

Standard for the production and use of Waste Derived Soil Enhancer



Environment Protection Authority



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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 information from the EPA itself regarding your possible obligations and, where appropriate, that you seek your own legal advice.

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Abbreviations

AgVet Act	Agricultural and Veterinary Products (Control of Use) Act 2002
AgVet Regulations	Agricultural and Veterinary Products (Control of Use) Regulations 2004
AQIS	Australian Quarantine and Inspection Service
BOD	biochemical oxygen demand
BTEX	benzene, toluene, ethylbenzene and xylenes
COD	chemical oxygen demand
CoP	code of practice
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CWMS	community wastewater management scheme
Development Regulations	Development Regulations 2008
DoH	Department of Health
EIP	environment improvement program
EP Act	Environment Protection Act 1993
EPA	South Australian Environment Protection Authority
EPHC	Environment Protection and Heritage Council
EPP	environment protection policy
GPT	gross pollutant trap waste
HCBs	hexachlorobenzenes
LBSC Act	Land and Business (Sale and Conveyancing) Act 1994
LBSC Regulations	Land and Business (Sale and Conveyancing) Regulations 1995
NATA	National Association of Testing Authorities, Australia
NChEM	National Framework for Chemicals Environmental Management
NEPM	National Environment Protection Measure
NRM	Natural Resources Management (SA)
OCPs	organochlorine pesticides
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls

POPs	persistent organic pollutants
PIRSA	Department of Primary Industries and Resources SA
QA/QC	quality assurance and quality controls
Site Contamination NEPM	National Environment Protection (Assessment of Site Contamination) Measure
SSW	street sweeping waste
TOC	total organic carbon
W2R EPP	Environment Protection (Waste to Resources) Policy 2010
WQ EPP	Environment Protection (Water Quality) Policy 2003
ZWSA	Zero Waste SA

Summary

This standard describes the information and processes that are required by the Environment Protection Authority (EPA) to support the beneficial recycling of waste by its application to agricultural land as a soil enhancer.

The standard aims to provide clarity to industry and the broader community, in particular producers and users of waste derived soil enhancer (WDSE) on the issues that need to be addressed to demonstrate the suitability of waste derived soil enhancers taking a balanced risk-based approach. This includes the need for quality assurance measures, demonstrating beneficial properties and minimising the risk of harm.

This standard will be used to help assess proposals and determine compliance with the *Environment Protection Act 1993* (EP Act) to ensure that the production and use of WDSE constitutes a genuine waste resource recovery and recycling activity, as distinct from waste disposal.

It is the responsibility of the proponents, namely producers and users of WDSE to ensure that they comply with all requirements of this standard.

This standard is designed to minimise the risk of potential harm to the environment and human health and will form an approved standard and specification for the purposes of the *Environment Protection (Waste to Resources) Policy 2010* (see clause 4 of the policy).

However, the EPA does not endorse or guarantee that the use of a WDSE will confer any benefit stated by the producer. All obligations and responsibilities imposed by the EP Act continue to apply and a proponent may still be liable if harm arises from the use of waste derived soil enhancer.

Failure to meet the requirements of this standard may result in the EPA determining that the material being produced or used remains a waste and is subject to regulation according to the EP Act.

PART ONE

INTRODUCTION

1 Introduction

The South Australian Environment Protection Authority (EPA) promotes the sustainable management of waste¹ materials and recognises that particular waste streams may be suitable for beneficial recycling as a soil enhancer. For example, the application of nutrient-rich agricultural wastes could be used as a replacement or supplement fertiliser for enhanced growth of grazing pasture. However, potential risks to the environment² and human health may arise from the use of inappropriate materials or the use of waste derived soil enhancer (WDSE) in an inappropriate manner.

For the EPA to support the sustainable³ application to land of WDSE, and ensure it is distinct from waste disposal, proponents (producers and users of WDSE) are required to address the considerations and comply with the processes outlined in this standard.

This standard has been drafted to support the objects of the *Environment Protection Act 1993* (EP Act) and to complement the *Environment Protection (Waste to Resources) Policy 2010* (W2R EPP).

The EP Act and W2R EPP define waste and set out regulatory requirements for waste management activities. To support the beneficial reuse, recycling and recovery of wastes, the W2R EPP provides a mechanism by which a waste that meets specifications or standards published or approved in writing by the EPA will be considered a product instead of a waste.

The EPA will use this standard as a guide to decide whether the material is a WDSE product or a waste when determining whether there has been a breach of the general environment duty⁴, the W2R EPP or other relevant provisions of the EP Act. The standard will also assist in determining the licensing requirements for activities that include the production of WDSE.

This standard, including its requirements for submission of information to and approval from the EPA⁵, will form a published standard under the W2R EPP [see clause 4(a) of the W2R EPP]. When the W2R EPP becomes operational⁶, materials that meet the standard, including composition specifications and all handling and approval obligations, will be considered products rather than wastes. This must be demonstrated in full prior to transfer to the reuse site. Until that time, the material remains a waste and is subject to relevant legislation.

There will be a transitional period during which the existing processes for proponents to apply for EPA approvals to receive a waste for reuse as a WDSE (eg biosolids endorsements, limited purpose declaration or a licence) will remain in place. Facilities which receive or treat waste for the purposes of producing a WDSE will continue to require a licence according to activity 3(3) Waste or Recycling Depot of Schedule 1 of the EP Act⁷.

Key components of this standard include:

- the need to demonstrate that the use of WDSE is for a beneficial purpose rather than as a means of convenient disposal and the associated avoidance of regulation and costs

¹ The term waste is defined under clause 3(1) of the EP Act and is reflected in the glossary.

² The term environment is defined under clause 3(1) of the EP Act and is reflected in the glossary.

³ Principles of ecologically sustainable development are described under section 10 of the EP Act.

⁴ Refer section 25 of the EP Act.

⁵ EPA approval means a written response confirming that the requirements of this standard have been met. For example for submission of a Type B WDSE proposal, recycling may proceed according to the site management plan, contingent upon compliance with the Auditor Protocol.

⁶ The W2R EPP will become operational on 1 September 2010.

⁷ This standard will apply to composting facilities receiving industrial waste as feedstock, and they will be licensed under activity 6(3) Composting.

- the need to ensure that harm to the environment and human health is prevented or the risks minimised to levels acceptable to the EPA⁸
- a requirement for the WDSE to meet a defined specification that is suitable for the proposed use.

Once a WDSE has been proven as a suitable fertiliser or agricultural product and not for disposal of waste to land, the regulation of the use of the WDSE falls under the *Agricultural and Veterinary Products (Control of use) Act 2002* (the AgVet Act) which is administered by PIRSA. The facility producing the WDSE will still require an EPA licence.

If an industry wishes to develop a waste management plan for their sector demonstrating the suitability of their specific waste stream for one or more uses not specifically addressed by this standard, this may be developed and agreed with the EPA as a code of practice (CoP) on a whole-of-industry group basis. A CoP must specify appropriate uses, suitable environments and the controls required for a specific waste type based on rigorous scientific research and risk assessment. This may then reduce the need for site-specific assessments and submissions to EPA to be made on each occasion.

1.1 Scope

This standard applies to:

- Type A WDSE proposals to be managed in accordance with existing guidance and the general environmental duty (refer section 5.2):
 - organic wastes from agriculture and primary production
 - compost, potting mix or mulch consisting purely of organic/vegetative matter and/or animal wastes that do not contain industrial waste or residues as components⁹.
- Type B WDSE proposals that require assessment prior to use in accordance with specific management requirements for that WDSE (refer section 5.3):
 - suitable industrial residues or wastes that are:
 - homogeneous, consistent, and fit for purpose, and
 - have beneficial characteristics for agricultural use via:
 - direct application as a fertiliser or soil conditioner, or
 - indirect application by inclusion as feedstock or components in agricultural products such as composts or potting mixes.

This standard does not apply to:

- agricultural products or their components that are non-waste derived (eg superphosphate chemical fertilisers)¹⁰
- stormwater reuse or managed aquifer recharge schemes¹¹.

⁸ This must also be to the satisfaction of other relevant authorities including Department of Planning and Local Government, SA Health and PIRSA.

⁹ These organic compost products should be produced to meet the relevant standards specified under the Agvet Act, EPA Guidelines and Australian Standards including AS 4454:2003–*Composts, soil conditioners and mulches*, AS/NZS5024 (INT):2005–*Potting mixes, composts and other matrices: examination for legionellae* (AMDT 1:2007), AS373:2003–*Potting mixes* and AS 4419:2003–*Soils for landscaping and garden use*. An EPA licence is required for facilities capable of producing greater than 200 tonnes of compost per annum.

¹⁰ The use of these is regulated by PIRSA via the *Agricultural and Veterinary Products (Control of Use) Act 2002* and product quality is governed by legislation under the Office of Consumer and Business Affairs www.ocba.sa.gov.au.

¹¹ Separate guidance is available in this regard. Refer section 7.

If a proposed application does not fit within these guidelines, then the EPA will need to be contacted to determine whether there is a possibility for reuse or alternatively, to determine the most appropriate waste management option.

This standard is consistent with the process being implemented by the EPA for the use of WDSE. As such, proponents currently using WDSE should already have submitted a proposal to the EPA for assessment and endorsement (where required in the case of Type B WDSE proposals and some Type A WDSE proposals managed under authorisation) or be following existing guidelines and standards in the case of Type A WDSE proposals. In both cases, no further action will be needed. Where this is not the case, the EPA should be contacted and an environment improvement program (EIP) or other compliance tool available under the EP Act may be required.

1.1.1 Codes of practice for specific industry wastes

In the circumstance that an industry sector would like EPA approval for reuse of a waste stream as WDSE or other waste derived product, there is scope for that industry sector to develop a waste or industry specific CoP for approval by the EPA. The CoP may negate the need for each facility or reuse site to gain individual EPA approval. However this need would be replaced by stringent controls applied under that CoP.

The CoP would fit under this standard including meeting the principles and being able to provide the following as agreed on an industry basis for implementation:

- a product specification
- product and usage limitations
- a range of specified uses for which thorough risk assessments have been conducted
- specific controls and limitations to manage the risks.

Such proposals will need to have substantive research and information to support its development, and will need to be developed closely with the EPA and any other relevant body with high level independent review. The CoP is not intended to be used as a reduced standard but is an alternative mechanism for achieving the outcomes addressed within this standard. Any industry sectors interested in developing a CoP should contact the EPA.

1.2 Process outline

The flowchart in Figure 1 sets out the process that proponents need to follow in order to use a WDSE and gain specific approval where required.

1.3 Using this standard

This standard is divided into four parts. Part One (section 1) provides the introductory information.

Part Two (sections 2 and 3) outlines relevant legislation and describes the principles and the factors that need to be addressed for the EPA to support any proposal to produce and use WDSE.

Part Three (sections 4 through 6) outlines the specific testing and approval requirements based on the type of waste used to produce the WDSE. It outlines how the EPA requirements differ, based on potential risk including the nature of the material, as well as the information that is required to be submitted to the EPA. Part Three includes a list of wastes prohibited from use and clarifies the reasons why the EPA considers the specified factors to be important. This standard specifies responsibilities for the producer of the waste and the producer and the user of the WDSE.

Part Four (sections 7 to 8) is the reference section and includes sources for further information and a glossary.

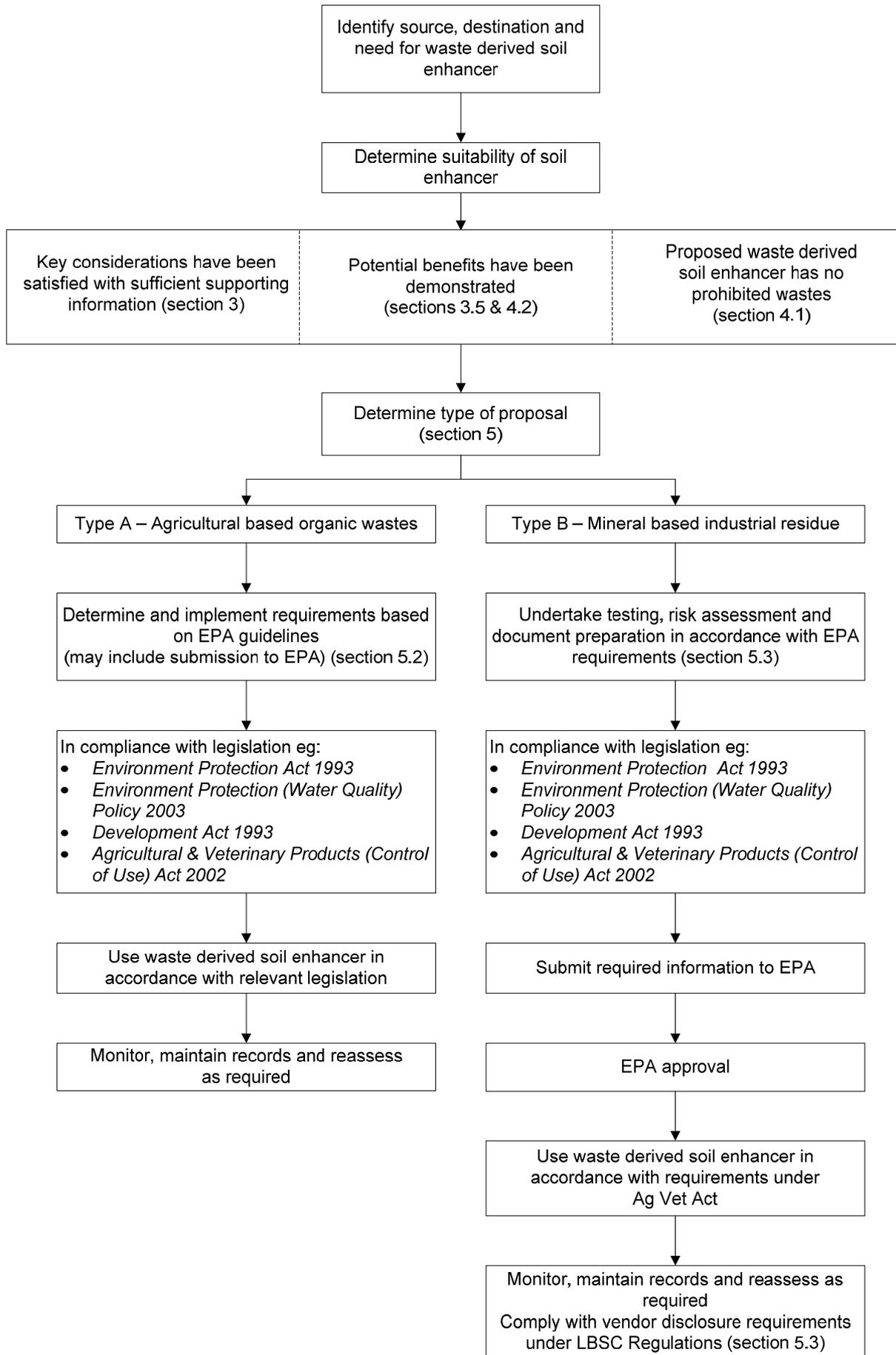


Figure 1 Process chart for the use of a waste derived soil enhancer

PART TWO

EPA POLICY AND BACKGROUND INFORMATION

2 EPA statutory framework

2.1 Objects of the EP Act and role of the EPA

The objects of the EP Act¹² include the prevention, minimisation and, where practicable, the elimination of harm to the environment, by regulating activities, products, substances and services that cause environmental harm by pollution or the production of waste¹³. The role of the EPA is to administer the EP Act and to have regard to and seek to further its objects.

The EPA's key objectives in regulating waste reuse, recycling and recovery¹⁴ are:

- to prevent or minimise the risk of harm to the environmental and human health
- to support the most preferable use of waste through the reasonable and practicable application of the waste management hierarchy (Figure 2).

