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Environment Protection and Heritage Council

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**Guidance for Assessing the Beneficial Reuse
of Industrial Residues to Land Management
Applications - A National Approach**

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NOTE

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GLOSSARY

COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEH	Department of the Environment and Heritage
EPA	Environment Protection Agency/ Authority
EPHC	Environment Protection and Heritage Council
EPHSC	Environment Protection and Heritage Standing Committee
FWG	Fertiliser Working Group
IRWG	Industrial Residues Working Group
NATA	National Association of Testing Authorities
NSW DEC	NSW Department of Environment and Conservation
PIMC	Primary Industries Ministerial Council
PSIC	Product Safety and Integrity Committee

INTRODUCTION

Industrial residues (by-products) arise largely from the processing and use of minerals from heavy industries such as mining, refining, metal production and coal fired power generation. Their production in Australia can run into the hundreds of millions of tonnes each year and they can be used in a variety of applications including as fertilisers, soil conditioners, stock feeds, fill, road base, input to cement and concrete products and to provide energy recovery.

Because of the potential benefits that these materials possess, interest in reusing industrial residues in land management applications has increased. However, over time concerns have been raised about the risks posed by the potential presence of some contaminants of concern such as heavy metals (i.e. cadmium, arsenic, copper, mercury, zinc, chromium, selenium, and lead) and Persistent Organic Pollutants (i.e. Polycyclic Aromatic Hydrocarbons and Polychlorinated Biphenyls) in these materials at levels which may alter the chemistry of the soil, cause pollution of groundwater, and be retained and later released as soil degrades over time.

Impacts on sustainable agriculture due to the reuse of industrial residues may include changes to pH levels of soils, alteration to soil microfauna and flora which in turn may reduce soil fertility, uptake of contaminants by plants, and the transfer and bioaccumulation of contaminants to other biota.

Conversely, materials of this nature may be of benefit to mineral deficient soils by improving water holding capacity and soil structure. The use of industrial residue in land management applications can also contribute to a reduction of waste materials going to landfill. If suitable industrial residue reuse is identified and there is a structured regulatory system in place to ensure consistency of the material over time, this approach may also assist governments to deliver desired waste management solutions.

Many jurisdictional legislative controls regarding fertilisers were originally implemented to address contaminants or environmental impacts from more traditional fertiliser products. Legislation is now generally moving towards being able to account for the potentially greater range of contaminants that may be introduced into the environment from waste derived fertilisers. State and Territory environment legislation, to date, generally covers impacts from fertilisers/soil conditioners via broad 'environmental harm' offence powers (e.g. pollution of water bodies), controls on specific contaminants, or in some instances through licensing the land application of some higher risk waste materials.

While environment agencies can provide controls over the application of industrial residues to land, community concerns have also been raised about the paucity of relevant policy and regulatory frameworks in place, the differences in jurisdictional assessment of these materials, the responsibility between agencies and jurisdictions, the lack of environmental data and the lack of national standards for contaminants of concern. These materials may present an unknown but potentially significant level of risk for the environment, human health and agriculture.

This national approach focuses on the application of industrial residues to land, particularly agricultural applications. The approach concentrates on closing the gaps in the 'front end' of the system by providing a common and consistent approach across jurisdictions in determining whether industrial residues should be allowed to be diverted from landfill and applied to land.

LINKAGES WITH THE MANAGEMENT OF FERTILISERS

The Primary Industries Ministerial Council (PIMC) recognised the need to look into the management of fertilisers, as many of the industrial residues (by-products) being applied to land at the time of

heightened public concern, were deemed to be fertilisers. The PIMC asked a government working group to look at the differences in the definitions of fertilisers across jurisdictions; to identify contaminants of concern and standards/guidelines for these; and to develop a national product label standard for fertiliser and soil ameliorants.

A nationally consistent definition for a fertiliser was developed. The definition states that a fertiliser is:

a substance that is manufactured, represented, supplied or used as a means of directly or indirectly fertilising the soil; supplying nutrients to plants; conditioning the soil by altering the chemical, physical or biological composition of the soil; or a substance declared by regulation to be a fertiliser.

This definition will be incorporated into state and territory fertiliser legislation. To date, three states have this definition in place, the remaining states and territories will follow.

