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PR25082

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**Re: Interim Soil Target Values for PFHxS, PFHxA, PFOA, and PFOS-Update 1**

Ecolog Engineering LTD (“Ecolog”), together with SLR Consulting, was requested by the Ministry of Environmental Protection (MoEP) to provide interim soil target values for four (4) PFAS compounds (PFHxS, PFHxA, PFOA, and PFOS). The interim soil target values were calculated using the IRBCA model spreadsheet and include the following updated parameters from the December 2024 published target values.

**Target Groundwater Concentration:** The soil concentrations protective of groundwater established in December 2024 were derived using a generic target drinking water concentration of 0.1 µg/L applied to each individual PFAS compound. The updated values have been derived using compound-specific target groundwater concentrations for domestic use, incorporating relevant exposure pathways (ingestion, oral contact, and inhalation of vapours associated with groundwater use) and based on human health toxicity parameters.

It is recommended that future revisions to the risk-based target concentrations for PFAS compounds include replacing the current leaching model, which predicts leachate concentrations based on soil properties and chemical fate and transport parameters. Where practicable, the model should be supplemented or replaced with laboratory-based leaching tests and direct analytical measurements to better characterise leaching potential under site-specific conditions.

**Update to Toxicity Reference Values:** A critical review has been undertaken of the available toxicity reference values for PFHxS, PFHxA, PFOA, and PFOS. The review was limited to the following jurisdictions:

- United States - Environmental Protection Agency (USEPA) Integrated Risk Information System (IRIS) and Office of Water.
- Australia - National Health and Medical Research Council (NHMRC) and Food Standards Australia New Zealand (FSANZ).
- Canada - Health Canada.

- Europe – European Chemicals Agency (ECHA) and European Food Safety Authority (EFSA). The outcome of the review is summarised in Appendix A and Table 1 below.

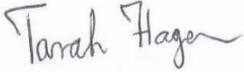
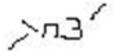
**Table 1. Health-based TRVs recommended for use by MoEP for derivation of interim soil target values for PFOS, PFOA, PFHxS and PFHxA**

PFAS	Recommended TRV (ng/kg bw/day)	Source & justification
PFOS	2.43	TRV used to derive Australian drinking water guidelines: NHMRC and NRMMC (2025), see <b>Section 2.0</b> .
PFOA	65	TRV used to derive Australian drinking water guidelines: NHMRC and NRMMC (2025), see <b>Section 3.0</b> .
PFHxS	9.7	TRV used to derive Australian drinking water guidelines: NHMRC and NRMMC (2025), see <b>Section 4.0</b> .
PFHxA	900	TRV derived <i>de novo</i> based on effects observed in the best available experimental animal study, see <b>Section 5.0</b> .
TRV = Toxicity Reference Value. PFAS = Per- and poly-fluoroalkyl substances. PFOS = Perfluorooctane sulfonate. PFOA = Perfluorooctanoic acid. PFHxS = Perfluorohexane sulfonate. PFHxA = Perfluorohexanoic acid.		

**Recommendation to Update MoEP’s Risk Management Policy for PFAS compounds:** Ecolog and SLR undertook a detailed literature review in January 2026 to inform the selection of international policy approaches for calculating risk-based target concentrations for PFAS compounds. Current international assessments indicate that some PFAS may be carcinogenic in laboratory animal studies; however, most regulatory agencies conclude that the available evidence does not support a direct-acting genotoxic (DNA-reactive) mode of action (ATSDR 2021; EFSA 2020; FSANZ 2017; Health Canada 2018a, 2018b; MDH 2022; NHMRC and NRMMC 2025; NJDEP 2019; OEHHA 2019; US EPA 2021; WSDH 2019). In this context, application of a low-dose linear extrapolation approach (and associated cancer slope factors) is generally considered highly conservative and may not be the most appropriate basis for deriving risk-based concentrations for PFOS and PFOA. Accordingly, oral and dermal cancer slope factors were not applied in the derivation equations and were replaced with conservative toxicological reference values (TRVs), including oral reference doses, intended to be protective of sensitive populations for lifetime daily exposure. This threshold-based approach is consistent with methodologies adopted by multiple regulators internationally, including Health Canada and Australia (as described in this study).

