PFAS in waste soils interim guideline

Interim Guideline issued July 2023

EPA 1130/23: This guideline provides interim direction and guidance for the reuse of waste soils containing PFAS. It outlines the EPA's Waste Fill (PFAS interim) criteria and Intermediate Waste Soil (PFAS interim) criteria. This interim guideline will apply until amendments are made to the Environment Protection Regulations 2009, the Current criteria for the classification of waste, and the Standard for the production and use of waste derived fill. These amendments are required to incorporate PFAS management. Waste soils must be managed in accordance with the WDF Standard except where variations are provided for PFAS by this guideline.

Introduction

Per- and poly-fluoroalkyl substances (PFAS) are a group of synthetic chemicals that have been extensively used in consumer and industrial products since the 1950s. They are used to manufacture non-stick coatings and products that require resistance to water, heat, fire, stain and weather. Examples include firefighting foams, carpets and waterproof clothing.

PFAS are known to have high thermal, chemical and biological stability. These chemicals are capable of long-range environmental transport through soil and water media. PFAS have been shown to be present at low levels in the environment across a range of land uses[1,2]. In upholding the objects of the *Environment Protection Act 1993* (EP Act)[3], the EPA seeks to promote the waste management hierarchy[4] and the circulation of materials in accordance with existing standards while applying the precautionary principle to prevent and minimise the potential for environmental harm.

The range of issues associated with PFAS, including the management of PFAS in wastes, presents a challenge for environmental regulators. To address this challenge, the *PFAS National Environmental Management Plan* (PFAS NEMP)[5] was developed.

The objective of the PFAS NEMP is to provide a clear, effective, coherent and consistent approach to the regulation of PFAS in Australia. Its provisions are broad and wide-ranging to take into consideration the different policy frameworks that govern the regulation of contaminated materials within each state and territory. This guideline provides further context for the management of PFAS in waste soils in South Australia, and has been informed by engagement with other jurisdictions.

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1 https://www.epa.sa.gov.au/environmental_info/perfluorinated-compounds

2 Section 5 of PFAS NEMP 3.0 (draft) https://consult.dcceew.gov.au/nemp-pfas

3 https://www.legislation.sa.gov.au/LZ/C/A/Environment%20Protection%20Act%201993.aspx

4 Section 4B of the EP Act

5 https://www.dcceew.gov.au/environment/protection/publications/pfas-nemp-2

Approach to PFAS NEMP Implementation in South Australia

The EPA has developed a series of guidelines to supplement the principles endorsed under the PFAS NEMP in a manner that is consistent with South Australia's established guidelines and standards. The guidelines currently address PFAS management related to waste disposal (see *Landfill disposal criteria for PFAS-contaminated waste guideline*[6] and draft *PFAS-contaminated waste disposal site suitability guideline*[7]).

Scope

The EPA permits reuse options for waste soils containing PFAS in accordance with the PFAS NEMP and the principles that reuse must not lead to an unacceptable risk to human health and/or the environment, or an increase in the level of risk at or near the location in which it is used.

This guideline is formulated to outline the EPA's position on the suitability of waste soils containing specific levels of PFAS for reuse or disposal. It focuses on Waste Fill (PFAS interim) criteria for waste soils that contain very low concentrations of PFAS and the Intermediate Waste Soil (PFAS interim) criteria for soils that contain higher concentrations of PFAS.

This guideline provides the environmental regulatory context referred to in the soil reuse section of the PFAS NEMP (section 12) and should be read and implemented in accordance with the PFAS NEMP and with the *Standard for the production and use of waste derived fill* (WDF Standard)[8]. The WDF Standard is applicable to waste soils that are proposed to be reused.

This guideline does not apply to the management of soils within a site (i.e. for the purpose of management/remediation of site contamination). For guidance on PFAS-impacted soils that are not proposed for movement off-site, please refer to the EPA publication *Guidelines for the assessment and remediation of site contamination* (GAR)[9] and the PFAS NEMP.

This guideline also confirms that a Site Contamination Auditor, as defined in the EP Act, is required to be engaged (referred to in 6.1.3 of the WDF Standard as the Auditor Protocol) where higher PFAS concentrations are present in waste soils that are proposed for reuse; i.e. soil concentrations greater than Waste Fill (PFAS interim) criteria but compliant with Intermediate Waste Soil (PFAS interim) criteria. In this case, increased risks to human health and the environment may exist that require additional management measures to support a proposed land use and the safe reuse of waste soils containing PFAS at the destination site.

Legislation

The EP Act is the principal legislation addressing pollution in South Australia. In particular, section 25 imposes the general environmental duty on all persons undertaking an activity that may pollute, to take all reasonable and practicable measures to prevent or minimise any resulting environmental harm.

