatory burdens.

Finally, on treatment technologies, the panel concluded that solutions should be determined on a case-by-case basis, reflecting site-specific conditions and water characteristics. However, they endorsed the use of mature, high-TRL interventions currently available, such as granular activated carbon (GAC), ion exchange resins, reverse osmosis (RO), and nanofiltration, noting that RO offers superior PFAS removal but may be constrained by water availability and wastewater management considerations. These recommendations aim to balance precautionary principles with practicality and flexibility.

Home water treatment

The discussion on in-home water treatment began with Steve introducing the topic, which included under-sink systems, countertop units, and filter jugs. He posed two key questions: whether the panel should recommend specific products or technologies, and whether they should signpost resources to help households make informed decisions. Ian responded that the same principles applied as for borehole treatment: recommendations should remain general rather than prescriptive. He noted that reverse osmosis (RO) systems tend to perform better than single-stage carbon filters,

but highlighted trade-offs such as water wastage—up to 20%—which could be problematic in Jersey given occasional water shortages. Steve confirmed that expert reviews and previous discussions indicated multi-stage systems, including RO, are highly effective at PFAS removal, whereas single-stage carbon filters, commonly found in filter jugs, are not efficient.

Tony added insights from two key studies: the Environmental Working Group (EWG) laboratory tests and a North Carolina field survey. He explained that while EWG tests under controlled conditions showed strong performance for certain countertop devices, real-world testing in North Carolina revealed that many jug filters underperformed compared to lab results. This discrepancy was attributed to factors such as inconsistent filter replacement and variable usage practices. Tony emphasised that filter jugs are less reliable than fixed installations under sinks, which generally provide more consistent performance when properly maintained.

Tony thanked an islander who noted an error in how we discussed the evidence for counter-top PFAS filters. The minutes of the October 22 meeting summarised how we compared the PFAS test results for home water filters, of the Environmental Working Group, with the detailed results in a paper measuring home filters in North Carolina. We stated that the Berkey filter was the only one that seemed 100% effective in the EWG reported and was also in the second report. (There was 1 Berkey device tested in the EWG survey, and 4 Berkey devices tested in the NC paper – 3 pitcher and one larger counter-top model). However, we missed that a pitcher filter “Zero Water” also deemed 100% by EWG was also tested in the NC paper, in one household where PFAS levels (for the sum of PFOS, PFOA, PFHxS and PFNA) were reduced from 7.5 to 1.0 ng/ml.

The panel agreed that while RO and multi-stage systems are more effective, they cannot recommend specific products. Instead, they proposed referencing the EWG report and North Carolina study in public guidance, enabling consumers to make informed choices. Tony underscored the importance of regular filter replacement and proper storage to maintain effectiveness. Steve reiterated that recommendations should focus on directing households to credible resources rather than endorsing individual technologies or brands. The group also briefly discussed whether to advise connecting to mains water; Steve confirmed no such recommendation would be made at this stage, noting that approximately 2,500 households remain on borehole supplies, with PFAS levels in non-airport areas to be reviewed in December.

The discussion concluded with agreement on three main points:

First, multi-stage treatment systems, particularly reverse osmosis (RO), were recognised as generally more effective than single-stage carbon filters for removing PFAS, although considerations such as water wastage and ongoing maintenance requirements must be factored in.

Second, the panel noted that filter jugs tend to perform less reliably in real-world conditions compared to laboratory tests, largely due to inconsistent filter replacement and variations in usage practices.

Finally, rather than endorsing specific products, the group agreed that public guidance should focus on directing consumers to authoritative resources—such as the Environmental Working Group (EWG) report and the North Carolina field study—while emphasising the importance of proper maintenance and informed decision-making.

No additional recommendations were made regarding mandatory connections to mains water or prescribing specific technologies beyond this general guidance.

PFAS Destruction Technologies

The discussion on PFAS destruction and disposal began with Steve introducing the topic and posing a key question about the group's appetite for technology readiness levels (TRLs) in destruction technologies. He asked whether the panel should maintain the same standard as for other interventions—TRL 8 or 9—or consider lower levels. Ian clarified that only technologies at TRL 8 or 9 are practically usable, as anything below that remains experimental and unproven at scale. He noted that while many technologies are marketed as solutions, some lack real-world validation, making it essential to focus on those demonstrated to work consistently in operational settings. The panel agreed that their risk appetite should prioritise proven technologies, analogous to requiring clinical trials for medicines before adoption.