The attached Excel table includes the calculated target values for the four PFAS compounds using the IRBCA model and updated toxicity parameters recommended by SLR.

Sincerely,

Name	Title	Company	Signature
<b>Tarah Hagen</b> <b>(BAppSc (Hons), MSc., DABT, FACTRA)</b> <b>(Reviewer)</b>	Technical Director   Toxicologist & Risk Assessor	SLR Consulting	
<b>Yitzhak Stramer</b> <b>(M.Sc)</b>	Environmental Engineer	Ecolog Engineering	

**To:** Yitzhak Stramer MSc  
**From:** Tarah Hagen, MSc DABT  
FACTRA  
**Company:** Ecolog Engineering  
**SLR Consulting Australia Pty Ltd**  
**cc:** Andrew Gemmell  
**Date:** 3 March 2026  
**Project No.** 723.000216.00001

**RE: Recommended Toxicity Reference Values for PFHxS, PFHxA, PFOA and PFOS for calculation of interim soil target values**

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## 1.0 Introduction and Scope

SLR Consulting (SLR) was requested by Ecolog Engineering Ltd (Ecolog) on behalf of the Israel Ministry of Environmental Protection (MoEP) to provide a critical review of available toxicity reference values (TRVs) for perfluorohexansulfonate (PFHxS), perfluorohexanoic acid (PFHxA), perfluorooctanoic acid (PFOA), and perfluorooctanesulfonate (PFOS). The purpose of the review is to define appropriate TRVs for use in derivation of interim health-based soil target values for use in Israel.

Due to time constraints, the review was limited to the following international jurisdictions:

- United States - Environmental Protection Agency (USEPA) Integrated Risk Information System (IRIS) and Office of Water.
- Australia - National Health and Medical Research Council (NHMRC) and Food Standards Australia New Zealand (FSANZ).
- Canada - Health Canada.
- Europe – European Chemicals Agency (ECHA) and European Food Safety Authority (EFSA).

On behalf of the Australian NHMRC, SLR recently undertook detailed evidence evaluations for the Australian drinking water guidelines chemical fact sheets for a number of PFAS (SLR 2024a, b), which included PFOS, PFOA and PFHxS. The information in this letter regarding these three PFAS primarily relied on the critical review already undertaken by SLR (2024a, b) and drew on conclusions made by FSANZ (2017, 2021). NHMRC and NRMCC (2025) then used the results of the SLR (2024a, b) evaluation to derive drinking water guidelines for these three PFAS.

PFHxA was not within the scope of the SLR (2024a, b) reviews, therefore this letter presents a critique of the studies used by international jurisdictions to derive TRVs for this PFAS.

## 2.0 PFOS

The SLR (2024a, b) reviews provide a discussion of the strengths and limitations of the identified guidance values for PFOS. Critical evaluation was focused on those guidance

values derived using underpinning studies not previously considered / evaluated in detailed reviews conducted by FSANZ (2017, 2021).

For PFOS, the only guidance values identified in the literature review conducted by SLR (2024a, b) that based their derivations on underpinning studies not previously considered / cited in the comprehensive review undertaken by FSANZ (2017, 2021)<sup>1</sup> are the following.

