28 February 2023

National coordinators on behalf of HEPA's
National Chemicals Working Group
pfasstandards@environment.gov.au

To whom it may concern,

RE: PFAS NATIONAL ENVIRONMENTAL MANAGEMENT PLAN (NEMP 3.0) – PUBLIC CONSULTATION

The purpose of this letter is to provide feedback on the draft per- and poly-fluoroalkyl substances (PFAS) National Environmental Management Plan (NEMP) 3.0 to the Heads of EPA National Chemicals Working Group (HEPA NCWG). The Australian and New Zealand Biosolids Partnership (ANZBP) welcomes the opportunity to provide feedback on this important plan.

The wastewater sector is an essential service, treating sewage from domestic and trade waste (including commercial, industrial and landfill) sources to recover valued resources (including biosolids and recycled water) for beneficial reuse. In an increasingly resource constrained world, the capacity to return the valuable nutrients (including phosphorus, nitrogen, carbon and a range of micronutrients such as calcium and magnesium) and beneficial microbes in biosolids to soils is a critical pillar of global sustainability and the circular economy (Refer Appendix A).

The ANZBP's mission is to support sustainable biosolids management for all utilities regardless of scale and geographic location. Beneficial reuse is supported as the major reuse option in all State biosolids reuse guidelines (Tasmanian Biosolids Reuse Guidelines 2020). With almost half of our 21 subscribing partners being water utilities, ANZBP is acutely aware of the role water utilities play in protecting the environment. We support the development of a clear and consistent national approach to the management of PFAS and other emerging contaminants of concern in biosolids across Australia, for the protection of public health and the environment. We also support the core objective of the PFAS NEMP 3.0 to protect human and environmental health by means of setting soil contamination limits. However, we believe that the Draft PFAS NEMP 3.0 guidance extends too far to prescribing day-to-day practice and that the guidance will have significant impact on the viability of the biosolids industry. We believe that the soil protection objective can be achieved through a less prescriptive risk-based approach (Appendix B).

ANZBP's feedback regarding the draft PFAS NEMP 3.0 is outlined below.

1) **The economic, environmental and social costs (and benefits) of the draft NEMP 3.0 are not well understood. ANZBP strongly recommends a Regulatory Impact Statement be undertaken to assess the broader economic, environmental and social costs and benefits associated with implementing the PFAS NEMP 3.0 (Refer Appendix C).**
   - Our evaluation of the draft PFAS NEMP 3.0 and the supporting document is that the proposed changes will have significant impacts across the biosolids economics and operations, the biosolids value chain, including wastewater treatment infrastructure

requirements, monitoring and reporting, beneficial reuse contractors, end-user markets, and potential for landfill disposal.

- Issues to be considered include nutrient, soil carbon, soil moisture and soil microbiome benefits of biosolids land application, maintaining phosphorus in circulation to delay "peak phosphorus", replacement of chemical fertilisers, greenhouse gas emissions, implications for zero waste and circular economy targets, infrastructure costs and potentially irreversible market implications (e.g. loss of end use markets due to a perceived increase in risk or loss of confidence in biosolids products).
- Uncertainty of regulation causes uncertainty and delays in investment decisions and planning for treatment infrastructure. e.g., 'End of pipe' PFAS treatment technologies are dominated by various forms of incineration, gasification and pyrolysis. These technologies are generally not proven long-term regarding PFAS management and the political and social acceptance of these technologies has not been substantially tested. The regulatory uncertainty may result in decisions that collapse established beneficial reuse markets and create a point of no return where financial implications make it impossible to return to current practises that in our opinion embody a true circular economy.
- A transition period will be critical to enable industry to plan and deliver infrastructure (where required) and allow supporting policy and regulatory frameworks to be developed in consultation with industry.
- The impacts for both large and small water utilities or local councils must be considered in the Regulatory Impact Statement.