The EPA documents entitled *Waste management—regulatory framework and objectives* (2008) and *Waste-derived materials—guiding principles for determining approval processes and product standards* (2008) outline the regulatory and policy framework and the key principles that need to be considered in addressing waste reuse, recycling and recovery issues to ensure that the EPA's objectives are met.

The *EPA Position Statement on the Role of EPA in Attaining Sustainability* (2005) further outlines EPA's purpose as an environmental regulator and its contribution to achieving state government policy including achieving sustainability.

2.2 Regulatory tools provided by the EP Act

The EP Act includes a range of provisions which allow the EPA to further the objects of the Act. These provisions include a general environmental duty¹⁵:

A person must not undertake an activity that pollutes, or might pollute, the environment unless the person takes all reasonable and practicable measures to prevent or minimise any resulting environmental harm.

The EP Act also specifies that certain activities¹⁶ must only be carried out under licence or other form of environmental authorisation granted by the EPA¹⁷. These activities include the receipt, storage, treatment or disposal of waste. Waste is defined in Part 1 of the EP Act and specifies that waste is a waste whether it is of value or not. Facilities which accept waste for the purposes of producing a WDSE will require a licence according to activity 3(3) Waste or Recycling Depot of Schedule 1 of the EP Act¹⁸.

The EP Act provides for the development of environment protection policies (EPPs) which can set out detailed requirements for protecting particular aspects of the environment, or protecting the environment from particular activities. The EPPs contain penalties for the breach of mandatory provisions, relating to required behaviours or causing certain types of environmental harm.

¹² Refer section 10 of the EP Act

¹³ The terms environment, activity, environmental harm, pollution and waste are defined under clauses 3(1) and 5 of the EP Act and are reflected in the glossary.

¹⁴ These objectives were identified by the EPA following a review of its waste regulation activities in 2007.

¹⁵ Refer section 25 of the EP Act.

¹⁶ Refer Schedule 1 of the EP Act.

¹⁷ Refer Part 6 of the EP Act.

¹⁸ This standard applies for composting facilities receiving industrial waste as feedstock. However they will be licensed under activity 6(3).

The W2R EPP provides clarification on the point at which a material resulting from the treatment of waste constitutes a product that is no longer waste. It provides, in effect, that a waste or material resulting from the treatment of waste will not be considered a waste when:

- it meets specifications or standards published or approved in writing by the EPA, or
- if no specification or standard applies, it is ready and intended for imminent use without the need for further treatment to prevent any environmental harm that might result from such use.

The EPA recognises that there may be acceptable and beneficial uses for waste including its application to land. Therefore, for the purposes of the W2R EPP¹⁹, this will be the standard used by the EPA in determining whether the material is a WDSE product and no longer subject to regulation as a waste. However, until the W2R EPP is operational²⁰, proponents will need to continue to comply with existing EPA endorsement and approval requirements (for example, biosolids endorsements or a licence or limited purposes declaration to be able to receive, store, treat or dispose of waste, including the recycling of waste as or as part of a WDSE applied to land).

Where WDSE is produced or used contrary to this standard, the EPA will consider that it continues to be a waste and regulate it accordingly under the EP Act and the W2R EPP.

The *Environment Protection (Water Quality) Policy 2003* (WQ EPP) is also relevant to this standard and should be considered in the assessment of suitability of the use of WDSE as it relates to protection of waters. Relevant sections of the WQ EPP include the general obligation to avoid the deposit of waste into waters or onto land from which it is reasonably likely to enter any waters and the obligation not to deposit any listed pollutants into waters or onto land from which it is reasonably likely to enter any waters. In addition, there are protected environmental values for any given type of water body and related water quality criteria that must be met to protect those environmental values.

2.3 South Australia's Waste Strategy

South Australia's Waste Strategy 2005–2010 sets the overall framework and aims for sustainable waste management in the state. It aims for the diversion of waste by following the waste hierarchy (Figure 2) to more sustainable options. This means that the production and use of a WDSE should be an alternative to disposal (the least preferable option) but should not be at the expense of more preferable options including waste avoidance or closed-loop recycling. However, WDSE should only be used where it is safe and sustainable to do so. This standard therefore describes the requirements for demonstrating the suitability of WDSE.

¹⁹ See clause 4(a) of the W2R EPP.

²⁰ The W2R EPP will become operational on 1 September 2010.



Figure 2 WDSE and the waste hierarchy

3 Key considerations for the beneficial production and use of WDSE

This section outlines the EPA's position and rationale on key issues relating to the acceptance and management of waste for recycling as a WDSE. It describes the key considerations which will guide decisions made by the EPA in relation to WDSE. The considerations are based on the EPA's Guiding Principles²¹ including that the use of a WDSE should be conducted in a manner where the need for ongoing regulation of the site is minimised and similarly, any constraints on the reasonable and usual use of sites is also minimised or, where possible, prevented.

3.1 Support for the waste hierarchy

- The waste production should first be avoided or minimised.
- Where possible and feasible, segregate the waste at the source or processing facility to maximise the options for reuse or recycling of various components.
- Investigate opportunities higher up in the waste hierarchy (Figure 2) in preference to use as a soil enhancer.
- Ensure the proposed application to land constitutes genuine recycling as a soil enhancer, rather than disposal of waste.

The EPA supports the reasonable and practicable application of the waste hierarchy and aims to achieve sustainable waste management by applying the waste hierarchy consistently with the principles of ecologically sustainable development²². This means that the benefits to the community and the environment must exceed the cost to the proponent. Proponents should be able to demonstrate that the waste proposed for use as a WDSE does not have a practical higher-order option according to the waste hierarchy, for example by avoiding the waste production or managing the industrial residue within the same process that produced it.

Production of industrial waste should be minimised and the EPA encourages the adoption of cleaner production and eco-efficiency programs for waste minimisation²³. Proponents should also consider, based on risk, if reuse is possible or if treatment and/or disposal (eg to an authorised landfill) is the more appropriate waste management technique.

3.2 An immediate market

- There must be an immediate market for the WDSE.
- There needs to be appropriate materials flow and stockpile management.

The production or storage of a WDSE, including for sale or supply, must not be speculative and an immediate market must exist. This must be demonstrated prior to moving the waste off site by the existence of a known customer or user with an available, suitable and beneficial use for the WDSE. However, the production of a WDSE should not lead to a demand for wastes such that the market would support a lesser preferred option in the waste hierarchy and inhibit more sustainable opportunities for waste avoidance, reduction, reuse or recycling.

Appropriate materials balance and flow management need to be in place to ensure there is a systematic approach and to demonstrate responsible and sustainable management rather than continuous stockpiling or over application.

²¹ Refer to *Waste-derived materials—guiding principles for determining approval processes and product standards* (EPA 2008).

²² These principles are set out in section 10 of the EP Act.

²³ www.epa.sa.gov.au/businesses/eco-efficiency.

Where stockpiling is necessary, this should be conducted according to the *Guideline for Stockpile Management–Waste and waste derived products for recycling and reuse* (EPA 2009) with special consideration given to:

- the need for stockpiling to be conducted with materials flow and capacity of the site in mind
- the storage time and market availability to avoid inappropriate and speculative stockpiling of material, and to minimise the risk of abandonment.

3.3 A risk-based approach

- Ensure sound science is used to assess risk.
- Ensure the use of the WDSE has acceptable and manageable risks, considering both short- and long-term impacts.
- Ensure appropriate quality assurance and quality controls (QA/QC) are proposed to manage the risks.

The EP Act requires that in the assessment of risk, a precautionary approach must be applied to ensure that all aspects of environmental quality affected by pollution and waste, including ecosystem sustainability and valued environmental attributes, are considered.

Therefore, in order to support the use of WDSE, the EPA expects relevant parties²⁴ to apply scientifically sound and robust QA/QC methods, including sufficient sampling, characterisation, risk assessment and monitoring in order to demonstrate the suitability of the proposal. The level of assessment required for WDSE will vary depending on the risk associated with the source and type of material (refer section 5).

This standard outlines the expectations, standards and processes which support the need to apply sound scientific practices. Sound science is 'organised investigations and observations conducted by qualified personnel using documented methods and leading to verifiable results and conclusions²⁵'. For more complex or novel proposals, third-party scientific peer review should be considered by proponents and may be required by the EPA to ensure sound scientific methodology has been used in assessments.

To ensure that the proposed WDSE is of acceptable quality, any required risk assessment and sampling must occur prior to it being removed from the producer's facility and transferred to the receiving site.

A special consideration of risks is required if the proposed receiving site is in close proximity to sensitive uses, karst environments, coastal environments, water courses, wetlands, flood plains, potable water supply catchments, water protection areas, prescribed aquifers or other sensitive or protected areas such as those protected for particular environmental values²⁶.

In addition, section 127 of the *Natural Resources Management Act 2004* (the NRM Act) defines certain offences that relate to undertaking activities contrary to the NRM plan applying in the region in which the activity is undertaken including:

- using effluent in the course of carrying on a business in an NRM region at a rate that exceeds that prescribed by the NRM plan
- draining or discharging water directly or indirectly into a watercourse or lake

²⁴ Relevant parties include the producer, processor and user of the waste. All relevant parties must be considered in the proposal with clearly specified responsibilities.

²⁵ US Environmental Protection Agency, '2003–2008 EPA Strategic Plan Direction for the Future', September 30, 2003, quoting *Society of Environmental Toxicology and Chemistry* 1999, Sound Science Technical Issue Paper. Pensacola, Florida.

²⁶ Refer to *Environment Protection (Water Quality) Policy 2003*.

- using water in the course of carrying on a business in an NRM region at a rate that exceeds the rate prescribed by an NRM plan if the water has been brought into the region by means of a pipe or other channel.

3.4 Prevention and minimised potential for harm

- The proposal must not cause harm to human health and/or the environment.
- There must be no increased risk of causing harm as a result of using the WDSE as a supplement or replacement for standard fertiliser products.

The application of WDSE has the potential to cause harm²⁷ when applied directly into the environment rather than being contained and controlled by disposal to an authorised landfill, or remaining in the wider economy (eg traditional recycled products). Irrespective of land use, the use of WDSE should not reduce or compromise the environmental quality of a site, or its current or potential future land use.

The WDSE must be of acceptable quality, demonstrated prior to its transfer and application to land. When applying a WDSE, land capability assessments and associated controlled application rates are essential components in the prevention of harm to the land.

Management of the production, transport, storage and use of the WDSE must be conducted in a manner that minimises harm including nuisance²⁸. The Guideline for stockpile management—Waste and waste derived products for recycling and reuse (EPA 2009) contains advice on appropriate storage and materials flow management.

To avoid causing site contamination, assessment needs to be conducted to ensure the WDSE is suitable for the site, giving consideration to the chemical concentrations in the WDSE (both for contaminants and beneficial constituents), background concentrations and any other chemical usage.

The *National Environment Protection (Assessment of Site Contamination) Measure* (Site Contamination NEPM) provides investigation levels for the assessment of existing contamination at a site to determine the suitability of a site for a particular ongoing use.

The investigation levels specified in the Site Contamination NEPM are not designed as chemical criteria for the suitability of soil enhancers proposed to be used. The Site Contamination NEPM specifies that increasing concentrations of chemical substances at a site up to the level stated is not condoned or permitted²⁹.

The AgVet Act and the *Agricultural and Veterinary Products (Control of Use) Regulations 2004* (AgVet Regulations) will be the primary legislation controlling the use of a WDSE (including fertilisers and other agricultural products) once they have been demonstrated as suitable products and no longer require regulation as a waste.

The AgVet Act includes legislative controls such as the requirement for compliance with Standards for Fertilisers (clause 10), General Duty (clause 5) and Compliance Orders (clause 30). The AgVet Regulations provide standards for fertilisers including truth in labelling and chemical limits.

²⁷ This includes the potential for short- or long-term harm to the environment including flora, fauna and ecosystem functions due to factors such as bioavailability and toxicity of chemical substances. It also includes the potential for chemical substances to mobilise and leach into the environment leading to potential harm to waters and any ecosystem functions those waters perform or support.

²⁸ As defined in section 82 of the EP Act.

²⁹ Refer clause 6(3) of the Site Contamination NEPM.

3.5 Demonstration of beneficial purposes³⁰

- There must be an acceptable and genuine benefit demonstrated by the proposal.

The EPA expects that proponents are able to demonstrate the beneficial aspects of the proposal. Examples of beneficial properties to support and regulate plant growth include (but are not limited to):

- reduced reliance on standard fertilisers
- enhanced nutrient supply and availability to plants over time
- improved soil physical or structural quality, such as moisture-holding capacity or adding organic matter
- improved soil chemistry such as pH or cation exchange capacity.

When delivered to the user, a WDSE must be able to be applied without further processing in the same way as a comparable standard fertiliser material. It must be fit for purpose and the source or process producing the WDSE (particularly for industrial residues) will need to be assessed in order to determine the suitability for use.

3.6 No dilution of waste or chemical substances

- Ensure each waste component used to produce the WDSE is demonstrated as suitable and meets the required specification prior to any mixing with other suitable components.
- Ensure the production of WDSE does not constitute dilution of waste or chemical substances.³¹

Dilution is the combining of materials for the purpose of reducing contamination levels, for example as a means to avoid disposal costs. Dilution is not a suitable waste management approach and is not supported by the EPA. Components should not be added to WDSE for the purpose of diluting the waste or chemical substance where, without dilution, the component would not be suitable for recycling and use. The EPA's position on dilution aims to prevent disposal by inappropriate means where this is done to avoid relevant regulation.

However, mixing by combining of two or more specific components may be suitable in the production of WDSE. Such mixing must only occur if it is first demonstrated that each component is a suitable ingredient or constituent (ie each can provide a benefit to the WDSE) rather than a contaminant.

Section 4.2 lists key aspects of risk that should be assessed. The criteria for production of a WDSE include not having a higher-order option available in accordance with the waste hierarchy and not containing prohibited wastes or unacceptable concentrations of chemical substances. In order to prevent inclusion of wastes simply as a means of dilution or disposal, only wastes that have substances or constituents that have a benefit may be present in WDSE³². For example, it is recognised that there are clear benefits for using organic agricultural wastes on agricultural land. Therefore mixing may be suitable for the purposes of supplementing irrigation water or fertiliser use, resulting in improved application or reducing the potential for creating salinity problems.

³⁰ The diversion of waste from landfill in and of itself is not considered to be sufficient grounds for demonstration of a benefit.

³¹ The term chemical substance is defined under clause 3(1) of the EP Act and is reflected in the glossary.

³² Sorvari J, Warne M St J, McLaughlin MJ, Kookana R 2008, *Methodology to assess the impacts of contaminants in fertilisers and fertiliser ingredients, including industrial residues*, CSIRO Land and Water Science Report 32/08, Report for the Primary Industries Ministerial Council and the Environment Protection and Heritage Council.

3.7 A consistent approach to regulation

- Ensure that the level of community consultation is suitable given the nature of the project, and details are included in the proposal (where submission is required).
- Ensure appropriate approvals have been obtained prior to undertaking the activity.

This standard is designed to provide a consistent approach to the production and use of WDSE. The application of WDSE to land may require approval from the EPA prior to undertaking any such activities. Additionally, approvals may be required from relevant planning or health authorities. The EPA may also seek advice from PIRSA³³ relating to the use of a WDSE as required.

Sections 4 and 5 describe the expectations for the use of a WDSE and the circumstances where specific EPA approval will be required.

Particularly for large-scale activities, appropriate consultation may be required with regard to considering the views of the council and community who could be potentially be affected by the activity. The activity must align with the relevant environmental regulatory framework and principles (refer section 2). This will contribute to a consistent approach to the regulation of waste and waste-related activities for sustainable environmental outcomes.

Where no specific approval is required, the EPA requires that proponents undertaking such activities adhere to their general environmental duty. Users should make sure that all reasonable and practicable measures are taken to ensure that application to land does not constitute illegal disposal or cause harm including site contamination.