- EFSA (2020a) who derived a TRV for  $\Sigma$ (PFOA + PFNA + PFHxS + PFOS) of 0.63 ng/kg bw/day (tolerable weekly intake, or TWI = 4.4 ng/kg bw per week). The critical study this was based on is Abraham et al. (2020), which is a cross-sectional study of 101 healthy 1-year old children which found statistically significant inverse associations between serum levels of PFOA, but not of PFOS, and adjusted levels of vaccine antibodies against *Haemophilus influenza* type b ( $r = -0.32$ ), diphtheria ( $r = -0.23$ ) and tetanus (IgG1 only) ( $r = -0.25$ ). When subjects were stratified according to PFOA concentration, comparison of the highest and lowest quintiles showed that PFOA was associated with antibody levels, on a logarithmic scale, that were 86% lower for *Haemophilus influenza* type b, 53% lower for diphtheria and 54% lower for tetanus. This effect is a marker of immune response. The EFSA CONTAM Panel decided to combine its assessment on the sum of four PFAS, i.e. PFOA, PFNA, PFHxS and PFOS as these four PFAS contribute most to the levels observed in human serum, share toxicokinetic properties in humans and show similar accumulation and long half-lives (EFSA 2020a). The Abraham et al. (2020) study was critically evaluated by SLR (2024a) and it was concluded that although low PFOS doses appear to be associated with immunosuppression, the data from this study are not considered reliable for use as a key study for derivation of a TRV. The detailed rationale is provided in SLR (2024a).
- US EPA (2024b) who derived a guidance value of 0.1 ng/kg/day for PFOS based on decreased infant birth weight (Wikström et al. 2020) and increased total cholesterol in adults (Dong et al. 2019). These studies were critically evaluated by SLR (2024b), and it was concluded that the dose response data from these studies are not considered sufficiently reliable for use as a key study for derivation of a TRV. The detailed rationale is provided in SLR (2024b).

It is noteworthy that a recent review on estimating safe doses for PFOS for human health consisting of an international collaboration of scientists also concluded that the available epidemiologic information could not form a reliable basis for a PFOS safe dose assessment (Dourson et al. 2026). Based instead on dose-response data from studies of PFOS-exposed laboratory animals, they estimated that PFOS dose rates of 20 to 100 ng/kg bw/day are protective of human health.

NHMRC and NRMCC (2025) considered the NTP (2022) 28-day toxicology study in rats to be the best available evidence to establish a health-based guidance value for PFOS. SLR (2024a, b) found that the NTP (2022) study was a comprehensive, high quality (high confidence) study that was considered to have been conducted appropriately and investigated a large number of endpoints. It was considered that the critical health effect in

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<sup>1</sup> The SLR (2024a, b) reviews covered many international guidance values. For PFOS, these included values from the US Agency for Toxic Substances and Disease Registry (ATSDR 2021), EFSA (2020), the Dutch National Institute of Public Health and the Environment (RIVM 2021), FSANZ (2017), Health Canada (HC 2018a), Minnesota Department of Health (MDH 2020a), Washington State Department of Health (WSDH 2019, 2022, 2023), Michigan's PFAS Action Response Team (MPART 2019), New Jersey Department of Environmental Protection (NJDEP 2019b), California Office of Environmental Health Hazard Assessment (OEHHA 2019, 2023), US EPA (2024b), World Health Organization (WHO 2022).



rats in NTP (2022) for PFOS was bone marrow effects (extramedullary haematopoiesis and bone marrow hypocellularity) (SLR 2024b, 2025).

The resulting NHMRC (2025) TRV which was used to derive a drinking water guideline for PFOS was **2.43 ng/kg/d**.<sup>2</sup> This health-based TRV is recommended for use in this assessment.

### 3.0 PFOA

For PFOA, the SLR (2024a, b) reviews also provide a critical evaluation of the guidance values identified in the literature review that based their derivations on underpinning studies not previously considered / cited in the comprehensive review undertaken by FSANZ (2017)<sup>3</sup>. These are:

- EFSA (2020a) who derived a guidance value for  $\Sigma(\text{PFOA} + \text{PFNA} + \text{PFHxS} + \text{PFOS})$  of 0.63 ng/kg bw/day (TWI = 4.4 ng/kg bw per week) for decreased antibody titre for specific vaccines. The critical study underpinning this guidance value (Abraham et al. 2020) was not available to FSANZ at the time of their 2017 review but was reviewed later by FSANZ (2021). As noted in **Section 2.0** this study was critically evaluated by SLR (2024a), and it was concluded that data from this study are not considered reliable for use as a key study for derivation of a TRV. The detailed rationale is provided in SLR (2024a).
- US EPA (2024a) who derived a guidance value of 0.03 ng/kg/day for PFOA based on decreased serum anti-tetanus and anti-diphtheria antibody concentrations in children (Budtz-Jørgensen and Grandjean 2018), decreased infant birth weight (Wikström et al. 2020), and increased total cholesterol in adults (Dong et al. 2019). These studies were critically evaluated by SLR (2024a, b) and it was concluded that the dose response data from these studies are not considered sufficiently reliable for use as key studies for derivation of a TRV. The detailed rationale is provided in SLR (2024a, b).