2) **The draft PFAS NEMP 3.0 is focused on end-of-pipe solutions. Source control, which includes import and manufacture bans on both PFAS and products containing PFAS, is the only effective way to ensure PFAS is effectively and permanently removed from our ecosystems (Refer Appendix D).**
   - ANZBP recognises and strongly advocates that a systems approach to management, including source control, is required, rather than relying on 'end of pipe' limits in isolation.
   - Greater control over the importing and use of these chemicals is needed to remove the burden on communities having to pay for high cost of 'end of pipe' treatment and management.
   - ANZBP urges Federal and state governments to implement similar source control measures to those adopted elsewhere in the world including New Zealand and Europe to limit access to imported PFAS products.
   - Source control includes import and manufacture bans on both PFAS and products containing PFAS.
   - Source control measures would not only reduce the risks associated with PFAS in biosolids, but more importantly reduce direct exposure of consumers to PFAS in a broad range of everyday household products.
   - Accountabilities and roles and responsibilities for all parties to meet national PFAS targets should also be defined.
   - There is evidence that biosolids is not the primary source of PFAS land contamination. Recent studies from the USA, detected PFAS compounds in the 'control' plants and further

investigation found that the fields had been sprayed by PFAS-containing pesticides[1]. Six of the ten pesticides tested that were stored onsite detected positive for PFOS with concentrations between 3,920 and 19,200 ug/kg (reminder: the recommended PFOS+PFHxS maximum in soil after biosolids application is 1.1ug/kg). It is assumed that similar insecticides are (or were previously) available in Australia and applied.

- There is evidence that PFAS levels are reducing in society and blood serums levels are reducing in areas where PFAS has been phased out, including Europe, the US and New Zealand. Ongoing regulation of a diminishing contaminant is counter intuitive and may lead to outcomes detrimental to zero waste and circular economy targets.

3) **ANZBP support a risk-based approach for the national guidance provided in the NEMP. This would enable regulators and biosolids practitioners in each jurisdiction to work together to develop appropriate frameworks to achieve the core objectives of the NEMP (Refer Appendix B)**
   - The proposed stringent biosolids concentration limits present a critical risk to the viability of current and future biosolids reuse programs.
   - We propose that a risk-based approach focusing on maximum allowable soil contaminant concentration limits to calculate acceptable biosolids application rates based on measured biosolids concentrations would achieve the core objectives to protect the environment and human health without the classification of restricted / unrestricted biosolids.
   - The approach to practical management of biosolids to minimise environmental risk and prevent impacts on sensitive receptors is currently managed through the respective State guidelines and procedures. This includes specifications for factors that address stabilisation grade, risk of offsite movement due to slope, flooding risk, leaching, etc.
   - The framework is based on the assumption that up to 50 dry tonnes per hectare (DT/ha) of biosolids is applied in a single application. In New Zealand and many Australian jurisdictions a typical biosolids application rate is 5 DT/ha (for example this might be limited by the maximum allowable nitrogen application rate of 200kg/ha and assuming biosolids with 4% Nitrogen content by Dry Solids). This highlights the need to allow a proportionate risk based approach depending on the local conditions and biosolids practices to ensure the objective of protecting soil is achieved.

4) **The "Potential biosolids assessment framework" set out in Figure 2 of the Supporting Document requires soil incorporation for all biosolids applications to land. ANZBP believes that incorporation should only be a requirement for some bespoke situations (Refer Appendix E).**
   - The proposed framework requires incorporation (ploughing) of biosolids, which does not align with current best practice farming methodology, including no-till agricultural practices.
   - While incorporation is currently used in some Australian operations, many biosolids application to land programmes do not use incorporation because:
     - The biosolids product is pathogen-free due to stockpiling, thermal treatment or composting,
     - The biosolids product is applied to forestry and orchards and the root systems would be damaged from incorporation,

[1] S. Lasee, K. McDermett, N. Kumar, J. Guelfo, P. Payton, Z. Yang, T.A. Anderson (2022) Targeted analysis and Total Oxidizable Precursor assay of several insecticides for PFAS. Journal of Hazardous Materials Letters, p. 3 https://doi.org/10.1016/j.hazl.2022.100067

- Application rates are approximately 10% by volume compared to assumed rate of application as the baseline in the NEMP 3.0,
- Modern regenerative farming practice discourages ploughing as it negatively impacts soil structure and quality, and the process itself heavily contributes to generation of atmospheric carbon.
- Natural incorporation of materials applied to land occurs in soil systems over time through root penetration, microbiological activity, movement of worms and other biota, and rainfall. It is widely accepted that PFAS compounds are more mobile than other trace elements such as heavy metals because heavy metals have a higher propensity to bind to elements of soil. PFAS is therefore expected to be naturally incorporated at a more rapid rate.