³³ PIRSA is the key regulator of the AgVet Act which controls the use of fertilisers and other agricultural products.

PART THREE

TECHNICAL INFORMATION AND APPROVAL REQUIREMENTS

4 Suitability of waste for use as WDSE

This section lists those wastes that are prohibited for use as, or in the production of, WDSE. When a particular waste stream for use is not mentioned, this does not imply approval and the EPA will need to be contacted for further advice where a proposed option for recycling and use is not specifically addressed by this standard. This section also states important aspects for WDSE.

4.1 Prohibited wastes

The following are considered to be wastes or substances that must not be recycled by application to land. These need to be managed and treated or disposed of at authorised waste depots:

- Any chemical substance that is:
 - prohibited under the AgVet Act and related legislation
 - not on the 'permitted' list of ingredients as a result of the national project to establish contaminant limits in fertilisers (CSIRO project³⁴), or not permitted under the National Framework for Chemicals Environmental Management (NChEM)³⁵; projects under the Environment Protection and Heritage Council.
- Mixed waste with unknown or unacceptably variable physical and chemical properties, or from unknown sources
- Wastes treated by immobilisation or fixation
- Waste Activated Sludge (WAS) from domestic or industrial wastewater treatment. This material is unstabilised and unclassified according to the draft South Australian *Biosolids Guidelines for the safe handling and reuse of biosolids* (EPA 1997) and is a waste not suitable for use as a WDSE. However, WAS may be considered suitable when produced as a result of food and agricultural processing. Contact EPA for further advice in this regard:
- Asbestos and asbestos-containing materials
- Commercial or Industrial Wastes (General)
- Construction and Demolition Waste
- Hazardous Waste
- Municipal Solid Waste (excluding compostable organic waste, eg green waste)
- Quarantine Wastes and waste of biosecurity concern
- Radioactive Waste
- Scheduled Wastes³⁶
- Treated timber
- Any chemical substance, including waste material that the CSIRO project recommends should not be permitted ingredients or components in fertilisers.

Note: If a waste is not on the permitted list of ingredients, a case can be presented based on a full assessment that shows it meets the principles of this standard, including that it has a beneficial effect and does not cause harm.

³⁴ The CSIRO project is a research project to assess the hazard posed by contaminants in fertilisers and industrial waste applied to agricultural land for the Primary Industries Ministerial Council and the Environment Protection and Heritage Council. Source: Sorvari *et al* 2008.

³⁵ EPHC, A National Approach to the Management of Chemicals website, www.ephc.gov.au/taxonomy/term/75.

³⁶ Persistent organic pollutants including OCPs, PCBs, chlorinated hydrocarbons, dioxins and ozone depleting substances. Refer to ANZECC *National Strategy for the Management of Scheduled Wastes 1992*.

4.2 Important aspects for WDSE

This section outlines the key elements to be included in the assessment of suitability for use of a WDSE³⁷.

Table 1 Aspects of WDSE

Aspect	Detail																																							
Chemical substances and environmental risk	<p>The concentrations of chemical substances needs to be assessed as part of determining the suitability for recycling and use, and the consistency or variability over time must be considered. The potential of chemicals to accumulate and cause harm will be important in determining overall suitability or maximum application rates and number of repeat applications permitted. Availability of the chemicals needs to be assessed taking into account the mobility of the chemical substances and their potential to re-mobilise in certain environments (such as low pH or low redox). Salinity, BOD, COD and TOC should also be assessed. In addition, products of the biological or chemical breakdown of WDSE need to be considered in terms of their toxicity, persistence and potential to cause harm.</p> <p>The following chemical substances or groups of substances³⁸ potentially pose a risk to human and/or environmental health. Foreign materials and substances can also be detrimental to environmental and human health, for example by the spreading of weeds and disease³⁹. Where these are likely to be present in a WDSE, an assessment of their potential to cause harm (eg assessment of potential persistence which relates to the half-life of the contaminant and the probability of it accumulating and being absorbed by organisms, causing toxic effects)⁴⁰ should be made and appropriate management controls implemented to avoid or minimise any potential harm.</p> <p>For any particular WDSE it is not mandatory to measure the concentration and assess the hazard posed by each of the listed substances or groups of substances. This is provided justification can be made to logically exclude substances as being unlikely to occur in the product based on the knowledge of the waste materials and/or the manufacturing process for the WDSE.</p> <table border="0" data-bbox="311 1164 1503 1646"> <thead> <tr> <th data-bbox="311 1164 606 1232">Potential inorganic contaminants</th> <th data-bbox="606 1164 1101 1232">Potential organic contaminants</th> <th data-bbox="1101 1164 1503 1232">Potential biological contaminants</th> </tr> </thead> <tbody> <tr> <td data-bbox="311 1232 606 1265">Metals</td> <td data-bbox="606 1232 1101 1265">Pesticides</td> <td data-bbox="1101 1232 1503 1265">Pathogens</td> </tr> <tr> <td data-bbox="311 1265 606 1299">Metalloids</td> <td data-bbox="606 1265 1101 1299">Scheduled Wastes (including PCBs,</td> <td data-bbox="1101 1265 1503 1299">Viruses, prions, detrimental</td> </tr> <tr> <td data-bbox="311 1299 606 1332">Radionuclides</td> <td data-bbox="606 1299 1101 1332">Dioxins, OCPs, HCBs and other</td> <td data-bbox="1101 1299 1503 1332">bacteria</td> </tr> <tr> <td data-bbox="311 1332 606 1366">Rare earth elements</td> <td data-bbox="606 1332 1101 1366">chlorinated hydrocarbons)</td> <td data-bbox="1101 1332 1503 1366">Foreign animal and/or plant pest</td> </tr> <tr> <td data-bbox="311 1366 606 1400">Anionic elements</td> <td data-bbox="606 1366 1101 1400">Furans</td> <td data-bbox="1101 1366 1503 1400">species, eg weeds and weed</td> </tr> <tr> <td></td> <td data-bbox="606 1400 1101 1433">Hydrocarbons including PAHs, BTEX</td> <td data-bbox="1101 1400 1503 1433">seeds</td> </tr> <tr> <td></td> <td data-bbox="606 1433 1101 1467">flocculants, coagulants and surfactants</td> <td></td> </tr> <tr> <td></td> <td data-bbox="606 1467 1101 1500">Pharmaceutical and personal care</td> <td></td> </tr> <tr> <td></td> <td data-bbox="606 1500 1101 1534">products</td> <td></td> </tr> <tr> <td></td> <td data-bbox="606 1534 1101 1568">Endocrine disruptors including natural</td> <td></td> </tr> <tr> <td></td> <td data-bbox="606 1568 1101 1601">and synthetic hormones</td> <td></td> </tr> <tr> <td></td> <td data-bbox="606 1601 1101 1635">Polymers</td> <td></td> </tr> </tbody> </table>	Potential inorganic contaminants	Potential organic contaminants	Potential biological contaminants	Metals	Pesticides	Pathogens	Metalloids	Scheduled Wastes (including PCBs,	Viruses, prions, detrimental	Radionuclides	Dioxins, OCPs, HCBs and other	bacteria	Rare earth elements	chlorinated hydrocarbons)	Foreign animal and/or plant pest	Anionic elements	Furans	species, eg weeds and weed		Hydrocarbons including PAHs, BTEX	seeds		flocculants, coagulants and surfactants			Pharmaceutical and personal care			products			Endocrine disruptors including natural			and synthetic hormones			Polymers	
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³⁷ This includes information sourced from Sorvari *et al* 2008.

³⁸ Adapted from Sorvari J, Warne M St J, McLaughlin MJ, Kookana R 2008, *Methodology to assess the impacts of contaminants in fertilisers and fertiliser ingredients, including industrial residues*, CSIRO Land and Water Science Report 32/08, Report for the Primary Industries Ministerial Council and the Environment Protection and Heritage Council.

³⁹ The Department of Health (DoH) and Primary Industry and Resources South Australia (PIRSA) may therefore need to be consulted in this regard.

⁴⁰ Sorvari *et al* 2008, pg 16.

Aspect	Detail
Key nutrient value	Key nutrients for plant growth need to be available and present in such concentrations in the proposed WDSE as to be beneficial. These include macro-nutrients (potassium, nitrogen, phosphorus) as well as magnesium, calcium, sulphur, carbon and trace elements (copper, zinc, manganese, molybdenum, iron, chloride, boron) that can benefit plant growth. Micro-organisms may also be beneficial.
In situ soil conditions and land capability assessment	Soil quality needs to be assessed in order to determine if it will benefit from the particular waste being proposed for use as a WDSE. Consideration of the site-specific conditions must form part of the overall assessment to ensure the quality and application to land is appropriate and targeted.
Physical properties and health risks	<p>An assessment of the physical nature of the material and potential to cause harm should be considered. This is particularly relevant to health risks due to:</p> <ul style="list-style-type: none"> • wastes containing nano particles (<100 nm), and • wastes of combustion origin which are likely to contain high concentrations of dioxins and furans.
Withholding times	As some wastes have the potential to carry and transmit diseases, and encourage antibiotic, anthelmintic and other resistance in animals including humans, there may need to be specific management in addition to stabilisation such as minimum withholding times to avoid exposure to such risks. These are particularly relevant to wastes such as abattoir effluent, manures and treated sewage effluent.
Locality	The location for the proposed application is important for several reasons including the potential to impact on surface and ground waters. For this reason, the local geology, topography, hydrogeology and surrounding sensitive environments should be assessed. This would include the presence and likely impact due to sandy, karstic or fractured rock environments underlying the site, hydrogeology (eg groundwater flow, media, use, quality and proximity), and proximity to other sensitive environments (eg flood plains, water catchments and coastal areas).
Separation distances	The <i>Guidelines for separation distances</i> (EPA 2007) contains the recommended separation for activities, including manure spreading, from sensitive receptors such as residential areas and surface waters. These are generally considered as suitable in most cases for the protection of public amenity and surface waters.
Application rates	<p>The application rate should consider:</p> <ul style="list-style-type: none"> • the type of nutrient or fertiliser needs of the receiving site • other fertilisers that may have been applied • the crop type • land capability assessment (including porosity or water retention capacity). <p>The application rate should be such that chemical substances will not accumulate or cause environmental harm.</p>

Note: The final report produced by the National Cadmium Minimisation Committee (NMC) advises that the maximum level of cadmium in soils should not exceed 1 mg/kg and the limit may need to be lower depending on local conditions⁴¹.

⁴¹ This position has been reflected in a number of scientific publications and brochures on the management of cadmium in agriculture (both crops and livestock). In addition, this has resulted in a number of recommendations by the NMC being adopted such as in the Biosolids guidelines, by AFFA (Agriculture, Fisheries and Forestry Australia), FIFA (Fertiliser

The CSIRO project may derive and publish additional contaminant limits, but until that happens a full assessment for each WDSE demonstrating its suitability, will need to be conducted by the proponent to determine the relevant limits. Once these limits are finalised, they will be reflected in this standard.

It is also understood that such limits and any banned substances will then be used to update standards set in accordance with the AgVet Act and related legislation for fertilisers. Currently the AgVet Regulations have limits set for lead, mercury and cadmium. However the current relevant limit for cadmium WDSE is 1 mg/kg as recommended by the NCMC.

5 Approvals and licensing

This section outlines the EPA application and approval⁴² requirements for specific waste types to be used as WDSE. Section 5.1 provides an overview with further details for Type A reuse provided in section 5.2 and Type B in section 5.3. Details on required information for submissions to the EPA are provided in section 6.

A specific approval, licence, limited purpose declaration or environment performance agreement may be required depending on the nature and scale of the proposal for the production of WDSE. Irrespective of the need for specific approval from the EPA for use, the responsibility lies with both the producer and the user of WDSE to comply with the W2R EPP and the general environmental duty by ensuring WDSE is suitable for use and will not cause harm to the environment or human health. This standard outlines the EPA's expectations and requirements in order to demonstrate that compliance.

Compliance with this standard is required for proponents currently undertaking an activity that produces or uses a WDSE. Where this is not the case, an environment improvement plan or other action may be required to achieve improved environmental performance to a level satisfactory to the EPA.

5.1 Overview

Production of WDSE

The production of WDSE will require either:

- An EPA authorisation where that activity involves either the receipt or processing of waste, so that it triggers an activity of environmental significance under Schedule 1 of the EP Act (for example 3(3) Waste or recycling depot or 6(3) Composting Works), or
- Where waste is produced as a result of another activity of environmental significance under Schedule 1 of the EP Act and is proposed for reuse as WDSE. Conditions will be placed on the relevant licence for such activities in relation to the quality assurance procedures for the production and EPA approval for reuse of the WDSE.

For WDSE produced at a facility not required to be licensed by the EPA:

- Type A WDSE proposals: the producer should refer to relevant guidelines (refer Table 2) and contact the EPA for advice. The activity is subject to the general environmental duty, the WQEPP and the W2R EPP. If it is an activity of environmental significance, the development authorisation and/or EPA licence may contain conditions relating to waste management.
- Type B WDSE proposals: the producer must contact the EPA. Waste must be taken only to authorised premises unless a reuse approval is provided by the EPA in line with this guideline.

Renewal of any specific approval will need to occur periodically for WDSE production. This detail may be provided at the time of approval. Renewal may also depend on results of required monitoring and reporting and the level of compliance with approved management plans.

⁴² EPA approval means a written response confirming that the requirements of this standard have been met, that the WDSE does not require regulation as a waste and that reuse may proceed, contingent also upon compliance with the Auditor Protocol where applicable.

Use of WDSE

WDSE use may be managed according to the following:

- Type A WDSE proposals:
 - Under an existing licence, where it is associated with another activity of environmental significance as prescribed under Schedule 1 of the EP Act, or
 - Under requirements of the WQ EPP including compliance with codes of practice and guidelines, or
 - Under the general environmental duty and relevant guidelines (refer Table 2) where no specific approval is required according to Schedule 21 or 22 of the *Development Regulations 2008* (Development Regulations) or Schedule 1 of the EP Act,
- Type B WDSE proposals:
 - Through conditions of a licence if a licence is required for that industrial activity under Schedule 1 of the EP Act, and the facility produces industrial residues proposed for reuse as WDSE, or
 - Under the general environmental duty, AgVet Act and Regulations or through limited purposes declaration⁴³, once the WDSE is demonstrated as a suitable fertiliser.

The general expectations and relevant guidelines that are to be followed in the production and use of a WDSE are outlined in the following sections.

Reports

This section also specifies the circumstances and the information to be included when submission to the EPA is required in order to assess and approve the proposal. This may include the need for a site contamination audit report (audit report) to be prepared and submitted (refer section 6).

In addition, a report prepared by a suitably qualified consultant in relation to the suitability of WDSE for use at a specific site or sites is considered to be an environmental assessment for the purpose of the vendor questions included in the 'Particulars relating to environment protection' under the *Land and Business (Sale and Conveyancing) Regulations 1995* (LBSC Regulations)⁴⁴.

Where relevant, the EPA will also confirm the existence of an audit report for the land in response to the question for the EPA included in the 'Particulars relating to environment protection' under the LBSC Regulations.

The audit report will also be recorded on the EPA public register.

Sampling and assessment

Testing and assessment assist in determining the suitability of the WDSE. This reduces the risk of environmental harm, and the liability and remedial costs associated with having unlawfully received or disposed of waste. Where it is indicated that testing is required, the sampling and testing will need to be done by a suitably qualified and experienced person.

Where the WDSE is sourced from a licensed facility, testing will be required and may be specified in licence conditions. Where the WDSE is sourced from an unlicensed facility, testing of the material is needed to ensure that the receiving site complies with its general environmental duty and is not operating as an illegal waste depot.

⁴³ The limited purposes declaration will only be required until the W2R EPP becomes operational (refer section 2.2)

⁴⁴ The LBSC Regulations are currently under review.

