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Appendix B to Legal Memorandum dated 12 March 2026

memorandum

TO	National Steel	FROM	Nerena Rhodes
		DATE	11 March 2026
RE	Green Steel Fast-track Consent Application - Freshwater Ecological Guidelines		

I have been requested by Green Steel to review the Australian & New Zealand Guidelines for Fresh & Marine Water Quality (ANZG) Technical Brief '*Toxicant default guideline values for aquatic ecosystem protection Perfluorooctane sulfonate (PFOS) in freshwater'* published 4/03/26 and comment on their use as trigger values in the draft conditions proposed for **FTAA-2506-1074** and further to comment on the changes proposed to trigger values by Jonathan Caldwell, Waikato Regional Council 06/03/26.

The Technical Brief[1] provides updated default guideline values (DGV) for PFOS in freshwater for 80, 90, 95 and 99% species protection levels. The brief states that, because PFOS bioaccumulates, the 99% species protection level is recommended for slightly to moderately disturbed ecosystems. The 99% species protection level for PFOS is 0.02 µg/L. This replaces the interim 99% DGV from the PFAS National Environmental Management Plan (NEMP) 3.0 (HEPA 2025)[2] of 0.00023 µg/L.

The DGV has been calculated using toxicity data from scientific studies for 37 aquatic species, including macroinvertebrates, fish, amphibian and aquatic plants. The subject species of one of those studies was the eel *Anguilla anguilla*. Eels are common in rural waterways in New Zealand. The study reported the no observable effects concentration for PFOS in water for eels was 11 µg/L.

The DGVs are only intended to be protective of aquatic organisms. For ecosystems where mammals and birds that predate aquatic biota require protection, the Technical Brief introduces a new biota screening threshold for PFOS in freshwater of 0.0005 µg/L. This screening threshold is based on a number of studies from Australia and North America that reported aquatic biota sample results alongside corresponding water concentrations. These studies found that concentrations of PFOS in freshwater that are below the 99% DGV can be associated with PFOS bioaccumulation in freshwater aquatic fauna (e.g. fish and macroinvertebrates) to concentrations that exceed the PFAS NEMP 3.0 (HEPA 2025) biota guideline values[3] . One study found that PFOS at 0.0005 ug/L could lead to concentrations of PFOS in aquatic biota which exceed the PFAS NEMP 3.0 biota guideline values for mammals if only aquatic fauna were considered as food sources (i.e. not also plants).

[1] *ANZG 2025, Toxicant default guideline values for aquatic ecosystem protection: Perfluorooctane sulfonate (PFOS) in freshwater.* Australian and New Zealand Guidelines for Fresh and Marine Water Quality. CC BY 4.0. Australian and New Zealand Governments and Australian state and territory governments, Canberra, ACT, Australia.
[2] HEPA 2025, PFAS National Environmental Management Plan Version 3.0, Heads of EPA Australia and New Zealand 2025. CC BY 4.0.
[3] Ecological direct exposure for wildlife diet Sum of PFOS and PFHxS: 3.1 ug/kg for mammals and 8.2 ug/kg for birds.

Exceedance of the biota screening threshold is a trigger to assess the concentration of PFOS in aquatic biota that may be consumed by mammalian and avian predators (e.g. via sampling and analysis of fish and macroinvertebrates). Whereas the 99% species protection DGV for PFOS in freshwater is protective of aquatic organisms and has been confirmed at 0.02 µg/L.

The biota screening threshold serves a different purpose to a DGV. It would be appropriate in situations where the sensitive receptors include mammals and birds which predate on aquatic fauna.

Conclusion

I consider the biota screening threshold complementary to, but not an alternative to, the DGV. The DGV is the appropriate guideline to be implemented for the protection of aquatic species. The 99% species protection DGV for PFOS of 0.02 µg/L replaces the 99% interim DGV from the PFAS NEMP 3.0 of 0.00023 µg/L.

To accurately reflect the DGV the discharge limits in conditions 30 and 32 for PFOS should be set as 0.02 µg/L.

Limitations

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