ANZBP seeks to support HEPA's NCWG in the development of a robust national framework. We would be pleased to work with you to provide further information and engage in further discussion to support the development of NEMP 3.0 and to ensure that the objectives set out in the Draft NEMP 3.0 can be achieved.

Should you require any further information regarding this submission, please contact Kelly Hopewell (ANZBP Advisory Committee Chair) via email khopewell@goldcoast.qld.gov.au.

Yours sincerely,

Kelly Hopewell

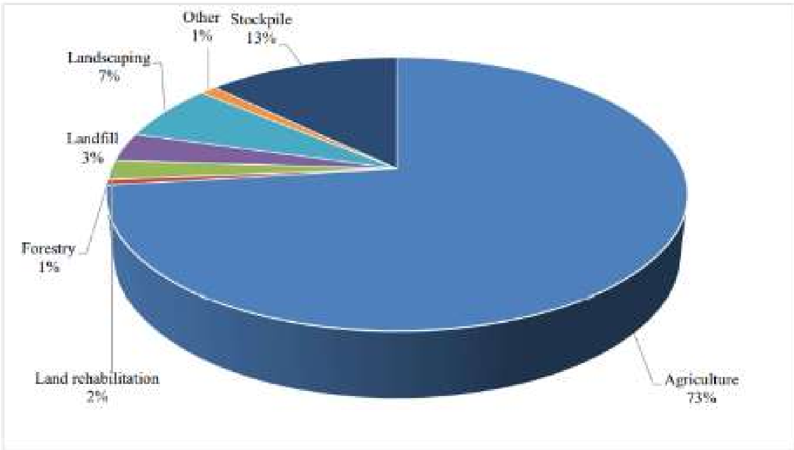
Kelly Hopewell
ANZBP Advisory Committee Chair

Appendix A

Overview of biosolids beneficial reuse

ANZBP's bi-annual end use survey (2021) identified that in Australia, 83% of biosolids were beneficially reused with only a small percentage ending up in landfill or remaining in stockpiles.

Figure 1: Biosolids end use (dry mass basis), Australia 2021



The total biosolids production was 349,000 dry tonnes per year in Australia and 66,000 dry tonnes per year in New Zealand (this equates to 12 – 14 kg for each person per year). The dryness of the biosolids varies depending on how much energy or storage time is used in processing the solids. When the wet weight tonnage is taken into account, the mass of biosolids produced each year becomes a large number. Australia's 1.4 million tonnes and New Zealand's 363 thousand tonnes would more than fill up the Melbourne Cricket Ground, every year!

It would take almost 10,000 London buses to fill the MCG according to surveyors.*(Getty Images: Michael Dodge).*
Source: [How big is the MCG? Surveyors find exact measurements of Melbourne Cricket Ground - ABC News]

Fortunately, the demand from agricultural users of biosolids is high, as biosolids land application helps them to reduce their reliance on mineral fertilisers and provides greater yields and improves soil health, meaning the positive effects are long lasting (many growing seasons).

In an increasingly resource constrained world, the capacity to beneficially re-use the nutrients and carbon in biosolids is a critical pillar global sustainability and the circular economy.

1. Phosphorous is an essential nutrient for plant growth and all animal life. There are limited known natural reserves of Phosphorus in the world, with the largest source of production being China (85Mt/yr). Russia is the fourth largest producer at 14Mt/yr. Recycling of the vast quantities of Phosphorous used in agriculture - assimilated into our food and concentrated in through our waste in biosolids - is crucial for the long-term of our global society. Estimates of the estimated point of "peak phosphorus production vary, with one article putting this as early as 2033 (Nat. Plants 8, 979 (2022). https://doi.org/10.1038/s41477-022-01247-2). Failure to improve phosphorus use efficiency and recycle phosphorus represents an existential threat to our society.
2. Nitrogen is also a critical plant nutrient. Nitrogen fertilisers have been pivotal in improving global food production and security, enabling the Green Revolution in agricultural production. Nitrogen is abundant in the atmosphere, but not in a form readily available to plants. Rather, nitrogen fertiliser is produced largely from natural gas. This is an energy intensive process, resulting in significant greenhouse gas emissions. Reuse of biosolids provides an important contribution to reduction in carbon emissions.
3. Carbon is critical for soil health and agricultural production. While fertiliser use has contributed to substantial improvements in food production, this has been at the expense of running down the carbon capital of our soils. Substantial evidence exists to demonstrate that beneficial use of biosolids in agriculture restores soil carbon and health. This also presents the capacity to sequester soil carbon and reduce the legacy carbon in the atmosphere, contributing to addressing the issue of climate change.