Timeframes

Timeframes for gaining approval will depend on the level of detail provided by the proponent and suitability of the proposal. Timeframes may be extended when insufficient information is provided in an application or when considerations for material use and approvals are not factored in until late in the planning stage. Early engagement of the EPA, forward planning and supply of comprehensive information is key to help in meeting anticipated timeframes.

Review

Producers and users of WDSE will be required to periodically⁴⁵ review their operation, to determine whether:

- there has been any technological or other advancement that would enable a higher-order end option according to the waste hierarchy (such as reuse within the process that produced it) and instigate measures to prevent further receipt of such wastes
- the benefit is still available and maintained
- there is still an immediate market
- there is any harm or unacceptable risk of harm to the environment or human health⁴⁶
- the activity is still in compliance with all relevant legislation.

Compliance

If application to land of a WDSE occurs and is not in accordance with this standard, it may be deemed that the user is operating a waste or recycling depot without authorisation or may be causing risk of harm to the environment (including site contamination) or human health. The proponent is seen as acting outside the law and subject to enforcement under the EP Act.

Undertaking an activity without an approval where one is required is an illegal activity and hence subject to EPA enforcement in accordance with the EP Act. Similarly, proponents may be acting outside the law if they vary from any approval or specified standards without further subsequent permission in that regard. If there are any proposed changes to the method of manufacture, the chemical composition or the source of the raw materials, any current approvals may not be valid. The EPA should be contacted to discuss the proposed changes and determine if use of the WDSE is still appropriate.

If a person is currently using a WDSE, compliance with this standard is required. Where the EPA believes this is not the case, action may be required to achieve improved environmental performance to a satisfactory level. Proponents will need to contact the EPA if they are undertaking this activity but are unsure they have the correct approvals in place.

5.2 Type A WDSE proposals—organic, agriculture and primary processing wastes

Type A WDSE proposals include WDSE produced from solid and semi-solid organic waste including:

- agricultural and primary production wastes such as manure and manure-containing solids
- sludges from wastewater management systems resulting from food processing, agricultural and primary production activities
- biosolids (stabilised and classified sludges) from sewage treatment works including CWMS⁴⁷

⁴⁵ Timeframe for review will be specified in licence conditions or through the approval process.

⁴⁶ Site-specific Type B WDSE reuse will require a site contamination audit report to be prepared. Refer section 5.3.

⁴⁷ Community Wastewater Management Scheme.

- compost, potting mix or mulch consisting purely of vegetative matter or animal wastes that do not contain industrial waste or residues as components⁴⁸.

Table 2 lists different agricultural and primary processing organic waste types and provides links to existing guidelines. If these wastes are sustainably used in accordance with the relevant guidelines, users will be meeting this standard and their general environmental duty. SA Health, PIRSA and Australian Quarantine and Inspection Service (AQIS) should be contacted to determine requirements in relation to managing risks from the potential exposure to pathogens associated with reuse of the wastes. These requirements may include exclusion periods prior to animal slaughter or crop harvesting.

Table 2 Guidance on use of solid and semi-solid organic wastes

Waste type	Details and guidance available
<p>Manures and sludges from primary production wastewater management systems</p>	<p>Sludges from wastewater management systems in piggeries, poultry farms, saleyards and feedlots including abattoirs are normally contaminated with animal manure. It is recommended that, where practicable, these wastes should be stabilised prior to use. In order to reduce the risks associated with pests, diseases and pathogens, heat destruction may be required, such as pasteurisation during composting and digestion. It should be noted that for biosecurity risks, this may also be a requirement placed on contracted growers in commercial horticulture by supermarkets to ensure raw manures are not applied to vegetables for human consumption. A set of minimum standards for achieving pasteurisation within a composting process is provided in AS4454⁴⁸.</p> <p>The <i>Manual for spreading nutrient-rich wastes on agricultural land</i>⁴⁹, provides information and guidance on:</p> <ul style="list-style-type: none"> • the general principles of spreading wastes • characteristics of wastes from various industries including piggeries, cattle feedlots, dairy sheds, wineries, olive processing and others • allowable BOD application rates relative to soil types • sodicity classes for irrigation waters • land application methods • potential health risks of land application. <p>WASTELOAD is a spreadsheet model that accompanies the manual for calculating sustainable spreading rates of solid and liquid wastes. It has been developed by PIRSA to assist managers, consultants, planners and farmers⁴⁹.</p> <p>Other similar models eg MEDLI⁵⁰ (Model for Effluent Disposal Using Land Irrigation), are also available for determining sustainable application rates.</p>

⁴⁸ These organic compost products should be produced to meet the relevant standards specified under the Agvet Act, EPA guidelines and Australian Standards including AS 4454:2003–Composts, soil conditioners and mulches, AS/NZS5024 (INT):2005–Potting mixes, composts and other matrices: examination for legionellae (AMDT 1:2007), AS373:2003–Potting mixes and AS 4419:2003–Soils for landscaping and garden use. An EPA licence is required for facilities capable of producing greater than 200 tonnes of compost per annum.

⁴⁹ The manual is available from PIRSA <www.epa.sa.gov.au/xstd_files/Waste/Brochure/manual.pdf> ; manual and WASTELOAD model available from local PIRSA or Rural Solution SA offices.

⁵⁰ Land and Water Australia's National Program for Sustainable Irrigation, <<http://npsi.gov.au/products/er960336>>.

Waste type	Details and guidance available
Sludges from food and agricultural processing wastewater management systems	<p>This includes sludges from rendering, tanneries⁵¹, wineries, distilleries, milk processing, olives and other fruit processing, breweries. Specific guidance is available in:</p> <ul style="list-style-type: none"> • Manual for spreading nutrient-rich wastes on agricultural land⁴⁹ and the accompanying <i>WASTELOAD</i> model • <i>Guideline for wineries and distilleries</i> (EPA 2004)
Biosolids (Stabilised and Classified sludges) from sewage treatment works and CWMS	<p>The WQ EPP specifies that the South Australian <i>Biosolids Guidelines for the safe handling, reuse or disposal of biosolids</i> (EPA 1997)⁵² apply to persons who:</p> <ul style="list-style-type: none"> • use sludge collected from a septic system; • supply for reuse and/or reuse sludge collected from septic systems under a septic tank effluent disposal scheme; or • supply for reuse and/or reuse sludge collected from a sewage treatment system.
Compost	<p>An EPA licence is required for facilities capable of producing greater than 200 tonnes per annum of compost. Refer to draft Guidelines for composting works in South Australia (EPA 2007) for further guidance on requirements for siting, design, operation and closure of compost facilities.</p> <p>Note:</p> <ul style="list-style-type: none"> • Composts, mulches or potting mixes that contain industrial residues or listed wastes as feedstock or components, must be assessed as Type B WDSE (refer section 5.3). • Where composts or any other materials contain biosolids or sewage sludges, these are all classified as biosolids and must be managed accordingly (refer Biosolids Guidelines for the safe handling, reuse or disposal of biosolids).

Note: The types of models mentioned (eg WASTELOAD and MEDLI) usually focus on the nutrient content of the organic wastes and sludges. However, sludges that have accumulated in holding ponds over extended periods of time may have elevated heavy metal concentrations and particular assessment of metals needs to be made (in addition to nutrient value) to ensure application to land will not cause harm. Contact the EPA for further advice in this regard. Refer to section 7 for further information.

Some industry sectors have developed their own environmental management manuals, which normally include guidance on current best practice for waste management in their industries listed under Section 7.

5.2.1 Regulation of Type A WDSE proposals

Generally, the use of Type A WDSE will be controlled by the EPA through relevant environment protection policies and the general environmental duty⁵³. However in some circumstances, such as when the reuse is directly related to or occurring as part of a licensed activity, the use of Type A WDSE may be regulated by the EPA through conditions of

⁵¹ Sludges must not contain chemical or listed waste that may be present such as through use of chromium in chemical tanning processes.

⁵² The guidelines have now been replaced by the draft South Australian Biosolids Guideline for the safe handling and reuse of biosolids <www.epa.sa.gov.au/xstd_files/Waste/Guideline/guidelines_biosolids.pdf>.

⁵³ Refer section 25 of EP Act.

development approvals (*Development Act 1994* and Development Regulations) as well as conditions of licence according to the potential environmental risks.

To enable regulatory authorities to fully assess development applications involving the use of Type A WDSE, proponents are required to demonstrate to the EPA the suitability of the site through soil characterisation and the sustainability of proposed application rates through chemical balances using WASTELOAD or similar models. In cases where the proposal does not meet EPA criteria, specific conditions may be imposed on the development approval to minimise environmental harm or nuisance arising from the use of the material.

Where a licensed activity of environmental significance (as prescribed under Schedule 1 of the EP Act) involves the use of organic wastes as Type A WDSE, the EPA may also require submission of details addressing management, quality assurance and quality control (QA/QC) procedures that will be undertaken at the premises to ensure their sustainable reuse, such as through an Environment Management Plan or Environmental Monitoring Program which require specific EPA approval.

Type A WDSE proposals not requiring specific EPA approval will need to be conducted in accordance with general environmental duty and relevant environment protection policies. Particular consideration needs to be given to the design, operation and management of the reuse activity to prevent or minimise potential impacts to waters as well as address odour and amenity issues. A variety of guidelines and codes of practice are available to assist in ensuring appropriate practice is undertaken (refer sections 3 and 4).

5.2.2 Other wastes

Street Sweeping Wastes (SSW) and Gross Pollutant Trap wastes (GPT)

These wastes can be highly variable in nature, and physical and chemical contamination levels can be high. Reuse as feedstock in composting⁵⁴ as a Type A WDSE proposal without chemical assessment may only occur if the SSW and GPT are:

- organic waste (eg leaves, grass and other vegetative matter)
- from low-risk areas (ie residential streets, country areas excluding industrial areas or clean up of road or industrial accidents and spills).

However, where the SSW and GPT consists of material that is:

- silt and sediments and not mainly vegetative matter
- from high-risk areas such as industrial areas, contaminated sites and surrounds or from the clean up of industrial or road accidents

then this waste must either be assessed and disposed to an authorised landfill⁵⁵ or assessed in accordance with Type B WDSE proposals for direct use to land or as a feedstock or bulking agent (ie in compost). Refer sections 5.3 and 6)⁵⁶.

Municipal and industrial wastewaters

Although municipal and industrial wastewaters may also possess soil enhancing capabilities, the EPA considers that the reuse of wastewater is driven primarily by the need for an alternative irrigation water supply. The reuse of treated wastewater or effluent for crop irrigation purposes is supported provided it is undertaken in a sustainable manner and causes no environmental harm.

⁵⁴ Refer draft Guidelines for composting works in South Australia (EPA 2007).

⁵⁵ Refer draft Guidelines for the assessment, classification and disposal of solid waste (EPA 2009).

⁵⁶ Unless sufficient justification can be provided to demonstrate that the chemical assessment component is not required.

The reuse of wastewater for irrigation purposes is regulated through meeting the requirements of the WQ EPP. The National Water Quality Management Strategy *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1)–November 2006* outlines the requirements for the reuse of sewage effluent from municipal treatment works and CWMS.

The EPA Guideline, *Wastewater irrigation management plan (WIMP)—a drafting guide for wastewater irrigators* (2008) provides guidance on the reuse of wastewater from food processing, agricultural and primary production activities for irrigation purposes.

For the purposes of this standard, municipal and industrial wastewater reuse is not considered by the EPA to be a WDSE and is not addressed further in this standard.

Water treatment solids

Water treatment solids are not currently recognised as having benefits for agricultural land such as cropping as they lock up phosphorous and most Australian soils are phosphorus deficient. They may however have some benefits for soil quality such as their moisture-holding capacity. These waste materials therefore must undergo Type B WDSE assessment, as required for industrial residues (refer section 5.2), to demonstrate the benefit and suitability for the proposed use as a WDSE.

Note: Where any other organic waste including waste from food processing, agriculture and primary production is proposed for use as a soil enhancer or fertiliser but is not addressed in this standard and does not have suitable guidance available, the EPA should be contacted for further advice. These wastes may need to be subject to assessment as a Type B WDSE proposal.

5.3 Type B WDSE proposals—solid industrial residue wastes

Type B WDSE proposals include WDSE produced either wholly or partially (ie as part of another product such as compost) from industrial residues⁵⁷. EPA approval is required prior to commencement of any Type B WDSE reuse.

Once a waste or residue is produced by an industrial activity and cannot be used within the process that produced it, it is a waste that requires disposal or other suitable management. Industrial activities can produce wastes with many and varied contaminants including some anthropogenic substances that differ from those naturally occurring in the environment.

The chemical substances in industrial residues or by-products can pose a potential risk to agriculture, the environment or human health (eg through bio-accumulation and alteration to soil and plant uptake, pH and soil microbiology). For example, the risk of harm can be due to the presence of contaminants such as metals and metalloids⁵⁸ and persistent organic pollutants [POPs including polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs)].

Recycling by application to agricultural land as a soil enhancer may be possible depending on:

- the source
- the chemical and physical nature of the material
- the geophysical characteristics of the proposed site
- the potential benefit provided especially in relation to agricultural use such as improved soil structure and supply of micronutrients, and

⁵⁷ Including water treatment residues, and street sweeping wastes or gross pollutant trap wastes consisting mainly of silt and sediment or from higher risk areas (refer to Table 2).

⁵⁸ Eg cadmium, arsenic, copper, mercury, zinc, chromium, selenium and lead.

- the risk of harm occurring at the proposed site.

Due to the potential risk to agriculture, environment and human health, proponents wanting to use an industrial residue for recycling and use as a WDSE will need to submit information to the EPA in order to support and provide specific approval for either:

- direct application of industrial residues to agricultural land, or
- indirect application, eg as part of a compost, mulch or potting mix product⁵⁹ (refer section 6).

Any recycling proposed for such residues must be proven to be fit for purpose, homogenous and of suitable and consistent quality. A pilot trial may be instituted.

If it is demonstrated that the material is a suitable soil enhancer or fertiliser, then its application to land will be subject to the AgVet Act and Regulations administered by PIRSA. The EPA's assessment of Type B WDSE proposals will involve consultation with PIRSA. The level of information required and the level of any controls for use will vary depending on whether the material is demonstrated to be suitable fertiliser for broad application or if it is restricted and only suitable for use at a specific site/s (refer sections 6.1 and 6.2 respectively).

In addition to the considerations relating to prohibited wastes and important aspects (see section 4), the following must be considered in any Type B WDSE proposals:

1 Sampling

Sampling and assessment of the industrial residue must occur at the site where it is generated prior to its transport for direct or indirect use. Sampling and assessment must be undertaken by a suitably qualified consultant (refer Appendix 2). Assessment must be for all chemical substances known and reasonably expected to be present in the waste. A robust residue-specific analysis is required including an assessment of the risks to demonstrate that the residue is fit for purpose as or as part of a WDSE.

2 Sound science

A sound method for determining contaminant limits is provided in the CSIRO report, Methodology to assess the impacts of contaminants in fertilisers and fertiliser ingredients, including industrial residues. This report was developed as part of the CSIRO project.

Section 5.3.1 includes details on the assessment process and principles incorporated in the CSIRO report on methodologies to assess contaminants in fertilisers. Once finalised, the values derived from that project will be adopted and the EPA will use the limits for any broad non site-specific application of WDSE to agricultural land.⁶⁰

Although this project is comprehensive, there may be additional contaminants in the industrial residue that do not have an established contaminant value to derive a limit based on risk. The approach used by the CSIRO will need to be followed when assessment is required for site-specific applications (refer section 5.3.1). The guidance document, *Environmental risk assessment guidance manual for agricultural and veterinary chemicals*⁶¹, produced through a project called the National Framework for Chemicals Environmental Management (NChEM), may be of assistance.

⁵⁹ It is advised the EPA is contacted to discuss the potential of any use providing an outline of the proposal in order to determine the suitability of proceeding to a full application.