It is noteworthy that a recent review on estimating safe doses for PFOA for human health consisting of an international collaboration of scientists also concluded that the available epidemiologic information could not form a reliable basis for a PFOA safe dose assessment (Burgoon et al. 2023). Based instead on dose-response data from studies of PFOA-exposed laboratory animals, they estimated that PFOA dose rates of 10 to 70 ng/kg bw/day are protective of human health.

NHMRC and NRMCC (2025) considered the NTP (2023) 2-year toxicology study in rats to be the best available study to establish a health-based guidance value for PFOA. SLR (2024a, b) found that the NTP (2023) study was a comprehensive, high quality (high confidence) study that was considered to have been conducted appropriately and

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<sup>2</sup> This was derived from a serum BMDL<sub>10</sub> of 5.688 mg/L in female rats, converted to a human equivalent point of departure of 0.000728 mg/kg bw/day, and application of an uncertainty factor of 300 (3 to account for the uncertainty of extrapolating from animals to humans, 10 to account for human variability and 10 for use of a short-term study), i.e.  $0.000728 \text{ mg/kg bw/day} \div 300 = 2.43 \text{ ng/kg bw/day}$ .

<sup>3</sup> The SLR (2024a, b) reviews covered many international guidance values. For PFOA, these included values from the US Agency for Toxic Substances and Disease Registry (ATSDR 2021), EFSA (2020), the Dutch National Institute of Public Health and the Environment (RIVM 2021), FSANZ (2017), Health Canada (HC 2018b), Minnesota Department of Health (MDH 2022a), Washington State Department of Health (WSDH 2019, 2022, 2023), Michigan's PFAS Action Response Team (MPART 2019), New Jersey Department of Environmental Protection (NJDEP 2019a), California Office of Environmental Health Hazard Assessment (OEHHA 2019, 2023), US EPA (2024a), World Health Organization (WHO 2022).



investigated a large number of endpoints. It was considered that the critical health effect in rats in NTP (2023) for PFOA was carcinogenicity, with neoplastic effects such as pancreatic acinar adenomas and adenocarcinomas considered to be more critical than non-neoplastic effects (e.g. hepatocellular necrosis) that occur at higher concentrations in rats. Although uncertainties about the clinical relevance to humans were noted, these findings are supported by IARC (2025) and *in vitro* studies which may support a relevant mode of action in humans (SLR 2024b). As a genotoxic mode of action was not consistently demonstrated (IARC 2025, SLR 2024a, b), a guidance value for PFOA was derived using a threshold approach.

The resulting NHMRC (2025) TRV which was used to derive a drinking water guideline for PFOA was **65 ng/kg/d**.<sup>4</sup> This health-based TRV is recommended for use in this assessment.

## 4.0 PFHxS

For PFHxS, the only guidance values identified in the literature review by SLR (2024a, b) that based their derivations on underpinning studies not previously considered / cited in the comprehensive reviews undertaken by FSANZ (2017, 2021)<sup>5</sup> are the following.

- EFSA (2020a) who derived a guidance value for  $\sum(\text{PFOA} + \text{PFNA} + \text{PFHxS} + \text{PFOS})$  of 0.63 ng/kg bw/day (TWI = 4.4 ng/kg bw per week) for decreased antibody titre to specific vaccines in children (Abraham et al. 2020). As noted in **Section 2.0** this study was critically evaluated by SLR (2024a), and it was concluded that data from this study are not considered reliable for use as a key study for derivation of a TRV. The detailed rationale is provided in SLR (2024a).
- US EPA (2025) who derived a guidance value of 0.0004 ng/kg/day for PFHxS based on decreased antibody titre following tetanus vaccination in 7-year old children (Grandjean et al. 2012, Budtz-Jørgensen and Grandjean 2018). These studies were critically evaluated by FSANZ (2017) and/or SLR (2024a) and it was concluded that the dose response data from these studies are not considered sufficiently reliable for use as key studies for derivation of a TRV. The detailed rationale is provided in SLR (2024a).