The *Environment Protection (Water Quality) Policy 2015*[10] provides the main legislative framework for the protection of the environmental values of the state's surface and underground waters.

The GAR provides further information to determine the environmental values of groundwater. The *Australian and New Zealand Guidelines for fresh and marine water quality*[11] provide further information to determine the environmental values

6 https://www.epa.sa.gov.au/files/14469_guide_pfas_landfill_disposal.pdf

7 https://engage.epa.sa.gov.au/82966/widgets/393686/documents/249845

8 http://www.epa.sa.gov.au/files/4771359_standard_wdf.pdf

9 https://www.epa.sa.gov.au/files/13544_sc_groundwater_assessment.pdf

10 https://www.legislation.sa.gov.au/lz?path=%2FC%2FPOL%2FEnvironment%20Protection%20(water%20Quality)%20Policy%202015

11 https://www.waterquality.gov.au/guidelines/anz-fresh-marine

of surface waters and identify the applicable protection to be applied to an environmental value, which is essential in determining the suitability of a site for the reuse of waste soils containing PFAS. The PFAS NEMP provides the ecological water criteria to apply to the determined environmental value.

The *Environment Protection (Waste to Resources) Policy 2010*[12] is another important legislative framework relevant to the administration of this guideline. This policy requires wastes to be managed in accordance with the waste management hierarchy. This includes, where appropriate, the reuse of waste soils.

Consistent with the waste management hierarchy, the PFAS NEMP (section 12) provides guidance on how the reuse of waste soils containing PFAS may be considered. In South Australia the reuse of waste soils is regulated through the WDF Standard and the *Environment Protection Regulations 2009*[13] (EP Regulations) which specify the chemical substances required to be tested for the purposes of waste soil classification. The EPA has developed this guideline to provide direction and guidance for the reuse of waste soils containing PFAS until appropriate amendments to the EP Regulations, the *Current criteria for the classification of waste*[14] and the WDF Standard are undertaken to incorporate PFAS management. Waste soils must be managed in accordance with the WDF Standard except where variations are provided for PFAS by this guideline.

Sites of significance according to Aboriginal tradition and sites significant to Aboriginal archaeology, anthropology and history are protected in South Australia by the *Aboriginal Heritage Act 1988*[15]. The EPA expects that proponents of projects generating waste soils will undertake early engagement directly with Aboriginal people to manage Aboriginal heritage within ground disturbing projects. During that process, there may be requests for heritage surveys, assessments and reports. Generally, these services are performed by commercial heritage professionals in consultation with Traditional Owners. The Department for Aboriginal Affairs and Reconciliation Division[16] of the Attorney-General's Department can provide further guidance.

The EPA's position and regulatory approach

1 The off-site reuse of waste soils containing PFAS should only occur after all options for on-site use, waste avoidance, waste treatment and volume reduction have been considered and implemented wherever reasonable and practicable.

2 Waste soils intended for offsite reuse must be sampled and analysed for PFAS where there is a history of PFAS use or contamination at that site, or where potentially contaminating activities (PCAs) have been undertaken that may reasonably have been expected to have involved PFAS-containing materials[17].

3 Sampling and analysis must occur in accordance with the PFAS NEMP and the WDF Standard.

4 For waste soils that are sampled for PFAS - PFOS, PFHxS and PFOA must be tested to demonstrate compliance with the Waste Fill (PFAS interim) criteria and the Intermediate Waste Soil (PFAS interim) criteria. A broader suite of 28 PFAS chemicals and a Total Oxidisable Precursor (TOP) Assay should also be tested. This is a requirement where a reuse proposal triggers the Auditor Protocol to inform the environmental risk of a range of PFAS chemicals and their precursors and any site-specific assessment.

5 The PFAS NEMP (section 12 in particular) must be considered for any reuse of waste soils containing PFAS. Where soils that comply with the Intermediate Waste Soil (PFAS interim) criteria are proposed for reuse, the considerations of section 12 and the WDF Standard must be addressed thoroughly through the Auditor Protocol.

12 https://www.legislation.sa.gov.au/lz?path=/c/pol/environment%20protection%20(waste%20to%20resources)%20policy%202010

13 https://www.legislation.sa.gov.au/lz?path=/v/r/2009/environment%20protection%20regulations%202009_227

14 https://www.epa.sa.gov.au/files/4771346_current_waste_criteria.pdf

15 http://www.legislation.sa.gov.au/LZ/C/A/ABORIGINAL HERITAGE ACT 1988.aspx

16 https://www.agd.sa.gov.au/aboriginal-affairs-and-reconciliation

17 Appendix B in the PFAS NEMP

6 The Intermediate Waste Soil (PFAS interim) criteria are maximum values that may be accepted by the EPA, but the upper limit of these concentrations may not be appropriate to many reuse locations and scenarios. The Auditor Protocol must assess reuse options for waste soils containing PFAS in accordance with the PFAS NEMP and the principles that reuse must not lead to an unacceptable risk to human health and/or the environment, or an increase in the level of risk at or near the location in which it is used.