Studies[2] show that biosolids has equivalent nutrient value of $70-90/dry tonne in comparison with chemical fertiliers.

[2] Melbourne Water Biosolids Land Application Market Identification Stages 1&2 Report

Appendix B

Risk base approach - Clarification on Margins of Safety

In its current form, the Draft PFAS NEMP 3.0 provides a margins of safety approach and is unclear which MoS would be applied to application sites. Indications that State-based regulators will be able to apply the guidance that they feel is warranted in each case. ANZBP approached all state regulators to ask how they intend to apply the PFAS NEMP 3.0 in their jurisdiction and only received two responses. Neither of the responses stated a clear direction for the implications of these limits.

ANZBP believes margins of safety should be embedded in a risk based approach to application rates for specific operations.

Maximum allowable soil contaminant concentration

The ANZBP notes that the descriptive text in Section 4.2 states that unrestricted application is "mechanically incorporated into the soil". The associated calculation results in a maximum allowable soil contaminant concentration of zero if zero depth of incorporation is assumed (i.e., spread on soil surface without incorporation when appropriate measures are undertaken to prevent movement to sensitive receptors). We assume this is un-intended as it would effectively mean that there is no practical difference for restricted or unrestricted application.

Lack of provision for unrestricted use

> The current framework provides for beneficial use when biosolids satisfy a product concentration at a specified margin of safety ***and*** a maximum allowable soil contaminant concentration. This effectively excludes the potential for unrestricted use of biosolids that achieves an "A Grade" product category and very low of nil PFAS concentration. Moreover, this is inconsistent with the approach to regulation of other materials.
>
> As an example, under the NSW Fertilisers Regulation 1997, a phosphatic fertiliser must not contain more than 350 milligrams of cadmium per kilogram of phosphorus. Assuming a phosphorous content in DAP of 46%, this equates to a cadmium concentration of 161mg/kg of fertiliser product. This is significantly greater than the allowable concentration of cadmium an A Grade biosolids (3 mg/kg).
>
> Importantly, however, the basis for regulation of other soil amendment products containing trace concentrations of contaminants (including biosolids) allows for unrestricted use below a threshold product concentration, and restricted use based on maximum allowable soil contamination concentration. The same principal should be applied to PFAS in biosolids.
>
> The application of this principal will also encourage innovation in approaches to PFAS destruction. For example, assuming a new technology becomes available to destroy 99% of PFAS compounds in biosolids, enabling a product quality to be achieved that might satisfy a Margin of safety of 5, then the treated biosolids would still be managed as a restricted product given the current proposed need to achieve both a maximum product concentration ***and*** a maximum allowable soil contaminant concentration.
>
> It is proposed that a product limit is recommended for unrestricted biosolids use, negating the need to test soil in order to meet a maximum allowable soil contaminant concentration. This recommendation modifies the first step in the assessment process below to replace "and" with "or".

Step 1 Is the concentration in biosolids below the threshold concentration? AND Is the in-situ soil concentration below the laboratory limit of reporting?	**Step 1** Is the concentration in biosolids below the threshold concentration? OR Is the in-situ soil concentration below the laboratory limit of reporting?
Current	Proposed.

APPENDIX C

Need for a Regulatory Impact Statement

ANZBP believes the implementation of the PFAS NEMP 3.0 in it's current form could cause significant economic and structural change to both the biosolids industry and farming practice. The ANZBP therefore recommends that a Regulatory Impact Statement is required to understand the cost and impact of compliance. An economic assessment or cost benefit assessment is recommended to be undertaken. How will the broader economic implications due to the implementation of PFAS NEMP 3.0 (e.g. considering nutrient, soil carbon, soil moisture and soil microbiome benefits of biosolids land application, maintaining phosphorus in circulation to prolong peak phosphorus, use of biosolids instead of chemical fertilisers, greenhouse gas emissions, implications on zero waste, circular economy, infrastructure costs, etc.) be assessed? Will potential market implications of any proposed changes (e.g. reduction in end use markets due to a perceived increase in risk or loss of confidence in biosolids products) be considered, and if so, how will these be determined?