⁶⁰ The EPA is advised that a final report entitled *Investigation into the impacts of contaminants in mineral fertilisers, fertiliser ingredients and industrial residues and the derivation of guidelines for contaminants*, has been produced by Sovari *et al.*, 2009, which contains Fertiliser Contaminant Trigger Values for industrial residues. EPA is awaiting the release of this report in order to incorporate those values into this document which will constitute default values for this determination of suitability for broad-scale reuse. In the absence of published contaminant limits, the onus lies with the applicant.

⁶¹ EPHC, A National Approach to the Management of Chemicals website, <www.ephc.gov.au/taxonomy/term/75>.

To ensure sound scientific practices are used, a suitably qualified consultant needs to be engaged. An assessment program should include laboratory trials and pilot studies in order to demonstrate the safety and efficacy of the proposed use of wastes.

The assessment must ensure that it addresses the receiving environment and site-specific factors. If the material is proposed for broad non site-specific application, then it must be demonstrated to have no potential adverse impact in the most conservative and sensitive environment likely, to demonstrate there are no limiting factors (which would include meeting the default values, once published). Site-specific applications (or applications to reuse material that exceeds the default values) will require the applicant to demonstrate that the use is suitable under the site-specific conditions. Any risks must be clearly expressed and be acceptable to the EPA if the application to land is to proceed.

3 Documentation and submissions

The EPA will require sufficient information to be submitted in order to support either direct beneficial application of industrial residues to agricultural land, or indirect beneficial application (eg as part of a compost, mulch or potting mix product)⁵⁹.

The level of detail required will depend on each application and the EPA may require submission of further information to be satisfied that a full assessment has been made so as to make a decision. Refer to section 6 for details on the required information.

Application to the EPA must be made following section 6 including the Auditor Protocol (section 6.2) as appropriate. The proposal must be approved and industrial residues must be treated and managed in accordance with the approved proposal for the material to meet the requirements of clause 4(a) of the W2R EPP and constitute a WDSE product.

4 Land Use

Direct application of industrial residues to sensitive land uses will not be permitted. Land use must be restricted to commercial agriculture practices unless other non-sensitive uses such as parklands are otherwise specified or endorsed by an auditor in accordance with section 6.2.

If the proposal is for broad non site-specific application rather than a nominated specific site, a thorough assessment has to be conducted to determine and specify:

- if there are any areas in which the proposed WDSE must not be applied due to risk of potential harm under normal use considering issues such as separation distances, and suitable and non-suitable land uses (eg assess accumulation potential over a longer term scenario such as over 100 years at the maximum application rate)
- how restrictions will be implemented
- suitable application rates.

The proposal must comply with the AgVet Act and Regulations and any limits that are adopted by the EPA in line with the CSIRO project on contaminants in fertilisers.

5 Titles information

The *Land and Business (Sale and Conveyancing) Act 1994* (LBSC Act) and LBSC Regulations⁶² are set in place to provide consumer protection for those buying property in South Australia. Section 7 of the LBSC Act specifies the requirement for a landowner and other organisations to complete a series of questions as part of the Form 1 or Form 2 Statement when land or businesses are sold. The 'Particulars relating to environment protection' under the LBSC Regulations constitute part of these forms and includes a series of questions relating to specific environmental interests.

⁶² The Land and Business (Sale and Conveyancing) Regulations 1995 are currently under review.

A vendor has the responsibility to respond to some of these questions and to specify, where applicable, the existence of an environmental assessment of the land or part of the land. This response includes any assessments conducted in relation to the specific use of a WDSE. The EPA is required under the LBSC Act and Regulations to respond to a question relating to site contamination audit reports, including any report regarding direct application of Type B WDSE to specific parcels of land (in accordance with section 6.2). This information will also be recorded on the Public Register by EPA.

5.3.1 Assessment process

The EPA supports the national approach to the assessment of Type B WDSE proposals (as outlined in the Environment Protection and Heritage Council publication, *Guidance for assessing the beneficial reuse of industrial residues to land management applications—a national approach* (2006)⁶³ and the subsequent CSIRO reports⁶⁴ (refer section 7). The principles, approach and required information within those documents have been incorporated and reflected in this standard as appropriate.

⁶³ EPHC, <www.ephc.gov.au/node/276>.

⁶⁴ Sovari *et al*, *Methodology to assess the impacts of contaminants in fertilisers and fertiliser ingredients, including industrial residues* (2008) and *Investigation into the impacts of contaminants in mineral fertilisers, fertiliser ingredients and industrial residues and the derivation of guidelines for contaminants* (2009).

Table 3 provides factors in addition to those outlined in Table 1 which need to be considered in the assessment process for Type B WDSE proposals.

Figure 3 gives an overview of the relevant steps to be taken to establish contaminant limits in fertilisers based on the CSIRO project methodology. To ensure methodologies and considerations are consistent, CSIRO project methodology should be referred to for any proposal to use inorganic industrial waste for beneficial application to land for agriculture.

The framework for assessment in essence includes the following steps:

- Collect data on the wastes proposed for reuse
- Assess these wastes as potential fertiliser ingredients firstly by identifying the beneficial effects
- If no benefit is identified, then this waste is not a permitted ingredient
- If a benefit is identified, then assess the potential contaminants within the ingredient
- If the contaminants do not exceed the default fertiliser contaminant trigger values established for non site-specific reuse to agricultural land, application at a suitable or specified may be permitted
- If the contaminants do exceed the default values, or there are no default values established, either
 - no reuse is permitted, or
 - a site-specific assessment may be conducted
- The site-specific assessment must assess the risks posed by the waste at a specific site including the risk of accumulation of contaminants as well as of the hazards that they pose
- Site-specific reuse may be permitted if the site-specific assessment demonstrates that the proposed reuse is genuine, beneficial and will not cause harm based on a thorough risk assessment. EPA approval will be required and is to be implemented through requirements of a statutory order from EPA and/or PIRSA.

Table 3 Important factors of the assessment process

Factor	Details
Physical and chemical characteristics of that waste— identification of beneficial effects	<p>Assessment of these characteristics must demonstrate that it has direct or indirect beneficial effects on plants, soil health, animal health or human health. Wastes that do not have any beneficial effects are not considered appropriate for application to land and will not be permitted as components of a WDSE. Dilution of contaminants is not permitted.</p> <p>Waste material is permitted to be included in WDSE if it is first demonstrated that:</p> <ul style="list-style-type: none"> • the waste contains constituents that will provide or enhance the WDSE's beneficial characteristics, and • the risks posed by contaminants will not cause harm to human health or the environment.
Variability of waste	<p>Variability or consistency of the waste and process producing that waste, over time and between batches need to be considered. This will influence the overall suitability of the waste, and the sampling rates required to ensure only suitable waste is used for production of WDSE to meet the required specification.</p>
Application rates	<p>Once potential benefits are identified, the assessment process must determine the safe application rates for the WDSE, based on the specific sites needs and benefit provided by the specific constituent.</p>
Contaminants in the waste	<p>Once beneficial constituents have been assessed, identification and assessment of contaminants in the waste is required to determine the potential for harm including from accumulation over the longer term (eg 100-year application at the maximum recommended rate).</p> <p>The chemical contaminants with a potential to accumulate in the environment above natural background concentrations will then need to undergo a determination of the hazards they might pose, including toxicity, bioaccumulation, leaching or degradation of soil or water quality, to determine the suitability of the waste⁶⁵.</p>
Monitoring	<p>Monitoring should continue over time to determine whether predictions in performance are correct and therefore allow the opportunity to make adjustments to the use where necessary, and to ensure that genuine beneficial recycling occurs and causes no harm to human health or the environment.</p>
Principles	<p>In addition to concepts of No Dumping, Disposal or Dilution and the Precautionary Principle, the national project to develop contaminant limits in fertilisers also states that the amount of a contaminant in a fertiliser must follow the ALARA principle (as low as reasonably achievable). This means that 'no more of a contaminant than is necessary should be allowed in a fertiliser, ie the concentration of contaminants in fertiliser ingredients should be as low as is reasonably achievable and within the recommended concentration limits⁶⁶.</p>

⁶⁵ A full assessment for each waste derived soil enhancer demonstrating its suitability will need to be conducted by the proponent to determine the relevant limits until adoption of any limits derived from the CSIRO project. It is understood that such limits and any banned substances will then be used to update standards set in accordance with the AgVet Act and related legislation for fertilisers. However until this modification, lead, mercury and cadmium present in WDSE are subject to the limits set in the AgVet Regulations.

⁶⁶ Source: Sorvari J *et al* 2008.

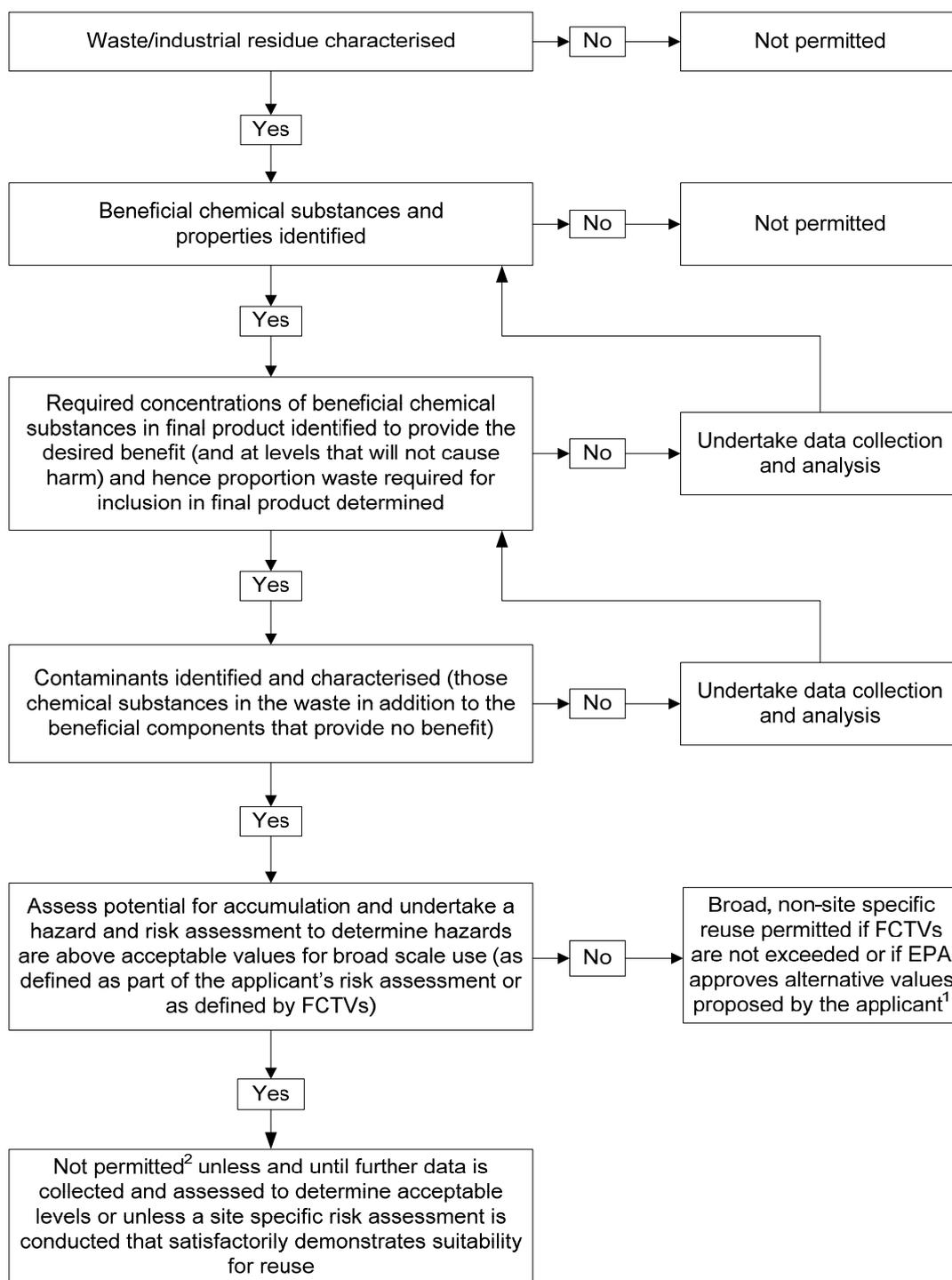


Figure 3 Overview of assessment procedure⁶⁷

Notes:

- 1 If the concentrations do exceed FCTV, site-specific reuse may be possible if the WDSE is demonstrated as suitable (refer section 6.2)
- 2 Until and unless Phase III of the CSIRO project to determine guideline values for highly hazardous contaminants is complete.

⁶⁷ Source: Sorvari J *et al* 2009. 'FCTV' means Fertiliser Contaminant Trigger Value. The trigger values will be incorporated in this document as default limits for broad scale reuse, upon finalisation by the national project.

6 EPA submissions for Type B WDSE proposals

EPA approval is required prior to commencement of any Type B WDSE reuse. In most cases the producer of the WDSE will be responsible for providing the required information for approval.

A suitably qualified consultant must undertake an assessment of the waste proposed for application to land as a WDSE in accordance with the processes outlined in this standard and determine whether it is suitable for the proposed use in unrestricted circumstances based on assessment.

This assessment needs to in line with the requirements of this standard. This may include following the methodology used within the CSIRO project including any contaminant limits derived from that process⁶⁸. Where limits have not been set for any particular chemical substance, or if the proposal includes concentrations of chemical substances in the WDSE that exceed any specified limits, then a site-specific risk assessment must be undertaken. This assessment must include a statement from the assessor indicating that based on their understanding of the WDSE, its use and the receiving site, the use of the WDSE will have no harm or adverse impacts on human health or the environment including causing site contamination.

A site contamination auditor accredited under the EP Act⁶⁹ will be considered as a suitable person to endorse Type B WDSE proposals and such proposals must follow the Auditor Protocol as described in section 6.2.

The use of the WDSE as a fertiliser product will also be subject to controls and standards specified under the AgVet Act and related legislation.

6.1 Required information for broad application (non site-specific application)

For WDSE designed for broad application, proponents will need to provide the following information⁷⁰ to the EPA:

- 1 Full details of industrial waste generator and user/s, including legal name and registered address and authorised contact personnel.
- 2 Outline of the proposal (waste type, volume/s required over time, subject site/s and purpose).
- 3 Assessment by a suitability qualified consultant that provides details of:
 - a the benefits of applying the WDSE material to land including supporting evidence
 - b the WDSE specification—chemical and physical composition of the waste proposed for use including thorough assessment of representative samples to accurately characterise the concentrations of chemical substances in the waste
 - c the suitability of WDSE:
 - Option 1: where trigger values from the CSIRO project to define contaminant limits in industrial residues used as fertilisers for non-site specific reuse to agriculture are adopted. Sufficient assessment details to accurately characterise the WDSE to demonstrate that it does not exceed the published limits.
If this option is used, the details in 3(d) are not required

⁶⁸ Currently, there are contaminant limits specified under the standards set in accordance with the AgVet Act. It is understood that such limits will be amended to reflect the outcomes of the national process.

⁶⁹ Accreditation under other legislation will be considered through the accreditation process. Refer to EPA Publication, *Site Contamination—using an environmental auditor* (2008) to assist in the considerations when selecting an auditor.

⁷⁰ Based on the EPHC Guidance for assessing the beneficial reuse of industrial residues to land management applications—a national approach (2006), <www.ephc.gov.au/node/276>.