NHMRC and NRMCC (2025) considered the NTP (2022) 28-day toxicology study in rats to be the best available study to establish a health-based guidance value for PFHxS. SLR (2024a) found that the NTP (2022) study was conducted in accordance with relevant standardised testing guidelines, evaluated a large number of endpoints, and provided serum PFHxS concentrations. It was considered that the critical health effect in NTP (2022) for PFHxS was thyroid effects (i.e. decreased thyroxine (T4) levels) in male rats, although it is noted there are some uncertainties about human clinical relevance of this endpoint.

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<sup>4</sup> This was derived from a serum BMDL<sub>10RD</sub> of 15.2 mg/L in rats, converted to a human equivalent point of departure of 0.0019 mg/kg bw/day, and application of an uncertainty factor of 30 (3 to account for the uncertainty of extrapolating from animals to humans, 10 to account for human variability), i.e. 0.0019 mg/kg bw/day ÷ 30 = 65 ng/kg bw/day.

<sup>5</sup> The SLR (2024a) review covered many international guidance values. For PFHxS, these included values from the US Agency for Toxic Substances and Disease Registry (ATSDR 2021), EFSA (2020), the Dutch National Institute of Public Health and the Environment (RIVM 2021), FSANZ (2017), Minnesota Department of Health (MDH 2020b), Washington State Department of Health (WSDH 2019, 2022, 2023), Michigan's PFAS Action Response Team (MPART 2019), California Office of Environmental Health Hazard Assessment (OEHHA 2022), US EPA (2023 draft, finalised in 2025).



The resulting NHMRC (2025) TRV which was used to derive a drinking water guideline for PFOA was **9.7 ng/kg/d**.<sup>6</sup> This health-based TRV is recommended for use in this assessment.

## 5.0 PFHxA

PFHxA was not one of the PFAS considered in the SLR (2024a, b) evidence review.

The following jurisdictions have derived health-based guidance values for PFHxA.

- US EPA (2023) derived a guidance value of 500 ng/kg/day for PFHxA based on decreased offspring body weight in neonatal rats (Loveless et al. 2009). A BMDL<sub>5RD</sub> of 10.62 mg/kg bw/day was identified for this endpoint and was used as the point of departure<sup>7</sup>. The human equivalent point of departure of 0.048 mg/kg bw/day was derived by US EPA (2023) by applying the ratio of the clearance between female rats and humans and a normalisation from the sodium salt to the free acid using a molecular weight conversion. An uncertainty factor of 100 (3 to account for the uncertainty of extrapolating from animals to humans, 10 to account for human variability, and 3 to account for the limited database of toxicological studies) was applied to result in a TRV of 500 ng/kg bw/day (i.e.  $0.048 \text{ mg/kg bw/day} \div 100 = 500 \text{ ng/kg bw/day}$ ). It is questionable whether the effect chosen by US EPA (2023) as the critical effect can be considered adverse at the doses tested in the study (see footnote 7).
- Health Canada (HC 2011) identified a NOAEL for PFHxA in the literature of 50 mg/kg/d in males based on liver histopathology and liver weight changes from a 90-day oral gavage study in CrI:CD(SD) rats given 0, 10, 50, or 200 mg/kg/d PFHxA (Chengelis et al. 2009a). This study is discussed further below. In 2011, Health Canada did not derive a TRV for PFHxA as there were no toxicokinetic studies for PFHxA in humans and it was inappropriate to derive a TRV for PFAS “*without taking pharmacokinetics into consideration*” as “*it would result in a value that might be inadequately conservative*” (HC 2011). SLR notes that the half-life of PFHxA in