APPENDIX D

Source Control and human exposure
The Draft PFAS NEMP 3.0 states that '*where PFAS concentrations in biosolids are high enough to prohibit their beneficial re-use they must be treated or disposed of in accordance with jurisdictional requirements for PFAS contaminated wastes*'. The options for treatment and disposal of biosolids with concentrations considered 'high' (between 6.2 and 31ppb for PFOS+PFHxS and 25 and 130 ppb for PFOA depending on the margin of safety) are landfilling or thermal treatment (by gasification/pyrolysis or incineration). To put these 'high' concentrations into perspective, the median PFOS concentration in blood serum samples from Australians[1] is 4.5ppb.

Most 'End of pipe' PFAS treatment technologies are not proven and require long lead time, the regulatory uncertainty may result in poor decisions that are hard to steer back from, financial and end-product wise.

Preliminary findings from sewage catchment monitoring suggest that residential sources of PFAS are a significant portion of the load to sewage treatment plants. Whilst the PFAS exposure of Australians appears to be declining for certain PFAS (e.g. PFOS and PFOA) based on blood serum results[3], others appear to be remaining steady (e.g. PFHxS). Also, whilst human exposure is declining, PFAS loads to sewer are not necessarily declining, overall. The figures shown below appear in Cookson and Detwiler (2022)[4] and suggest that most PFAS are likely to be increasing in Australian effluents (red indicates increasing trend in Fig 6), and that whilst PFOA is declining in wastewater effluents in the USA, that effluents from China are increasing to levels surpassing that of the USA from the early 2000's (Fig 7). According to some sources[5], over 65% of the textiles and clothing imported into Australia is from China, by value. Product and import bans will heavily influence the manufacturing industries away from the use of PFAS in their products towards safe non-PFAS containing alternatives.

[3] Toms LML, Bräunig J, Vijayasarathy S, Phillips S, Hobson P, Aylward LL, Kirk MD, Mueller JF (2019) Per- and polyfluoroalkyl substances (PFAS) in Australia: Current levels and estimated population reference values for selected compounds. Int J Hyg Environ Health. 2019 Apr; 222(3):387-394. doi: 10.1016/j.ijheh.2019.03.004

[4] Cookson, ES, Detwiler, RL (2022) Global patterns and temporal trends of perfluoroalkyl substances in municipal wastewater: A meta-analysis. Water Research 221: DOI: 10.1016/j.watres.2022.118784

[5] Australia Textiles and Clothing Imports by country & region 2020 | WITS Data (worldbank.org)

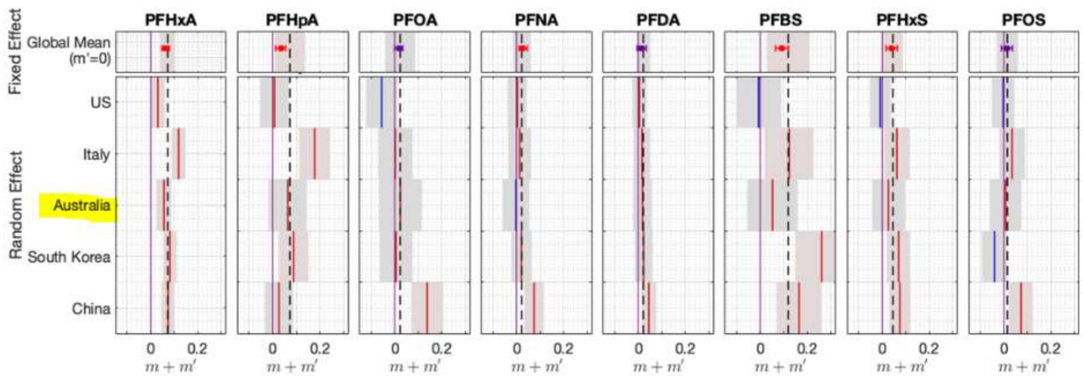


Fig. 6. Slopes, $m + m'$, indicate the change in log concentrations of PFAS, reported from effluent waste-stream samples, per year. Fixed effect or global mean slopes, m, for LME1 (of 17 countries not displayed, •) and LME2 (– –) are shown. The total slope, is adjusted by the LME2 model for each ith country by the estimated random effect slope, m_i', for each PFAS. Colors of the vertical lines and marker indicate whether PFAS concentrations are expected to increase (red: $m + m' > 0$) or decrease (blue: $m + m' < 0$) with time. The error bars and shaded region represent confidence intervals. Shorter-chained PFAS ($C < 8$) have increased in effluent waste-streams for most countries considered in the LME2 analysis. Whereas longer-chained PFAS concentrations have changed less significantly with time in reported studies. Notably, all PFAS have an increasing trend, higher than the global mean, in WWTP effluent reported from China. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