- Option 2: interim approach where no trigger values from the CSIRO project to define contaminant limits are adopted, or where contaminants that are present in the waste are not specified in the adopted limits. A detailed risk assessment is required to demonstrate the suitability for broad non site-specific use (including application rates for beneficial components in conjunction with limitations posed by contaminants). This must be a thorough assessment to a similar or greater level of rigour as that conducted by the CSIRO and must stand up to peer review. The risk assessment must include consideration of:
 - any potential short- and long-term impacts for the receiving environment/s including human health with details of the methodology used to assess risks of application
 - geology (eg a sandy, karstic or fractured rock environments) and hydrogeology (eg groundwater and surface water quality, use, flow and proximity)
 - proximity to environmentally sensitive areas including coastal, wetland or riverine environments, flood plains or potable water supply catchments and water protection areas proclaimed by the Governor in accordance with section 61A of the EP Act
 - exposure pathways, accumulation, bioavailability, mobility, leaching and toxicity of contaminants
 - suitable land uses, including demonstrating that the WDSE is suitable for use at the most sensitive area/s targeted.
- d definitive opinions from relevant experts in the field based on the risk assessment that the WDSE is fit for purpose and will not cause harm to human health or the environment (including degradation of land quality considering the current land use and proposed WDSE application).

Methodologies for determining contaminant limits are provided by the CSIRO project⁷¹ and there is a draft report regarding risk assessment processes for agricultural and veterinary chemicals⁷². Upon adoption of any contaminant limits or trigger values for chemical substances from the CSIRO project, these limits shall then apply as limits for non site-specific application to commercial agricultural land.

QA/QC procedures for production and use

- 4 Details of the QA/QC programs and processes to ensure production and use of the material will meet the specification and application requirements. The QA/QC must ensure the WDSE will not cause harm to the environment or human health, and will be sustainable for the proposed timeframe of application. These programs and processes must address:
 - a WDSE application rate (volumes/mass per area), frequency (how often) and timeframe (for how long)
 - b sampling program and assessment (in accordance with process outlined in Figures 2 and 3), monitoring and reporting
 - c roles and responsibilities
 - d consistency of composition of the waste and process producing that waste between batches and over time
 - e consistency of supply (quantities required, and storage and materials flow management)
 - f records management and maintenance
 - g details of any pre-treatment or processing required prior to being received at the site. Processing or treatment of waste is likely to require specific authorisation
 - h transport and storage requirements for the material

⁷¹ Sources: Sorvari *et al* 2008, and Sovari *et al* 2009.

⁷² EPHC, The National Framework for Chemicals Environmental Management (NChEM) website, <www.ephc.gov.au/taxonomy/term/75>.

- i details of any completed or proposed stakeholder consultation as relevant
- j details of any existing or proposed industry standards, codes of practice or specifications proposed to be implemented.

6.2 Required information for site-specific application (Auditor Protocol)

In some cases, a WDSE may not be suitable for broad non-site specific application but may be suitable for use at a particular site. This includes where the assessment under step 3(c) of section 6.1:

- under Option 1 shows that upper limits are exceeded; or
- under Option 2 shows the risk assessment for broad application was unable to demonstrate that no harm would result,

but that use at a specific site may be suitable.

In such scenarios, a site management plan prepared by a suitably qualified consultant and independently endorsed by a site contamination auditor must be submitted to the EPA as part of the application for approval. The application will be referred to PIRSA for review and comment and EPA written approval⁷³ must be gained prior to the commencement of the Type B WDSE reuse in accordance with the Auditor Protocol.

Follow-up site contamination audits will also be required to determine whether there has been any harm caused by the application of site-specific WDSE to land after a specified timeframe. Therefore the application must include a recommended timeframe for the follow-up site contamination audits which needs to be endorsed by the auditor and will be integral to EPA approval.

The application may need to include a requirement for the proponent to consult appropriately with and have regard to the views of the community and council adjacent to/within the area with a potential to be affected by the project.

In addition to the information required in section 6.1, the information and requirements described below must be included in a site management plan as part of the applications for Type B WDSE.

6.2.1 Site management plan

A site management plan that is submitted as part of the applications for Type B use of WDSE must include:

- 1 Details addressing all operational and management issues of the project to the satisfaction of the EPA, including:
 - a information specified in section 6.1 (items 1 to 4 inclusive)
 - b the specific sites where the material is proposed to be applied including title, ownership and land use, and a site plan
 - c details of the proposed timeframe for application, rate of receipt, maximum volumes stored on site and storage and management controls for the WDSE prior to application [refer Guideline for stockpile management–Waste and waste derived products for recycling and reuse (EPA 2009)]
 - d information on how the method of application and maximum recommended rates of application will be assured
 - e details on procedures to prevent adverse off-site impacts including from dust, odour, noise and hours of operation, and soil run-off

⁷³ Until the W2R EPP becomes operational, EPA approval means the issuing of a licence or limited purposes declaration for the receiving site. Once the W2R EPP is operational, EPA approval will mean a written response confirming that the requirements of this standard have been met, for example in relation to submission for a Type B WDSE reuse proposal, and that recycling may proceed in accordance with the site management plan, contingent also upon compliance with the Auditor Protocol.

- f any restrictions on application of the WDSE such as which may be related to geology and sensitive receptors
 - g clear identification process for the land that is the subject of the proposal (system of certificates of title administered by the Lands Titles Office or similar). This identification must be managed in perpetuity and independently from the project proponent by the Lands Titles Office or other suitable enduring body if the land is not subject to title. When completing questions as part of Form 1 or Form 2 statements under the LBSC Act and Regulations when land or business are sold, the vendor must indicate the existence of an environmental assessment of the land or part of the land, including any audit report regarding the specific use of a WDSE.
 - h OHS&W requirements with respect to maintenance and use of the material received at the site
 - i stated roles for relevant parties who will be responsible for ensuring that both the site management plan and the audit report requirements are implemented for the duration of the project
 - j recommended timeframes for site contamination audits to occur and site contamination audit report/s to be prepared and submitted to the EPA
 - k confirmation that requirements and conditions of subsequent audit reports will be implemented and maintained
- 2 Clear endorsement of the site management plan by the auditor⁷⁴.
- In endorsing the plan the auditor needs to provide interim audit advice⁷⁵ based on the requirements outlined in the *Guidelines for the site contamination audit system (EPA 2009)*. In doing so, the auditor provides an opinion that, based on the knowledge available at the time including appropriate assessment of the site, the WDSE is suitable for use, will not pose an unacceptable risk of causing harm and the land will be suitable for its proposed use at the completion of the project. In documenting this opinion, the auditor must include details supporting details such as:
- a chemical and physical characteristics of WDSE
 - b reuse site assessment
 - c assessment methodologies and QA/QC.

It must be noted that the auditor may decide not to endorse the site management plan if issues of *existing* site contamination are found. In this case additional action may be needed to remediate the site.

6.2.2 Site contamination audit report

After specified intervals (as proposed in the site management plan endorsed by the auditor and approved by the EPA), a site contamination audit (audit) must be undertaken and a site contamination audit report and site contamination audit statement must be prepared by the auditor in accordance with Part 10A of the EP Act, section 103 of the *Environment Protection Regulations 2009*, and guidelines before submission to the EPA.

The audit [as defined in section 3(1) of the EP Act] is a review that is carried out by a person that:

1. examines assessments or remediation carried out by another person in respect of known or suspected site contamination on or below the surface of a site; and
2. is for the purpose of determining the following matters:
 - a. the nature and extent of any site contamination present or remaining on or below the surface of the site;
 - b. the suitability of the site for a sensitive use or another use or range of uses; and
 - c. what remediation is or remains necessary for a specified use or range of uses.

⁷⁴ A site contamination auditor accredited under the Division 4 of Part 10A of the EP Act.

⁷⁵ Interim audit advice form available at <www.epa.sa.gov.au/xstd_files/Site%20contamination/Form/sc_audit_advice.pdf>.

The audit will also take into account the application to land of the WDSE produced from industrial residues and/or other wastes.

The audit report must:

- 1 set out the findings of the audit and comply with the guidelines from time to time issued by the EPA
- 2 include a summary of the findings of the audit certified, in the prescribed form, by the site contamination auditor who personally carried out or directly supervised the audit.

It must be noted that the auditor may decide not to provide the audit report confirming suitability for use if site contamination is caused or the site management plan is not complied with. In these circumstances action may need to be taken to remediate the site.

There is a requirement for the EPA and the vendor to indicate the existence of an audit report on the certificate of title for the land in question. This is to ensure that any ongoing site management requirements are maintained in perpetuity in order to provide assurance to any future owners or persons interacting with the land.

IMPORTANT

The user and the producer of the WDSE must ensure they produce and maintain accurate records that will demonstrate compliance with the approved use of the WDSE and a site management plan including all relevant sampling, assessment, and QA/QC reports and procedures. These must be kept and made available upon request to the EPA and the auditor.

Compliance with any audit report requirements will be a condition of any continuing use of the WDSE at the site.

Failure to implement the requirements of an audit condition may result in land no longer being suitable for its current use, and potentially posing a threat of harm to human health or the environment, or causing site contamination.

The EPA reserves the right to require an audit report be prepared at intervals other than those specified in the site management plan prior to the scheduled audit if there is validated evidence that the approval (including the site management plan) has not been followed, or that harm has been caused to human health or the environment or that site contamination exists.

Similarly, the EPA reserves the right to revoke any approval to receive and use the WDSE at the site if contamination or harm is evident, or if the WDSE has been supplied, received or used contrary to the approval. The EPA may issue a Site Contamination Assessment Order (section 103H EP Act), a Site Remediation Order (section 103J EP Act) or take other enforcement action to remedy any harm caused.

If any harm is caused that results from the receipt or use of the WDSE contrary to the approval, the EPA will consider this as not taking all reasonable and practicable measures to prevent or minimise harm. It will also consider the WDSE applied to land may be receipt and deposition of waste to land without authorisation, and take any punitive enforcement action deemed appropriate in addition to the remedial action to make good any harm caused.

6.3 General responsibilities

Producer—the person producing WDSE is required to:

- ensure relevant approvals are obtained where required
- implement appropriate QA/QC procedures and management plans
- ensure only suitable approved wastes are used to produce the WDSE
- ensure that the WDSE is consistently produced to the approved specification

- ensure the WDSE is only transported to facilities permitted to receive and use the WDSE
- maintain, and be able to provide, records to demonstrate the points above including relevant sampling, testing and monitoring of the process and the WDSE:
 - to the user prior to transport
 - upon request from the EPA or auditor.

Transporter—the person engaged to transport WDSE is recommended to:

- ensure the vehicle is suitable for transport of the WDSE
- transport site-specific WDSE only to premises permitted to receive and use it
- maintain and provide records of transport to the producer, the user, the EPA or the auditor on request to demonstrate the above
- when transporting organic agricultural and primary processing wastes for use as a WDSE, waste transporters need to have regard to the requirements of the Manual for spreading nutrient-rich wastes on agricultural land (PIRSA 2008).

User—the person who received and uses WDSE is required to:

- ensure relevant approvals are obtained where required
- implement appropriate QA/QC procedures and management plans
- ensure WDSE is fit for the site-specific purpose
- ensure WDSE is only received from suitable sources
- where approval is required, ensure full compliance with the approval inclusive of the site management plan and any conditions of relevant site contamination audit reports
- ensure they maintain appropriate and relevant records to demonstrate compliance with the points above, relevant guidelines and the general environmental duty, and make these records available to the EPA or the auditor upon request
- ensure full disclosure as required when answering questions in relation to the sale of land or a business in accordance with the LBSC Act
- ensure compliance with any and all requirements of the AgVet Act.

It is the responsibility of the proponents to ensure that they comply with all requirements of this standard.

This standard is designed to minimise the risk of potential harm to the environment, human health and agriculture. The EPA does not in any way guarantee that the use of these recycled materials will confer the proposed benefit stated by the producer. The liability for any harm rests with persons who produce and use the recycled material.

PART FOUR

REFERENCES

7 Further information

EPA Guidelines

Air quality impact assessment using design ground level pollutant concentrations (DGLCs), publication 386/06,
<www.epa.sa.gov.au/xstd_files/Air/Guideline/guide_airquality.pdf>.

Composite soil sampling in site contamination assessment and management, publication 584/05,
<www.epa.sa.gov.au/xstd_files/Site%20contamination/Guideline/guide_composite.pdf>.

Draft Guidelines for the assessment, classification and disposal of solid waste, publication 712/09,
<www.epa.sa.gov.au/xstd_files/Waste/Public%20consultation/draft_guidelines_waste.pdf>.

Guidelines for compliance and enforcement of the Environment Protection Act 1993, publication 585/07,
<www.epa.sa.gov.au/xstd_files/Licensing/Guideline/guide_compliance.pdf>.

Guidelines for environmental management of on-site remediation, publication 623/06;
<www.epa.sa.gov.au/xstd_files/Site%20contamination/Guideline/guide_remediation.pdf>.

Guidelines for separation distances, publication 714/07,
<www.epa.sa.gov.au/xstd_files/Industry/Guideline/sepguidepcd.pdf>.

Guidelines for stockpiling: Waste and waste derived products for recycling and reuse, publication 849/09,
<www.epa.sa.gov.au/xstd_files/Waste/Guideline/guidelines_stockpile.pdf>.

Guidelines for wineries and distilleries, publication 510/04,
<www.epa.sa.gov.au/xstd_files/Industry/Guideline/guide_wineries.pdf>.

Odour assessment using odour source modelling, publication 373/07,
<www.epa.sa.gov.au/xstd_files/Air/Guideline/guide_odour.pdf>.

Presentation of air pollution modelling outputs, publication 578/05,
<www.epa.sa.gov.au/xstd_files/Air/Guideline/guide_apm.pdf>.

Reclaimed water irrigation of pasture for grazing of cattle and pigs, publication 189/05,
<www.epa.sa.gov.au/xstd_files/Water/Guideline/guide_reclaimed.pdf>.

Regulatory monitoring and testing: Groundwater sampling, publication 667/07,
<www.epa.sa.gov.au/xstd_files/Water/Guideline/guide_gws.pdf>.

Regulatory monitoring and testing: Independent verification requirements, publication 649/06,
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Regulatory monitoring and testing: Monitoring plan requirements, publication 650/06,
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Other relevant legislation

The *Agricultural and Veterinary Products (Control of Use) Act 2002* and *Agricultural and Veterinary Products (Control of Use) Regulations 2004* are the primary legislation governing use of rural chemicals in SA including fertilisers. It prescribes labelling requirements and standards limiting the levels of unacceptable impurities such as heavy metals in fertilisers and also provides control mechanisms including the General Duty and Compliance Orders.

The *Australia New Zealand Food Standards Code* developed under the *Food Standards Australia New Zealand Act 1991* specifies 'Maximum Levels' (ML) and 'Maximum Residue Limits' (MRL) permitted to be present in food.

The *Food Act 2001* ensures food for sale is both safe and suitable for human consumption and provides for the application of the Food Standards Code.

The National Water Quality Management Strategy has produced a *Guideline for Sewerage System Sludge (Biosolids) Management*. Specific requirements for biosolids in accordance the NWQMS document are included in the Biosolids guidelines.

The *Food Regulations 2002* enables the adoption of the definition of the Food Standards Code with some modifications.

The Land and Business (Sale and Conveyancing) Act 1994 specifies the requirement for a landowner to complete a Form 1 Statement under section 7 when the land is sold.

The *Livestock Act 1997* specifies the requirements for livestock grazing in order to protect stock health and the health of humans who consume stock produce.

The *Natural Resources Management Act 2004* contains general provisions for the protection of water bodies.

WDSE producers, reprocessors and end users must meet the requirements of the *Occupational Health, Safety and Welfare Act 1986*. These requirements include the responsibilities of both employer and employee to provide the necessary information and equipment to ensure a safe working environment.

The *Primary Produce (Food Safety Schemes) Act 2004* objective is to develop food safety schemes for primary industries that reduce risks to consumers and primary industry markets associated with unsafe or unsuitable primary produce.

The *Public and Environmental Health Act 1987* contains provisions for the prevention and abatement of conditions and activities which are or may be unsanitary and hence offensive or dangerous to public health and for the protection of water supplies.