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<sup>6</sup> This was derived from a serum BMDL<sub>20</sub> of 32.4 mg/L in male rats, converted to a human equivalent point of departure of 0.00292 mg/kg bw/day, and application of an uncertainty factor of 300 (3 to account for the uncertainty of extrapolating from animals to humans, 10 to account for human variability, and 10 to account for the limited database of toxicological studies (e.g. no two-generation or immunotoxicity studies)), i.e.  $0.00292 \text{ mg/kg bw/day} \div 300 = 9.4 \text{ ng/kg bw/day}$ . No uncertainty factor was applied for the use of a sub-chronic study as the serum PFHxS levels in rats in NTP (2022) were considered likely to be at steady state (SLR 2024a). The database uncertainty factor is likely to already account for use of a sub-chronic study since it is applied for a lack of chronic toxicity studies; the composite uncertainty factor of 300 was therefore considered to be sufficiently health protective (NHMRC 2025).

<sup>7</sup> This BMDL<sub>5RD</sub> was not markedly different from the author-derived BMDL<sub>10</sub> (13 mg/kg bw/day) for what they considered to be the most sensitive effect, i.e. nasal lesions (Loveless et al. 2009). It is, however, noteworthy that the author did not consider pup weight gain to be significantly reduced at any dose apart from the highest dose tested (i.e. 500 mg/kg bw/day). Upon consultation of the original publication, F1 pups in the lowest dose group of 20 mg/kg bw/day only experienced 4.2% lower body weight gains at day 0 compared with controls. This suggests that the BMDL modelling conducted by US EPA (2023) is likely highly conservative for this endpoint.



humans was estimated in 2013, reported after the TRV for PFHxA was considered by Health Canada (HC 2011)<sup>8</sup>.

- ECHA (2018) derived a general public 'Derived No Effect Level' (DNEL) (i.e. a TRV) of 50 µg/kg/d (i.e. 0.050 mg/kg/d) for PFHxA based on a 90-day oral gavage study in Crl:CD(SD) rats given 0, 10, 50, or 200 mg/kg/d PFHxA (Chengelis et al. 2009a). Lower body weights were noted in males of all groups, although this was not dose responsive. Other changes included lower red blood cell parameters, higher reticulocyte counts and lower globulin in the 200 mg/kg/d males and females, higher liver enzymes in males at 50 and 200 mg/kg/d, lower total protein and higher albumin/globulin ratio, and lower cholesterol, calcium in males at 200 mg/kg/d. Minimal centrilobular hepatocellular hypertrophy was present in 200 mg/kg/d males and correlated with higher liver weights at the end of the dosing period. The authors denoted a NOAEL of 50 mg/kg/d in males based on liver histopathology and liver weight changes. The NOAEL in females was 200 mg/kg/d (Chengelis et al. 2009a). ECHA (2018) assigned a NOAEL of 10 mg/kg/d for this study due to increased relative kidney weights observed at 50 mg/kg/d, noting there was no clear dose correlation and no accompanying macroscopic or histopathological findings for this effect.

The general public DNEL of 50 µg/kg/d was derived by ECHA (2018) using the NOAEL of 10 mg/kg/d and an uncertainty factor of 200 comprising 4 for allometric scaling (i.e. toxicokinetic differences), 2.5 for remaining interspecies variability (i.e. toxicodynamic differences), 10 for human variability and 2 for use of a sub-chronic study (ECHA 2018). The DNEL does not incorporate a chemical-specific toxicokinetic adjustment factor that has accounted for reduced PFAS clearance in humans compared to rats. In addition, SLR notes the NOAEL selected by ECHA (2018) is not supported by the findings in the study and agree with the study authors in their selection of a NOEL of 50 mg/kg/d for hepatocyte hypertrophy observed in male rats at the highest dose tested (200 mg/kg/d).

Based on the above assessment, there is low confidence in the agency-derived guidance values, and neither are considered appropriate for adoption.