7 The EPA sets out the following Waste Fill (PFAS interim) criteria:

Simple option

Parameter	Dry weight concentration (mg/kg)	Leachate concentration (µg/L)
PFOS	<0.001	Not required
PFHxS	<0.001	Not required
PFOA	<0.001	Not required

Leachable option

Parameter	Dry weight concentration (mg/kg)	Leachate concentration (µg/L)
PFOS	<0.005	<0.05
PFHxS	<0.005	<0.05
PFOA	<0.005	<0.05

8 The EPA sets out the following Intermediate Waste Soil (PFAS interim) criteria:

Parameter	Dry weight concentration (mg/kg)	Leachate concentration (µg/L)
PFOS	<1 (sum of PFOS and PFHxS)	<0.13
PFHxS	<1 (sum of PFOS and PFHxS)	<0.13
PFOA	<10	<0.56

9 In relation to the Waste Fill (PFAS interim) criteria and the Intermediate Waste Soil (interim) criteria:

a Where dry weight concentrations of PFOS, PFHxS and PFOA are <0.001 mg/kg the waste soil will be accepted as meeting Waste Fill (PFAS interim) criteria without a leachate test.

b Where leachate testing is required:

i both the dry weight and leachate concentrations of the criteria must be met for the waste soil to comply with the criteria; and

ii it should be undertaken on one in every five dry weight samples with the highest dry weight concentrations[18] of PFOS, PFHxS and PFOA, however variability of the soil needs to be taken into account when designing the actual sampling program.

c To demonstrate compliance with the Waste Fill (PFAS interim) criteria, the *Simple option*, the *Leachable option*, or a combination of these options can be used.

d Where the criteria refer to the sum of PFOS and PFHxS, this includes PFOS only, PFHxS only, and the sum of the two.

10 The physical and/or chemical treatment of waste soils to meet the Waste Fill (PFAS interim) criteria or the Intermediate Waste Soil (PFAS interim) criteria for subsequent reuse would only be considered under the Auditor Protocol with a treatment plan and validation report. The EPA will only accept destruction or removal treatment methodologies for waste soil reuse where PFAS is present. Solidification and stabilisation methodologies will not be accepted.

[18] Where the highest dry weight concentrations cannot be determined (i.e. where dry weight LOR is not sensitive enough), the leachate tests must be undertaken on samples with known or suspected higher concentrations of PFAS (based on field indicators, site history information, and/or the presence of a broader suite of PFAS). Where this is still unknown, the leachate tests must be undertaken on samples selected at random.

11 The Australian Standard Leaching Procedure (ASLP) using the relevant worst-case pH should be adopted as standard for leachate testing for soils proposed for reuse, consistent with procedures in the WDF Standard (page 70). The US EPA Method 1320 (Multiple Extraction Procedure; MEP) is also accepted as an alternative leachate test method to ASLP.

Publications and standards

The management of waste soils should be undertaken in accordance with relevant EPA guidelines and other standards on soil sampling, storage and stockpiling, waste classification, and landfill disposal including but not limited to the following:

- *Guidelines on the environmental management of landfill facilities – solid waste disposal*
- *Landfill disposal criteria for PFAS-contaminated waste*
- *Current criteria for the classification of waste including Industrial and Commercial Waste (Listed) and Waste Soil*
- *Standard for the production and use of waste derived fill*
- *Guideline for stockpile management − waste and waste-derived products for recycling and reuse*
- *National Environment Protection (Assessment of Site Contamination) Measure 1999*
- *Guidelines for the assessment and remediation of site contamination*
- *Aboriginal Heritage Guidelines*

Emergence of new scientific knowledge and understanding of PFAS may result to changes in standards and criteria. This position may be subject to periodic review to ensure it aligns with new developments related to the reuse of waste soils containing PFAS.

Disclaimer

This publication is a guide only and does not necessarily provide adequate information in relation to every situation. This publication seeks to explain your possible obligations in a helpful and accessible way. In doing so however, some detail may not be captured. It is important therefore, that you seek specific information from the EPA regarding your possible obligations and, where appropriate, that you seek your own legal advice.

Further information

Legislation

Online legislation is freely available on https://service.sa.gov.au/12-legislation

General information

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