The *River Murray Act 1993* ensures that all reasonable and practicable measures are taken to protect restore and enhance the River Murray in recognition of its critical importance.

8 Glossary

Activity	<p>Includes the storage or possession of a pollutant.</p> <p>Schedule 1 of the <i>Environment Protection Act 1993</i> prescribes activities of environmental significance.</p>
Agricultural product	<p>(for the purposes of the AgVet Act) means and agricultural chemical product or a fertiliser</p>
Agricultural chemical product	<p>(for the purposes of the AgVet Act) has the meaning given by the <i>Agricultural and Veterinary Chemicals Code Act 1994</i> , which states that</p> <ul style="list-style-type: none">(2) Subject to subsections (3) and (4), an agricultural chemical product is a substance or mixture of substances that is represented, imported, manufactured, supplied or used as a means of directly or indirectly:<ul style="list-style-type: none">(a) destroying, stupefying, repelling, inhibiting the feeding of, or preventing infestation by or attacks of, any pest in relation to a plant, a place or a thing; or(b) destroying a plant; or(c) modifying the physiology of a plant or pest so as to alter its natural development, productivity, quality or reproductive capacity; or(d) modifying an effect of another agricultural chemical product; or(e) attracting a pest for the purpose of destroying it.(3) An agricultural chemical product includes a substance or mixture of substances declared by the regulations to be an agricultural chemical product.(4) An agricultural chemical product does not include:<ul style="list-style-type: none">(a) a veterinary chemical product; or(b) a substance or mixture of substances declared by the regulations not to be an agricultural chemical product.
Asbestos	<p>The fibrous form of mineral silicates belonging to the serpentine and amphibole groups of rock-forming minerals, including actinolite, amosite (brown asbestos), anthophyllite, chrysotile (white asbestos), crocidolite (blue asbestos), tremolite or any mixture containing one or more of the mineral silicates belonging to the serpentine and amphibole groups.</p> <p>Asbestos-containing material is any material, object, product or debris that contains asbestos.</p> <p>Friable asbestos means</p> <ul style="list-style-type: none">(a) non-bonded asbestos fabric, or(b) asbestos-containing material that:<ul style="list-style-type: none">(i) is in the form of powder, or(ii) can be crumbled, pulverised or reduced to powder by hand pressure when dry. <p>Non-friable asbestos means asbestos-containing material in which the asbestos fibres are bonded by cement, vinyl, resin or other similar material, eg asbestos cement.</p> <p>Asbestos waste means waste asbestos-containing material (ACM) including all removed ACM, as well as disposable items used during asbestos removal work, such as plastic sheeting and disposable coveralls, respirators and cleaning rags.</p>

Advice on the requirements for handling and transport of this waste can be found in EPA Guideline, Wastes containing asbestos: removal, transport and disposal (2009).

See also Approved Codes of Practice under the Occupational, Health, Safety and Welfare Act 1986.

Background concentrations	(in relation to chemical substances on a site or below its surface) means results obtained from carrying out assessments of the presence of the substances in the vicinity.
Biosecurity waste	<p>Biosecurity is the protection of people, animals, horticultural industries and ecological systems against disease and other biological threats.</p> <p>Biosecurity waste may also be called quarantine waste determined by relevant state authorities (including Primary Industries and Resources SA, Department of Environment and Heritage, and the Department of Water, Land and Biodiversity Conservation) as related to biosecurity including plant and animal health risk and disease or pest control.</p> <p>The Biosecurity Strategy for South Australia aims to protect South Australia's favourable pest and disease status from the increased risk of exotic pest, disease and weed incursions and to maintain and enhance access by South Australian industries to international animal and plant-related markets, <www.pir.sa.gov.au/pirsa/biosecurity>.</p>
Biosolids	<p>Stabilised organic solids derived totally or in part from wastewater treatment processes that can be managed safely to utilise beneficially their nutrient, soil conditioning, energy, or other value. The term biosolids does not include untreated wastewater sludges, industrial sludges or the product produced from the high temperature incineration of sewage sludge. It should also be noted that many other solid waste materials are not classified as biosolids eg animal manures, food processing or abattoir wastes, solid inorganic wastes and untreated sewage or untreated wastes from septic systems/sullage wastes.</p>
Building or Demolition Waste	see Construction and Demolition Waste (Inert)
Chemical substance	Any organic or inorganic substance, whether a solid, liquid or gas (or combination thereof), and includes waste.
Chemical criteria (or contaminant limits)	Chemical substances and their corresponding total (dry weight) chemical concentrations in mg/kg and the leachate concentrations in mg/L.
Commercial and Industrial Waste (C&I)	<p>Commercial and Industrial Waste (General)</p> <p>The solid component of the waste stream arising from commercial, industrial, government, public or domestic premises (not collected as Municipal Solid Waste), but does not contain Listed Waste, Hazardous Waste or Radioactive Waste.</p> <p>Commercial and Industrial Waste (Listed)</p> <p>The solid component of the waste stream arising from commercial, industrial, government, public or domestic premises (not collected as Municipal Solid Waste), that contains or consists of Listed Waste.</p>
Compost	Pasteurised material resulting from the controlled microbiological transformation of compostable organic waste under aerobic and thermophilic conditions for at least six weeks.
Compostable Organic Waste	The biodegradable component of the waste stream that is of biological origin but does not contain any Listed Waste, Radioactive Waste or Hazardous Waste.

Notes:

These organic materials may be processed through composting works to formulate valuable recycled organic products.

Suitability of compostable organic waste as feedstock is dependent on the location, site design, processes and potential to cause environmental harm.

Composting

The controlled process whereby compostable organic wastes are pasteurised and microbiologically transformed under aerobic and thermophilic conditions for a period not less than six weeks including a pasteurisation phase.

Construction and Demolition Waste (C&D)

Construction and Demolition Waste (Inert)

The solid inert component of the waste stream arising from the construction, demolition or refurbishment of buildings or infrastructure but does not contain Municipal Solid Waste, Commercial and Industrial Waste (General), Listed Waste, Hazardous Waste or Radioactive Waste.

Notes:

C&D waste (Inert) should be such that the entire composition of the C&D materials is Inert Waste with no contamination by foreign material. As such it is acknowledged that—with the aim of no contamination—there may be some negligible components of foreign material contained in the waste (as a guide, 0–5% maximum by volume per load). C&D waste (Inert) includes bricks, concrete, tiles and ceramics, steel and inert soils.

Foreign material includes green waste, plastics, electrical wiring, timber, paper, insulation, tins, packaging and other waste associated with construction or demolition of a building or other infrastructure. Foreign material must not be Municipal Solid Waste, Liquid, Listed, Hazardous or Radioactive Waste.

Construction and Demolition Waste (Mixed)

The solid component of waste stream arising from the construction, demolition or refurbishment of buildings or infrastructure which contains some foreign material (as set out below), but does not contain Municipal Solid Waste, Commercial and Industrial Waste (General), Listed Waste, Hazardous Waste or Radioactive Waste.

Notes:

C&D Waste is considered C&D Waste (Mixed) if it contains significant foreign materials from construction and demolition activities that would render the load of waste no longer inert (as a guide, 5–25% maximum by volume per load).

Foreign material includes green waste, plastics, electrical wiring, timber, paper, insulation, tins, packaging and other waste associated with construction or demolition of a building or other infrastructure. Foreign material must not be Municipal Solid Waste, Liquid, Listed, Hazardous or Radioactive Waste.

Where waste from construction and demolition sites contains predominantly foreign materials or domestic waste, such as waste from household clean-ups collected by commercial skip bins, this is defined as Commercial and Industrial Waste (General).

Contaminant*

An element or compound present in a waste derived soil enhancer that has no beneficial effects for the stated purpose of the soil enhancer.

Note: Sorvari *et al* (2008) also states the following: There are several definitions for contaminants in fertilisers. The USEPA defines a contaminant as 'a constituent or component of a fertilizer that is not part of the guaranteed analysis and/or 1) is not a macro-nutrient (primary or secondary), 2) is not a micro-nutrient, 3) is not required for plant nutrition (eg Cd, Pb, As, Hg, radionuclides, dioxins), and 4) may be essential for some plants (and humans) at low levels or in one oxidation state but toxic at higher levels or in a different oxidation state (eg Cr, Ni, V, Cu, Zn)'. Contaminant

constituents are present naturally in inorganic fertilizer ores and in industrial byproducts reprocessed for fertilizers. (USEPA, 1999, *Background Report on Fertilizer Use, Contaminants and Regulations*. National Program Chemicals Division, Office of Pollution Prevention and Toxics, Washington, DC, USA.).

Inorganic contaminants

Includes essential elements, potentially toxic metals, metalloids, radionuclides, rare earth elements, and anionic elements.

Organic contaminants

Pesticides, persistent organic pollutants (eg PCBs, dioxins and furans, PAHs), flocculants, coagulants, surfactants, pharmaceutical and personal care products and known endocrine disruptors (Sorvari *et al* 2008), PAHs, hydrocarbons.

Constituent	Any element or compound in a fertiliser that exerts a beneficial effect. (Sorvari <i>et al</i> 2008)
Dioxin	Any of three unsaturated heterocyclic compounds, two having the formula C ₄ H ₆ O ₂ and the third C ₄ H ₄ O ₂ .
Effluent	(for the purposes of the NRM Act) means domestic wastewater or industrial wastewater.
Endocrine disrupters	Endocrine means a gland having an internal secretion which is poured into blood or lymph eg the thyroid, ovary, pituitary, testis and adrenal glands. These organs or glands secrete hormonal and regulatory substances directly into the circulation and not through a duct. Endocrine disruptors affect the normal function of these glands. Known human endocrine disruptors include PCBs, DDT and hormonally active pharmaceuticals.
Environment	Land, air, water, organisms and ecosystems, and includes— <ul style="list-style-type: none"> (a) human-made or modified structures or areas; and (b) the amenity values of an area.
Environmental harm	(As prescribed in section 5 of the <i>Environment Protection Act 1993</i>) Any harm, or potential harm, to the environment (of whatever degree or duration) and includes: <ul style="list-style-type: none"> (a) an environmental nuisances; and (b) anything declared by regulation (after consultation under section 5A) or by an environment protection policy to be environmental harm.
Fertiliser Contaminant Trigger Value (FCTV)	The FCTVs are the highest concentration of contaminants in mineral fertiliser ingredients and industrial residues used in Australia that will not, after 100 years of application to agricultural soil, lead to exceedances of the benchmarks in any of the assessed environmental compartments. (Sorvari <i>et al</i> 2009)
Furan	A heterocyclic compound having a five-membered ring, (CH) ₄ O, and isolated as a colourless liquid with an ethereal odour.
Green waste	The vegetative portion of the waste stream arising from various sources including waste from domestic and commercial premises, and municipal operations.
Hazardous Waste	Listed waste having a characteristic described in schedule A list 2 of the <i>National Environment Protection (Movement of controlled waste between States and Territories) Measure</i> . <i>Note:</i> <i>Hazardous Waste includes any unwanted or discarded material (excluding radioactive material), which because of its physical, chemical or infectious characteristics can cause significant hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed.</i>

Industrial Residues	Wastes and residual materials from industrial or manufacturing processes, including waste processing. Sometimes called by-products or secondary materials, and includes Commercial and Industrial Waste (Listed).
Inert Waste	Solid waste that has no active chemical or biological properties. These wastes do not undergo environmentally significant physical, chemical or biological transformation and have negligible potential to cause environmental harm.
Inorganic soil enhancers or fertilisers*	Waste derived soil enhancers which do not have carbon as the essential component of its basic chemical structure.
Liquid Waste	Waste classified as liquid waste in accordance with the assessment process set out in the EPA Guideline, <i>Liquid waste classification test</i> (2003). <i>Note: Liquid waste includes any waste that is liquid at 20°C regardless of whether or not it is packaged or otherwise contained, and irrespective of whether or not the packaging or container is to be disposed of together with the liquid that it contains.</i>
Listed Waste	means wastes listed in Part B of Schedule 1 of the Environment Protection Act 1993.
Metalloids	Any of a group of chemical elements having some, but not all, of the typical properties of the metals. Also called <i>semi-metal</i> . Typical elements include arsenic, silicon, germanium and tellurium.
Mulch	Dry green waste that has been processed by way of chipping, shredding or similar mechanical process, but does not contain putrefying material. <i>Note: The Australian Standard 4454–2003 for Composts, soil conditioners and mulches, specifies properties for mulch including the need to be pasteurised. Pasteurisation reduces the risks from pathogens and plant propagules.</i>
Municipal Solid Waste	Municipal Solid Waste–Domestic sources The solid component of the waste stream arising from domestic premises that is received directly from the public. It is not received as Municipal Solid Waste–Kerbside bin collection. Municipal Solid Waste–Hard Waste The solid component of the waste stream arising from domestic premises which is not suitable for collection using a kerbside bin system, but does not contain Commercial and Industrial Waste (General), Listed Waste, Hazardous Waste, Radioactive Waste or waste that is not deemed suitable for collection by local councils. <i>Note: MSW (Hard Waste) is typically collected in campaigns by local councils, which also advise on what wastes are suitable for that collection.</i> Municipal Solid Waste–Kerbside bin collection The solid component of the waste stream arising from mainly domestic but also commercial, industrial, government and public premises including waste from council operations, services and facilities that is collected by or on behalf of the council via kerbside collection, but does not contain Commercial and Industrial Waste (General), Listed Waste, Hazardous Waste or Radioactive Waste.
Oestrogens	Any of a group of naturally occurring hormones and synthetic compounds that are capable of regulating sexual development and function in female vertebrates.

Organic waste derived soil enhancers or fertilisers*	Soil enhancers with carbon as the essential component and they cover agricultural wastes, composts and manures which do not contain industrial residues.
Pasteurisation	A process whereby organic materials are treated to significantly reduce the numbers of plant and animal pathogens, and plant propagules
Pasteurised product	An organic product that has undergone pasteurisation but is relatively immature and lacking in stability.
Pathogen	A micro-organism that causes disease.
Persistence	The ability of a chemical to resist degradation in the environment, eg in soil, air, water, sediment. Persistence is generally measured as a half-life, ie the length of time required to halve the concentration of a chemical in a particular environmental compartment. (Sorvari <i>et al.</i> 2008)
Pollutant	<p>(a) any solid, liquid or gas (or combination thereof) including waste, smoke, dust, fumes and odour; or</p> <p>(b) noise; or</p> <p>(c) heat; or</p> <p>(d) anything declared by regulation (after consultation under section 5A) or by an environment protection policy to be a pollutant,</p> <p>but does not include anything declared by regulation or by an environment protection policy not to be a pollutant.</p>
Pollute	<p>(a) discharge, emit, deposit or disturb pollutants; or</p> <p>(b) cause or fail to prevent the discharge, emission, depositing, disturbance or escape of pollutants,</p> <p>and pollution has a corresponding meaning.</p>
Potentially Contaminating Activities	As prescribed in the <i>Environment Protection Regulations 2009</i> .
Prion	An abnormally folded, protease-resistant protein which forms aggregates in the brain, in the spongiform encephalopathies [brain diseases] and certain other neurodegenerative disorders, can be transmitted between individuals, and is thought to propagate itself by inducing the abnormal conformation in a normal form of the protein. (Protease is an enzyme that degrades proteins or polypeptides by hydrolysing peptide bonds.)
Putrescible waste	<p>The component of the waste stream liable to become putrid.</p> <p><i>For example, organic matter which has the potential to decompose with the formation of malodorous substances; usually refers to vegetative, food and animal products.</i></p>
Quarantine Waste	<p>Quarantine Waste means material or goods of quarantine concern as determined by the Australian Quarantine and Inspection Service (AQIS) and which is subject to and or identified under Commonwealth Legislation (<i>Quarantine Act 1908</i>) and associated regulations and proclamations. This includes:</p> <p>(a) material used to pack and stabilise imported goods</p> <p>(b) galley food and other waste from overseas vessels</p>

- (c) human, animal or plant waste brought into Australia
- (d) refuse or sweepings from a hold of an overseas vessel
- (e) any other waste or other material, which comes into contact with Quarantine Waste
- (f) contents of AQIS airport amnesty bins
- (g) articles seized by AQIS and/or not collected by clients.