However, the Loveless et al. (2009) study was appropriately conducted and investigated a large number of endpoints across 90-days and developmental dosing regimes. If the author-derived BMDL<sub>10</sub> of 13 mg/kg bw/day from the 90-day study were considered the most appropriate point of departure, then a guidance value of **900 ng/kg bw/day** could be derived based on the following:

- A ratio of elimination half-lives between humans (~32 days or 768 hours) and rats (1.6 hours) of 480x for PFHxA.
- $13 \text{ mg/kg bw/day} \div (480 \times 3 \times 10) = 0.9 \text{ } \mu\text{g/kg bw/day}$  (i.e. 900 ng/kg bw/day), where the uncertainty factor of 30 consists of 3 to account for extrapolation from animals to humans and 10 to account for human variability.

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<sup>8</sup> Chengelis et al. (2009b) reported serum half-lives for PFHxA of 2-3 hours in male and female rats following repeated oral exposures of 50, 150 or 300 mg/kg/d for 25 days. In monkeys, the serum half-life after intravenous administration of PFHxA was 2.4-5.3 hours (Chengelis et al. 2009b). Plasma elimination half-lives of PFHxA in rats reported by Gannon et al. (2011) were similar (1.5-1.7 hours in males, 0.5-0.7 hours in females) after both single and 14-day repeat oral dosing. Gannon et al. (2011) also collected tissues at three time points (0.5, 2, and 24 hours) after dosing the rats with a single oral dose of 2 or 100 mg/kg PFHxA. In all tissues except skin, PFHxA was not quantifiable 24 hours after dosing in both sexes suggesting bioaccumulation potential of PFHxA is low. Russell et al. (2013) estimated the apparent half-life of PFHxA in humans to range between 14 – 49 days (geometric mean: 32 days).



It is noted this value of 900 ng/kg bw/day is within the range of values identified from international jurisdictions (i.e. 500 to 50,000 ng/kg bw/day). This health-based TRV derived *de novo* in this letter is recommended for use in this assessment.

## 6.0 Summary

**Table 1** below provides a summary of the health-based TRVs recommended for use by MoEP for derivation of interim soil target values for PFOS, PFOA, PFHxS and PFHxA. The recommendations are based on a critical review of studies underpinning TRVs from various international jurisdictions.

**Table 1: Health-based TRVs recommended for use by MoEP for derivation of interim soil target values for PFOS, PFOA, PFHxS and PFHxA**

PFAS	Recommended TRV (ng/kg bw/day)	Source & justification
PFOS	2.43	TRV used to derive Australian drinking water guidelines: NHMRC and NRMCC (2025), see <b>Section 2.0</b> .
PFOA	65	TRV used to derive Australian drinking water guidelines: NHMRC and NRMCC (2025), see <b>Section 3.0</b> .
PFHxS	9.7	TRV used to derive Australian drinking water guidelines: NHMRC and NRMCC (2025), see <b>Section 4.0</b> .
PFHxA	900	TRV derived <i>de novo</i> based on effects observed in the best available experimental animal study, see <b>Section 5.0</b> .

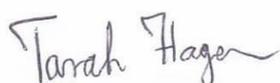
TRV = Toxicity Reference Value. PFAS = Per- and poly-fluoroalkyl substances. PFOS = Perfluorooctane sulfonate. PFOA = Perfluorooctanoic acid. PFHxS = Perfluorohexane sulfonate. PFHxA = Perfluorohexanoic acid.

## 7.0 Closure

We trust the contents of this technical memorandum meet your requirements.

Regards,

**SLR Consulting Australia Pty Ltd**



**Tarah Hagen, MSc DABT FACTRA**  
 Technical Director – Toxicologist & Risk Assessor



**Rhian Cope, PhD DABT DABVT FACTRA**  
 Technical Director – Toxicologist & Risk Assessor



## 8.0 References

- Abraham, K., Mielke, H., Fromme, H., Volkel, W., Menzel, J., Peiser, M., Zepp, F., Willich, S.N. and Weikert, C., (2020). Internal exposure to perfluoroalkyl substances (PFASs) and biological marker in 101 healthy 1-year-old children: associations between levels of perfluorooctanoic acid (PFOA) and vaccine response. *Archives of Toxicology*, 94, 2131–2147.
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