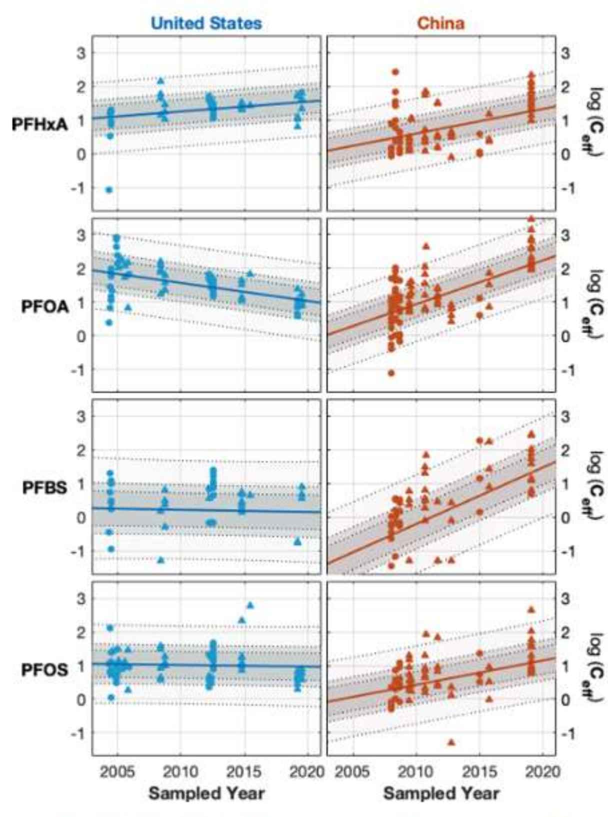


Fig. 7. Measured effluent PFAS concentrations, $\log(C_{eff})$, and estimated concentrations from the linear mixed-effect (LME2) model for the United States and China. Although reported PFAS concentrations were historically higher in waste-streams in the United States than in China (before 2012), concentrations reported in China have steadily increased and are approaching or are higher than the concentrations measured recently in the US. Circles indicate composite samples and triangles indicate grab samples.

The state of knowledge of the largest residential sources of PFAS is not well established, so attempts to reduce sources of PFAS in wastewater by gaining community support is difficult. Consumers do not even know which products they purchase are contributing to the problem. To attempt to reduce both human and environmental exposure, some states in the USA and parts of Europe are in the process of banning the sale of consumer products that contain PFAS, including food packaging, cosmetics and clothing/textiles. It is understood that the Australian Packaging Covenant Organisation (APCO) is voluntarily reducing PFAS in packaging, which is a move supported by the ANZBP. APCO's report [6] shows total PFAS (post-total oxidised precursor TOP assay) concentrations in snack cartons and popcorn bags up to 54,800ug/kg (n.b. the recommended PFOS+PFHxS maximum in soil after biosolids application is 1.1ug/kg). Whilst food packaging is unlikely to get into sewer systems, PFAS transfer into foods has been surmised[7] and packaging is being rejected by some composters and sent to landfills. PFAS is likely to leach from the packaging and then appear in the leachate (often discharged to sewer systems).

ANZBP suggests that whilst the voluntary approach proactively taken by some industries is a positive first step, that more needs to be done to highlight other potential sources (e.g. cosmetics and personal care products as found in this Nth American study[8],[9]). Recent studies from the USA, detected PFAS compounds in the 'control' plants and further investigation found that the fields had been sprayed by PFAS-containing pesticides[10]. Six of the ten pesticides tested that were stored onsite detected positive for PFOS with concentrations between 3,920 and 19,200 ug/kg (reminder: the recommended PFOS+PFHxS maximum in soil after biosolids application is 1.1ug/kg). It is assumed that similar insecticides are (or were previously) available in Australia and applied.