Quarantine Act 1908

www.austlii.edu.au/au/legis/cth/consol_act/qa1908131.txt/cgi-bin/download.cgi/download/au.legis/cth/consol_act/qa1908131.rtf

Quarantine Regulations 2000

www.comlaw.gov.au/comlaw/Legislation/LegislativeInstrumentCompilation1.nsf/0/DA413F48F8983E81CA257472007FAF66?OpenDocument

Radioactive Waste Any radioactive substance in the form of a solid, liquid or gas (or combination thereof) that is left over, surplus or an unwanted by-product from any business or domestic activity, whether of value or not, but excluding the following:

- (a) substances to which the regulations under the *Radiation Protection and Control Act 1982* do not apply
- (b) substances which have been exempted from regulatory control under provisions of the Radiation Protection and Control Act
- (c) material containing activities or activity concentrations of radioactive elements below the exemption levels specified in the *National Directory for Radiation Protection* published by the Australian Radiation Protection and Nuclear Safety Agency.

Radionuclides A radioactive nuclide:

Note: a nuclide is:

- 1 an atomic species which is characterised by its mass number, atomic number, and energy state.
- 2 any individual atom of such a species.

Scheduled waste A material or article containing a chemical, or mixture of chemicals, exceeding the threshold concentration and threshold quantity (see the relevant specific scheduled waste management plan), which is:

- organic in nature;
- resistant to degradation by chemical, physical or biological means;
- toxic to humans, animals, vegetation or aquatic life;
- bioaccumulative in humans, flora and fauna; and
- listed on Schedule X.

Note: For scheduled wastes, their management plans and Schedule X, refer to Australian Department of Environment, Water, Heritage and the Arts,

www.environment.gov.au/settlements/chemicals/scheduled-waste/index.html.

Site contamination (in accordance with section 5B of the *Environment Protection Act 1993*)

(1) For the purposes of this Act, **site contamination** exists at a site if—

- (a) chemical substances are present on or below the surface of the site in concentrations above the background concentrations (if any); and

- (b) the chemical substances have, at least in part, come to be present there as a result of an activity at the site or elsewhere; and
- (c) the presence of the chemical substances in those concentrations has resulted in—
 - (i) actual or potential harm to the health or safety of human beings that is not trivial, taking into account current or proposed land uses; or
 - (ii) actual or potential harm to water that is not trivial; or
 - (iii) other actual or potential environmental harm that is not trivial, taking into account current or proposed land uses.

(2) For the purposes of this Act, environmental harm is caused by the presence of chemical substances—

- (a) whether the harm is a direct or indirect result of the presence of the chemical substances; and
- (b) whether the harm results from the presence of the chemical substances alone or the combined effects of the presence of the chemical substances and other factors.

(3) For the purposes of this Act, site contamination does not exist at a site if circumstances of a kind prescribed by regulation apply to the site.

Site contamination audit (for the purposes of this standard) means a review carried out by a person that—
is for the purpose of determining all of the following matters:

- (i) the nature and extent of any site contamination present or remaining on or below the surface of the site;
- (ii) the suitability of the site for a sensitive use or another use or range of uses;
- (iii) what remediation is or remains necessary for a specified use or range of uses.

Site contamination auditor (for the purposes of this standard)
means a person accredited under Division 4 of Part 10A [of the Act or Amendment Act] as a site contamination auditor.

Site contamination audit report (for the purposes of this standard) in relation to a site contamination audit, means a detailed written report that—

- (a) sets out the findings of the audit and complies with the guidelines from time to time issued by the Authority; and
- (b) includes a summary of the findings of the audit certified, in the prescribed form, by the site contamination auditor who personally carried out or directly supervised the audit.

Site contamination audit statement (for the purposes of this standard) in relation to a site contamination audit, means a copy (that must comply with the regulations) of the summary of the findings of the audit certified, in the prescribed form, by the site contamination auditor who personally carried out or directly supervised the audit.

Site contamination consultant (for the purposes of this standard) means a person other than a site contamination auditor who, for fee or reward, assesses the existence or nature or extent of site contamination.

This person must be suitably independent, qualified and experienced in the undertaking of such assessments, and the assessment for the purposes of this standard will include potential for causing harm including site contamination.

Soil Enhancer or Fertiliser*	means— <ul style="list-style-type: none">(a) a substance that is manufactured, represented, supplied or used as a means of directly or indirectly—<ul style="list-style-type: none">(i) fertilising the soil; or(ii) supplying nutrients to plants; or(iii) conditioning the soil by altering the chemical, physical or biological composition of the soil; or(b) a substance declared by regulation to be a fertiliser, but does not include a substance excluded by regulation from the ambit of this definition.
Solid Waste	Any waste that is not gaseous and is not a Liquid Waste as determined by EPA Guideline, <i>Liquid waste classification test</i> (2003).
Waste	As defined under the <i>Environment Protection Act 1993</i> , Waste means— <ul style="list-style-type: none">(a) any discarded, rejected, abandoned, unwanted or surplus matter, whether or not intended for sale or for recycling, reprocessing, recovery or purification by a separate operation from that which produced the matter; or(b) anything declared by regulation (after consultation under section 5A) or by an environment protection policy to be waste, whether of value or not.
Waste Activated Sludge	means excess activated sludge that is extracted from the process dealing with the treatment of sewage or industrial wastewaters.
Watercourse	(for the purposes of the NRM Act) means a river, creek or other natural watercourse (whether modified or not) in which water is contained or flows whether permanently or from time to time and includes— <ul style="list-style-type: none">(a) a dam or reservoir that collects water flowing in a watercourse;(b) a lake through which water flows;(c) a channel (but not a channel declared by regulation to be excluded from the ambit of this definition) in to which the water of a watercourse has been diverted;(d) part of a watercourse;(e) an estuary through which water flows;(f) any other natural resource, or class of natural resource, designated as a watercourse for the purposes of this Act by an NRM plan.

* These definitions were based on definitions sourced from the *Methodology to assess the impacts of contaminants in fertilisers and fertiliser Ingredients, including industrial residues*.

Appendix 1 Water protection areas in South Australia

Proclaimed by the Governor in accordance with section 61A of the *Environment Protection Act 1993*.



WATER PROTECTION AREAS

 BAROOTA, 1	 MIDDLE RIVER, 6	 PARA WURLIE, 11	 ROBINSON BASIN, 16	 THULINPIE, 21
 CARRIBIE, 2	 MOUNT LOFTY RANGES, 7	 PENONG, 12	 SHERINGA, 17	 TOD RIVER, 22
 EYRE PENINSULA SOUTHERN BASINS, 3	 NEVER NEVER CREEK, 8	 POLDA, 13	 SOUTH EAST, 18	 TOOKAYERTA CREEK, 23
 KAPPAWANTA AND BRAMFIELD BASINS, 4	 NORTH PARA, 9	 PORT KENNY, 14	 SPRING CREEK, 19	 VENUS BAY, 24
 MARION, 5	 NORTH WEST RIVER, 10	 RIVER MURRAY, 15	 TALIA, 20	 BEETALOO, 25

Appendix 2 Waste sampling and assessment

Sampling programs should be based on standardised, scientifically valid procedures and methodologies. The design of the program should account for factors such as waste volume and heterogeneity, and knowledge of the activity and level of consistency of the process from which the waste is produced. This includes prior use or treatment of the waste, as well as the difference between the sample concentration and the appropriate criteria.

A sampling program developed by a suitably qualified and experienced person will be required for EPA licensees seeking approval of Type B WDSE proposals. This person should be independent of the organisation. However if the organisation has a person with the relevant expertise, this may be acceptable.

Type A WDSE proposals may be required to submit sampling plans as part of documents such as irrigation management plans or biosolids application to land.

To ensure sound scientific practices are used, peer review by a separate research group eg CSIRO or university-based research group, may be required including where pilot trials are being used to prove suitability.

When designing a sampling program and selecting a testing laboratory, the following information must be addressed.

Waste characterisation

The sampling methodology for characterising waste (and waste derived products) must be representative of the entire waste stream, and must accurately and reliably characterise the waste (or waste derived product).

Guidance on sampling plans, QA/QC and statistical assessment is set out in Schedule B(2) of the Site Contamination NEPM⁷⁶.

Number of samples

The number of samples to be collected should be determined on a case-by-case basis, based on investigation of the proposed site and the process producing the waste as applicable. The chemical composition of the WDSE based on a specification and control of the waste materials used to produce it should be well understood for full characterisation.

For industrial residues, a minimum sampling rate should be one sample per 250 m³, with a minimum of five samples. However, the variability over time of that waste and process producing the waste must be considered when determining the appropriate number of samples that will accurately characterise the waste.

⁷⁶ The following documents may provide useful guidance on sampling:

- Australian Standard 1141 series: *Methods for sampling and testing aggregates*.
- *Sampling and analysis of waters, wastewaters, soils and wastes*, EPA Victoria, <[http://epanote2.epa.vic.gov.au/EPA/publications.nsf/2f1c2625731746aa4a256ce90001cbb5/d90f1ae51cb8f7a2ca2575df002086bd/\\$FILE/IWRG701.pdf](http://epanote2.epa.vic.gov.au/EPA/publications.nsf/2f1c2625731746aa4a256ce90001cbb5/d90f1ae51cb8f7a2ca2575df002086bd/$FILE/IWRG701.pdf)>
- *Solid industrial waste sampling*, EPA Victoria, <[http://epanote2.epa.vic.gov.au/EPA/publications.nsf/2f1c2625731746aa4a256ce90001cbb5/761d5e4ebc793c00ca2575e4002ee920/\\$FILE/IWRG703.pdf](http://epanote2.epa.vic.gov.au/EPA/publications.nsf/2f1c2625731746aa4a256ce90001cbb5/761d5e4ebc793c00ca2575e4002ee920/$FILE/IWRG703.pdf)>
- *Soil sampling*, EPA Victoria, <[http://epanote2.epa.vic.gov.au/EPA/publications.nsf/2f1c2625731746aa4a256ce90001cbb5/744c1556fb57f75dca2575e4002d81c4/\\$FILE/IWRG702.pdf](http://epanote2.epa.vic.gov.au/EPA/publications.nsf/2f1c2625731746aa4a256ce90001cbb5/744c1556fb57f75dca2575e4002d81c4/$FILE/IWRG702.pdf)>

Note: All sampling needs to be conducted by an independent, suitably qualified and experienced environmental consultant with the relevant expertise.

Duplicate samples

A minimum of one internal-laboratory field duplicate and one external-laboratory field duplicate per 20 primary samples (or part thereof) is recommended. However, further advice on sampling QA/QC is available in Schedules B(2) and B(3) of the Site Contamination NEPM.

Composite sampling (not recommended)

The EPA does not recommend composite sampling for heterogenous waste streams. The use of composite sampling may be acceptable in situations where waste is from a single source and has been shown by previous sampling and analysis to be homogeneous (refer EPA guideline, *Composite soil sampling in site contamination assessment and management 2005*).

Composite sampling should not be used for sampling when volatiles are known, likely or suspected to be present.

Laboratory selection

All analyses must be conducted by a laboratory that is accredited by the National Association of Testing Authorities (NATA) for the requisite test methods where available. Where NATA accredited test methods are not available, a laboratory with an acceptable QA/QC program such as from the Australasian Soil and Plant Analysis Council (ASPAC) may be used <www.aspac-australiasia.com>.

The detection limits of the testing laboratory need to be sufficiently below the criteria listed in this standard for confidence in the results. If detection limits are above the standard criteria then that detection limit will be considered as the result for the analyte in question.

Chemical analysis

The WDSE and the waste used as components of WDSE must be analysed for all chemical substances that are reasonably expected to be present. This is based on knowledge of that waste including the expected variability, provided there is sufficient knowledge and homogeneity in that waste stream and process producing it (based on a desktop assessment documenting the waste generation process and potential sources of chemical substances and contaminants). If contaminants are unknown, a broad analysis needs to be conducted. Consideration is required for those substances listed in part B of Schedule 1 of the EP Act as well as any contaminants listed in Table 1 that are likely to be present.

Frequency of sampling

Initially, the WDSE and the waste used as components of WDSE should be regularly and thoroughly tested to gain confidence in its consistency of composition. Depending on the results of the initial assessment, a more limited ongoing assessment program may be suitable if there is confidence in the consistency as well as in the process producing the waste over time.

Assessment and reporting of results

All assessment of results needs to be conducted by an independent, suitably qualified and experienced environmental consultant or auditor as required, with the relevant expertise.

Statistical assessment of the data

Statistical evaluation using 95% Upper Confidence Limit (UCL) calculations can be used on test results from representative sampling if some samples exceed the chemical concentration criteria. The 95% UCL demonstrates with

95% certainty that the 'true' mean contaminant concentration will not exceed the value determined by this method. The Site Contamination NEPM including Schedule B(7a), also has advice on statistical assessment which has been included in the points below. There is guidance on sampling plans and statistical assessment of sites provided in sections 4 and 6 of Schedule B(2) of the Site Contamination NEPM, which can also be referred to for sites being assessed accordingly.

If a proponent wants to use a statistical assessment, the following conditions must be met:

- the statistical assessment must only be used where there has been adequate characterisation of a site or waste, eg systematic grid sampling or stockpile sampling in accordance with Australian standards and guidance provided in the Site Contamination NEPM
- the relevance of elevated values must be considered and should not be obscured by consideration only of the arithmetic mean
- if using a statistical method to determine disposal requirements, it needs to be calculated for each contaminant of concern
- statistics need to include:
 - the 95% UCL estimation of the mean
 - the standard deviation of the results (which must be less than 50% of the stated maximum total dry weight concentration criteria)
 - the maximum value obtained during sampling (no single value can be greater than 250% of the maximum total dry weight concentration criteria).

Additional guidance on sampling design and statistical assessment can be found in:

- *Contaminated sites: Sampling design guidelines* (NSW EPA 1995)
- *Sampling and analysis of waters, wastewaters, soils and wastes* (EPA Victoria 2009)
- *Solid industrial waste sampling* (EPA Victoria 2009)
- *Soil sampling* (EPA Victoria 2009)
- ISO 11648-1:2003: *Statistical aspects of sampling from bulk materials*

Appendix 3 Checklist

• Support for the waste hierarchy—no other practical higher order reuse or waste avoidance (3.1)	<input type="checkbox"/>
• Identification of an immediate market (3.2)	<input type="checkbox"/>
• Risk based approach—risk has been assessed (including destination site) (3.3)	<input type="checkbox"/>
• Prevent environmental harm—assured avoidance or minimised risk of harm to the environment or human health (3.4)	<input type="checkbox"/>
• Beneficial purposes—benefit has been demonstrated (3.5)	<input type="checkbox"/>
• Process does not involve dilution (3.6)	<input type="checkbox"/>
• No prohibited wastes used in WDSE (4.1)	<input type="checkbox"/>
• Characteristics of the WDSE and the waste sources assessed—scientifically valid and robust sampling used, all chemical substances reasonably expected to be in the waste tested for and sampling done in accordance with Appendix 2	<input type="checkbox"/>
• Details of WDSE source, destination and relevant stakeholders are identified as required	<input type="checkbox"/>
• WDSE specification is known, consistent and fit for purpose	<input type="checkbox"/>
• Relevant plans and reports have been produced and, where required, submitted to the EPA	<input type="checkbox"/>
• Roles and responsibilities of producer, transporter and user are clearly defined	<input type="checkbox"/>
• Necessary approvals sought prior to commencing a WDSE activity	<input type="checkbox"/>
• In compliance with other legislation	<input type="checkbox"/>