Ian explained that effective PFAS destruction requires breaking the strong carbon-fluorine bond, which typically demands very high temperatures—around 1,100°C for complete destruction, though incineration at 850°C in waste-to-energy plants has shown reasonable effectiveness. Data from limited studies indicate that such incineration does not fully eliminate PFAS but reduces residual levels to very low concentrations in ash and wastewater streams. These findings underscore that while thermal treatment is not perfect, it achieves approximately 99.9% destruction, leaving trace amounts in solid residues and leachate.

The conversation then turned to landfill as a disposal option for PFAS-contaminated materials. Ian highlighted significant concerns: PFAS in landfill remains indefinitely, posing long-term containment challenges. Modern landfills capture leachate, which must undergo specialised treatment, but volatile PFAS can still diffuse into the atmosphere. Steve clarified that in Jersey, hazardous waste storage facilities—not general landfill—would be considered. Ian stressed that landfill is not a destruction technology but merely containment, making it a last resort for small-volume residues rather than bulk contaminated materials. The panel agreed that using hazardous waste facilities for large volumes of soil or biosolids would be impractical due to capacity constraints, reinforcing the need for alternative strategies such as soil washing or thermal treatment for highly contaminated hotspots.

Steve raised the issue of residual PFAS in ash from incineration and whether secondary treatment—such as re-incineration at higher temperatures—could be viable. Ian noted that while theoretically possible, this approach is untested (TRL 1–2) and constrained by limited capacity in Jersey's clinical waste incinerator, making it impractical. The panel concluded that such methods fall outside their TRL appetite and should not be recommended. Discussion also covered the potential for incinerating PFAS-containing materials like spent granular activated carbon (GAC) in municipal waste-to-energy plants. Steve observed that GAC is combustible, relatively low in PFAS contamination, and produced in small volumes, making it a feasible option compared to non-combustible rejectate from reverse osmosis or nanofiltration. Ian agreed, noting that disposal considerations should inform technology choices in water treatment planning.

The group acknowledged that large-scale destruction of biosolids or contaminated soil would require significant infrastructure investment, such as dedicated soil washing plants, which are currently absent in Jersey. For less contaminated land, containment remains an option, though it is not ideal due to long-term persistence of PFAS. Emerging technologies like supercritical water oxidation and other high-energy processes were briefly discussed but deemed too early-stage to meet TRL requirements. Ian emphasised that breaking the carbon-fluorine bond invariably demands high energy input, reinforcing thermal destruction as the only mature option currently available.

The panel agreed on several key points regarding PFAS destruction and disposal:

Only technologies with a Technology Readiness Level (TRL) of 8 or 9—those proven effective under real-world conditions—should be considered for implementation.

Among available options, thermal destruction through high-temperature incineration emerged as the only mature and viable method, capable of achieving near-complete PFAS breakdown, although not absolute elimination.

Landfill was recognised as a containment measure rather than a destruction technology and should therefore be reserved for small-volume residues such as ash from incineration, not for bulk contaminated materials like soil or biosolids.

The panel acknowledged significant practical constraints, noting that large-scale destruction of soil or biosolids is currently impractical in Jersey without substantial investment in new infrastructure; interim strategies may include soil washing for highly contaminated hotspots and containment for lower-risk areas.

Finally, while advanced technologies such as supercritical water oxidation show promise, they remain at early development stages and are not yet ready for deployment.

These conclusions reflect a pragmatic approach that balances scientific rigor, operational feasibility, and the limitations of Jersey's existing infrastructure.

Any other business

No other business was raised.

Date of next meeting

Wednesday 17 December 2025. It will be held 10am - 1pm online.

The Chair thanked everyone for their contributions, those watching the meeting and those offering support throughout the whole process.

A reminder to the public that this meeting has been recorded, and the video will be available online on request by emailing the Regulation Enquiries mailbox on RegulationEnquiries@gov.je. This will take a couple of days to make sure the observers are anonymised.

There being no further business, the meeting was closed.

To note that the Panel can be emailed via PFASpanel@gov.je.

Details of meeting dates and times can be found at [PFAS in Jersey \(gov.je\)](https://www.gov.je/PFAS)