Example of utility Source Control action: A medium sized utility proactively monitors their trade waste customers in key industries as identified in the NEMP 2.0, including laundries, textile manufacturers and metal finishers. One of their customers was found to have higher than typical concentrations of PFAS compounds (post-TOP assay) and were very open about sharing the products they used on site. Two products were identified as having PFAS in them, one was a surfactant and the other was waterproofing agent. The waterproofing agent goes into the manufacturing of the fabrics and the customer insists that all product is recycled internally (not released to sewer) and leaves the premises bound to their fabric products.

The surfactant chemical is called Hostapal LF-AU and lists Perfluoroalkyl acrylate/polyurethane in its ingredient list. The customer was happy to find an alternate PFAS-free surfactant and marked the chemical barrel 'Do Not Use' and disposed of it responsibly. **This chemical is still available for purchase and use in Australia** (despite there being PFAS-free alternatives). The customers of those utilities that do not have the resources to track down sources of PFAS are unlikely to even know they

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[6] PFAS+in+Fibre-Based+Packaging (packagingcovenant.org.au)

[7] Moodie D., Coggan T., Berry K., Kolobaric A., Fernandes M., Lee E., Reichman S., Nugegoda D., Clarke B.O., (2021) Legacy and emerging per- and polyfluoroalkyl substances (PFASs) in Australian biosolids, Chemosphere, Volume 270, https://doi.org/10.1016/j.chemosphere.2020.129143

[8] Whitehead H.D., Venier M., Wu Y., Eastman E., Urbanik S., Diamond M.L., Shalin A., Schwartz-Narbonne H., Bruton T.A., Blum A., Wang Z., Green M., Tighe M., Wilkinson J.T., McGuinness S., and Peaslee G.F., (2021) Fluorinated Compounds in North American Cosmetics, Environmental Science & Technology Letters 2021 8 (7), 538-544 DOI: 10.1021/acs.estlett.1c00240

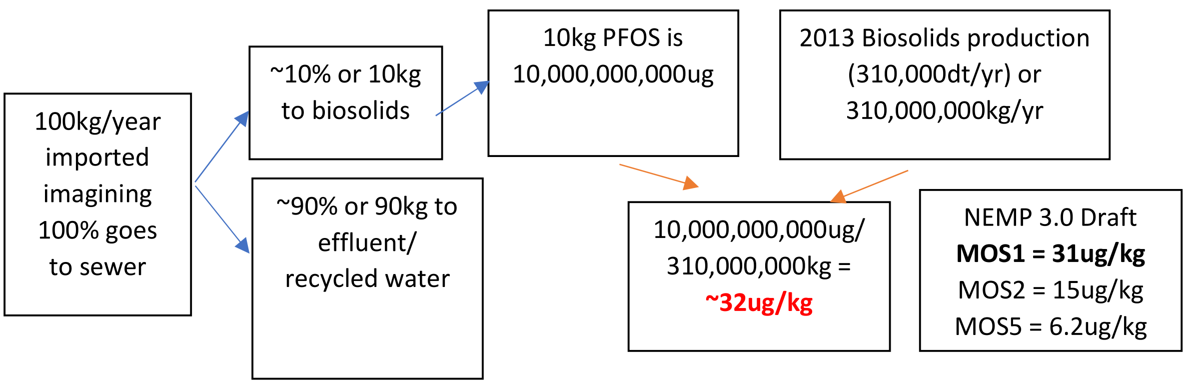
[9] Unlabeled PFAS chemicals detected in makeup (medicalxpress.com)

[10] S. Lasee, K. McDermett, N. Kumar, J. Guelfo, P. Payton, Z. Yang, T.A. Anderson (2022) Targeted analysis and Total Oxidizable Precursor assay of several insecticides for PFAS. Journal of Hazardous Materials Letters, p. 3 https://doi.org/10.1016/j.hazl.2022.100067

are using problematic products. The utility that did the work to track down and find the Hostapal LF-AU feels disappointed that efforts to highlight this chemical have not ended in a National ban. Unfortunately larger utilities that can have upwards of 30,000 trade waste customers do not have the resourcing capabilities technology and budget to identify and guide their customers from the end of the pipe.

Regulation and awareness of PFAS containing substances is vital, so that wastewater treatment plants (and biosolids and recycled water) don't become the end-of-the pipe problem that the wastewater industry is left to cover costs of treatment, when it is clear that something must be done about PFAS sources. ANZBP does not consider the water utilities that receive and treat a variety of wastes from society as the 'polluter', however, they are being asked to pay for the management of PFAS (when the real polluters that import and distribute PFAS-containing products are exempted from responsibility and are profiting from this inconsistency). The 'polluter pays' model appears to be broken in the case of PFAS.