The PIMC is aiming for greater national uniformity through harmonised fertiliser quality standards among all Australian jurisdictions. In delivering the above, the PIMC has undertaken a study that focused on environmental, food safety, public health, trade and agricultural sustainability concerns and identified a list of substances which should be banned from being applied to land, those that should be controlled (maximum permissible concentrations) and the approaches in determining these guidelines. The reference document -“Background and scope for establishing a list of prohibited substances and guideline limits for levels of contaminants in fertilizers” can be found at <<http://www.clw.csiro.au/publications/consultancy/2005/contaminants-in-fertilizers-CECR.pdf>>

The development of a national standard and guidelines for an agreed list of contaminants in fertilisers and soil conditioners as well as an agreed list of prohibited substances is an important starting point for jurisdictions to deliver frameworks which protect agriculture, the environment and human health from the potential impacts of industrial residue application.

The PIMC is also aiming to achieve a national standard for minimum label information on fertilisers to ensure that specifications and labelling requirements for chemical fertilisers are consistent across Australia. Fertiliser and soil conditioner product labels should contain accurate and appropriate information about the product and provide adequate instructions for the safe use of the product, including advice about uses that could lead to adverse impacts.

Accordingly, product description and labelling laws have been passed by jurisdictions to ensure that fertilisers contain defined levels of nutrients and to disclose some of the contaminants in these products.

Suppliers of fertilisers are also bound by fair trading practices in making claims on the effectiveness of their products, the level of nutrients and whether the nutrients are bioavailable.

- The work of the PIMC interlinks with this national approach. The information generated will assist state and territory environment agencies in their decision making processes, as it will focus on those materials or substances that should be prohibited ingredients in fertilisers. It will also ensure those materials or substances that pose a low and high potential risk if present in fertiliser, have appropriate guideline limits and/or loadings for them. The work on substances and contaminants in fertilisers will also aim to deliver a transparent and traceable evaluation process, which would provide the basis for future amendments or additions as new data become available or new developments occur.
- As fertiliser legislation across jurisdictions only addresses the manufacture and sale of mineral fertilisers, with most jurisdictions prescribing labelling requirements and compositional standards, it is imperative that the two systems work together to deliver a seamless outcome.

SECTION A: GUIDANCE FOR ASSESSING THE BENEFICIAL REUSE OF INDUSTRIAL RESIDUES TO LAND MANAGEMENT APPLICATIONS

PURPOSE

The purpose of this national approach is to provide nationally consistent guidance on the use of industrial residues (by-products), in a way which:

- applies sound scientific knowledge, quality assurance, management and evaluation processes, risk management and compliance processes and penalties
- ensures the environmental and economic benefits are maximised
- is beneficial and does not cause harm to the environment, human health or agriculture.

PRINCIPLES

The national approach will be achieved through applying the following principles:

- the application of industrial residues to land is in accordance with the principles of Ecologically Sustainable Development
- the reuse and recycling of industrial residues are consistent with the concepts of the Waste Management Hierarchy (i.e. waste avoidance, reduction, reuse, recycling, treatment and disposal)
- the reuse and recycling of industrial residues to land occur only if they are beneficial and does not cause harm to the environment, human health or agriculture
- state and territory agencies integrate into existing policy and regulatory frameworks the guidance provided by the criteria and general information of this document to ensure a consistent and common approach in determining “if industrial residues are fit for reuse to land”
- the reuse and recycling of industrial residues only proceed with the involvement of stakeholders, and through the provision of information and transparency in decision-making as stated in the Council of Australian Government’s (COAG) Principles and Guidelines for National Standard Setting and Regulatory Action.

Implementation

The national approach shall be used as a guiding tool by all the state and territory environment agencies and applied against their existing regulatory frameworks. The national approach applies to the release and management of materials generated by, but not limited to the following:

- Bauxite residue (i.e. red mud)
- Steel slag
- Blast furnace slag
- Sewage ash
- Fly ash and bottom ash
- Clay slimes
- Quarry fines
- Industrial lime
- Gypsum.

There are other materials (such as biosolids, grease trap waste, food processing waste, abattoir residues, manures, crop residues and green-waste, forestry residues and biomass, processed municipal solid waste, construction and demolition waste (but not plasterboard), materials used for ‘waste to energy’ purposes e.g. tyres to cement kilns, materials sent to landfill, mining residues or overburden retained on site and stockfeed) which have not been considered under this approach. Whilst the general principles may still apply, it is appropriate that enquires and/or proposals to re-

use or recycle materials listed above should be handled through the appropriate state and territory environment agency.

Interested stakeholders may include, but are not limited to, industrial residue generators (i.e. industry owners and/or operator personnel); collectors and transporters of industrial residues, re-processors, landholders, government agencies, community groups, and local government.

Review and effectiveness period

The national guidance document should be reviewed and evaluated for its effectiveness not more than three years after initial introduction.

The review shall consider information made available through State and Territory environmental agencies as well as stakeholders, including industry.