The iChems Direct precursors to perfluorooctanesulfonate (PFOS): Environment tier II assessment (13/02/2015) states that '*100 kg of PFOS was imported in bulk in 2013 by one importer*'. If all 100kg of this PFOS ended up in the sewer in 2013, it would have been enough to contaminate the 310,000 tonnes of biosolids produced in Australia that year, to levels above figures in the draft PFAS NEMP 3.0 appropriate for land application at the least stringent margin of safety (MOS).



The PFAS NEMP 3.0, draft biosolids guideline for PFOS+PFHxS at a margin of safety of five (MOS5) is 6.2ug/kg. Regulators have suggested that is a number biosolids managers should strive towards and the PFAS NEMP 3.0 states it gives a tiered approach that will be '*reduced over time to encourage biosolids producers to manage and reduce PFAS*'. The large portion of PFAS coming from residential sources means the reduction of imports of PFAS in domestic products is required. Federal initiatives are required to help reduce PFAS imports to ensure sustainability targets are met.

The ANZBP supports all measures that reduce the volume and number of persistent bioaccumulative and toxic chemicals that are imported into Australia, and especially PFAS chemicals, that are ultimately discharged to the environment. Alongside other water industry bodies e.g Qld Water Directorate), we call for the following:

- That Australia moves to ratify the Stockholm Convention to allow the government to apply restrictions on import, use and disposal of these chemicals (targets protective of biosolids reuse are encouraged)
- The fast-tracking of national labelling laws for all imported goods that identifies chemicals that belong to the PFAS class of chemicals
- A transition to the national prohibition of the PFAS class of chemicals in all goods in Australia that intended for use in contact with skin and food or food products.
- A national communication campaign to explain the risks and why the new approach is being adopted and how it will be funded
- Recognition and support of the utilities including the wastewater and municipal waste sectors as the receiver of these chemicals on behalf of the community.

These measures will assist the urban water sector to work together with regulators and the communities they serve, to make informed choices that will support the sustainable development of a circular economy for biosolids reuse in Australia.
We recommend HEPA to undertake a Cost-Benefit Analysis which estimates costs for source control options that will enable compliance with the proposed criteria for discharge or reuse of treated effluent, and reuse or disposal of biosolids, and determine the requirements for and practicability of source control. This would involve better understanding the current use of PFAS in both industrial and non-industrial uses that can contribute to PFAS in wastewater entering WWTPs. When this information is obtained, then determine the practicability of introducing regulations to prohibit such use.

APPENDIX E

Requirement for soil incorporation

The NEMP 3.0 includes a three step "potential framework for screening" (Section 4, and specifically Figure 2). ANZBP does not believe this is proportionate with practice for biosolids application to land or compatible with best practice farming because :

1. The framework requires incorporation (ploughing) of biosolids, however, no reason for the requirement of incorporation is given. While incorporation is currently used in some Australian operations, almost all biosolids application to land in NZ and Tasmania, as well as other Territories, do not use incorporation. This may be because :
   a. Biosolids application is pathogen-free due to thermal treatment or composting,
   b. Biosolids are applied to forestry and orchards and the root systems would be damaged from incorporation,
   c. Application rates may be as low as 10% by volume compared to some the baseline in the NEMP 3.0 (refer point 2 below), and;
   d. Modern regenerative farming practice discourages ploughing as it negatively impacts soil structure and quality.

Natural incorporation of materials applied to land occurs in soil systems over time through root penetration, microbiological activity, movement of worms and other biota, and rainfall. It is widely accepted that PFAS compounds are more mobile than other trace elements such as heavy metals because heavy metals have a higher propensity to bind to elements of soil. PFAS is therefore expected to be naturally incorporated at a more rapid rate.

Importantly, the approach to practical management of biosolids to minimise environmental risk and prevent impacts on sensitive receptors is currently managed through the respective State guidelines and procedures. This includes specifications for factors that address stabilisation grade, risk of offsite movement due to slope, flooding risk, leaching etc. We suggest that the respective State/Territory-based Guidelines are the more comprehensive and appropriate vehicle to manage the practical aspects of biosolids than the NEMP, which should be focussed on product and/or soil limits. We therefore recommend that reference to requirements for incorporation of biosolids is removed from the NEMP.