SECTION B:

NATIONALLY CONSISTENT CRITERIA FOR DETERMINING THE BENEFICIAL REUSE OF INDUSTRIAL RESIDUES

A nationally consistent approach to the assessment of industrial residues to land management applications aims to provide appropriate protection of the environment while providing greater certainty to industry.

The following broad criteria will provide the basis for considering proposals to re-use and recycle industrial residues to land. Where a material has been identified as being suitable for use, materials must comply with maximum levels and concentrations prescribed under the appropriate state and territory legislation.

Should the waste not be considered fit for use under these criteria, it will be managed as appropriate under the jurisdiction's applicable waste management legislation.

CRITERIA FOR ASSESSING PROPOSALS TO RE-USE AND RECYCLE INDUSTRIAL RESIDUES TO LAND

1. Is there a demonstrated benefit to growing plants (including agriculture, forestry, landscaping or environmental rehabilitation)?
2. Does a practical higher order use exist for the material (in the context of the Waste Management Hierarchy)? For example, could the waste be used as an input to another industrial process or could its generation be avoided.
3. Will the material cause harm if applied to land? In particular, what is the harm to agriculture, the environment and human health arising from any contaminants that are likely to be in the waste material. To meet this criterion satisfactorily, any limitations or constraints arising from the specific receiving environment(s) must be identified (e.g. impact on an adjacent environmentally sensitive site, particular impact in relation to type(s) of soil/plant/agricultural system).
4. Has the generator fully characterised the material from a land application perspective, including identifying its nature and composition and the potential contaminants (given the proposed application) that are likely to be in the material?
5. What other existing guidelines, standards, specifications or agreed conditions apply to the material to ensure the material is of an appropriate quality, consistency and will not cause harm? Note: the material should not be diluted (*materials shall not be mixed with other substances to meet the contaminant limits*), in order to meet any relevant specifications, guideline levels or conditions.
6. Have measures been identified to mitigate or eliminate any potential environmental impact(s)?
7. Is the proponent/receiver able to manage any residual materials, i.e. for materials not proposed for offsite use or proposed for use on a specific site?
8. Is there potential for environmental harm, other than that caused by contaminants in Criteria 3 above, such as dust, odour and noise (in relation to the application to land)?
9. Is there evidence of the proponent's and applicator's (if different from the proponent) appropriate environmental performance, i.e. demonstration of a fit and proper person?

Note: These are broad criteria which provide the basis for assessment. The actual criteria that will need to be considered will depend on the specifics of the proposal received.

SECTION C: INFORMATION REQUIRED TO SUPPORT DECISION MAKING

The following information is to be provided by the proponent and should be used to support the consideration of a proposal to apply industrial residues to land. All information provided in the proposal would be assessed by the appropriate state and territory environment agency against the criteria above. Where an application is made for a material to be used across a wide range of land management applications (e.g. soil types or land management contexts), proponents should consult with the state and territory environment agency on the additional information requirements.

SUPPORTING INFORMATION THAT IS NEEDED FROM PROPONENTS TO SUPPORT NATIONALLY CONSISTENT CRITERIA

1. Details of Industrial Residue Generator. For example:
 - Company name
 - Address
 - Phone number
 - ABN (if applicable)
 - Contact person
2. Details of the proponent/receiver (the proponent and the receiver may, in some instances, be different)
 - Company name
 - Address
 - Phone number
 - ABN (if applicable)
 - Contact person.
3. Outline of the proposal (e.g. proposed application of fly ash to pasture in the Goulburn Valley to improve the water holding capacity of the soil).
4. Details of the benefits in applying the material (i.e. how the use of the material will improve or assist plant growth).
5. Details on generation, transport, storage and any treatment/processing of the material including consistency of supply and composition.
6. Details on quantity of the material to be applied.
7. Details of quality assurance and quality control processes to ensure application of the material will not cause environmental harm or harm to humans and/or animals.
8. Typical properties of the material and identification of concentration/quantity of contaminants (note that all analyses must be conducted at a National Association of Testing Authorities (NATA) or equivalent accredited laboratory).
9. Information on method of application and recommended rates of application.
10. Description of the site/land contexts where the material will be applied including proximity to environmentally sensitive areas, soil type and composition and other site/land context specific characteristics. Where the proposal is for general application rather than in specific receiving environments, the assessment would also need to determine whether there are certain receiving environments in which the application is likely to be harmful.
11. Details of any existing or proposed industry standards, codes of practice, specifications, agreements and/or environmental management plans with which the application will comply.
12. Details of any proposed monitoring and reporting.
13. Details of any completed or proposed stakeholder consultation.

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