General beneficial use approval for Foundry sand

Waste Reduction and Recycling Act 2011
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Version history

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description of changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>August 2015</td>
<td>Original document</td>
</tr>
<tr>
<td>1.01</td>
<td>16 August 2016</td>
<td>Added publication numbers (ESR/2016/2232 for this document) and effective date.</td>
</tr>
</tbody>
</table>
Explanatory statement

This notice of a general approval for foundry sand has been issued by the Department of Environment and Heritage Protection (the department) in accordance with section 163 of the Waste Reduction and Recycling Act 2011 (WRR Act).

This general beneficial use approval (BUA) states the conditions for using foundry sand in certain beneficial uses. It supports the vision of Queensland’s Waste Avoidance and Resource Productivity Strategy (2014-2024) for Queensland to become a national leader in avoiding unnecessary consumption and waste generation—by adopting innovative resource recovery approaches and managing all products and materials as valuable and finite resources.

If you wish to use foundry sand for a purpose other than what is provided for in this approval, an application for a specific BUA can be made for that use. If you wish to use foundry sand as an additive in manufacturing compost or soil products and the conditions of this approval cannot be complied with, an application to conduct environmentally relevant activity (ERA) 55 for regulated waste recycling or reprocessing under the Environmental Protection Act 1994 (EP Act) is to be made. Information on making an application to conduct an ERA can be found on the Queensland Government's Business and Industry Portal www.business.qld.gov.au.

If foundry sand is not being used in accordance with this approval, or another type of permit that allows for its use, it is a waste and must be disposed of appropriately at a facility that is lawfully able to receive it.

Legislative framework

Waste is defined in the EP Act as including anything that is left over, or an unwanted by-product, from an industrial, commercial, or domestic activity. There are a range of requirements that are placed on the management of waste depending on its type or composition.

The waste and resource management hierarchy needs to be considered when determining your options for managing waste. Reusing a waste is one of the preferred management options, second only to avoiding or reducing the amount of waste generated. Waste and recovered resources should also be managed as close to the source of generation as possible.

Under the WRR Act, a waste can be approved for reuse as a resource if the chief executive of the department (the chief executive) considers that it has a beneficial use other than disposal. If a waste is approved as a resource, it is no longer considered a waste for the purposes of the EP Act. These approvals are commonly called beneficial use approvals (BUAs).

Approval types

There are two types of BUAs—a general approval and a specific approval.

This notice of an approval is a general approval. A general approval has clear standards which, if complied with, do not require individual assessment by the department. Anyone can operate under this type of approval provided they are using the resource in accordance with the conditions of the approval. There is no need to apply to the

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1 In order of most preferable to least preferable – Avoid or reduce, Reuse, Recycle, Recover energy, Treat, Dispose (s. 9 of the WRR Act)
department to be able to operate under the approval however there are requirements in the conditions for certain persons to notify the department that they intend to operate under the approval.

A specific approval is applied for by a person and the department conducts an individual assessment of the proposal. Only the holder of that approval can operate under it once approved. You can find more information on specific approvals in the department’s guideline Approval of a resource for beneficial use (ESR/2016/1626)².

Both general and specific BUAs include conditions that are considered necessary and desirable to ensure the waste is used in a sustainable manner and does not pose a significant risk of environmental harm.

Complying with the conditions of this approval

Any person operating under this approval must comply with the conditions of the approval. It is an offence to not comply with the conditions, having a maximum penalty of 1665 penalty units for an individual and 8325 penalty units for a corporation³.

Foundry sand

Foundry sand is the material that has been used in moulds for the hot casting of metals which is no longer suitable to be used for that purpose. Much of this sand produced by foundries is not hazardous and can be used for other purposes. Reuse options however may be limited due to the presence of chemical binders (which may include phenols, formaldehyde or Triethylamine (TEA)), residual metal, or fluoride (which may be naturally occurring in the sand). High concentrations of contaminants may pose a risk to the environment or human health.

Foundries should not deliberately promote a reuse option if they know that the waste stream contains contaminants that might at any time present a risk to human health or the environment. If not characterised and managed appropriately, using foundry sand may cause environmental harm including contamination of surface water, groundwater and land, as well as potentially posing a health risk. Best practice environmental management must be considered and implemented wherever possible.

A review of the best practice approach to dealing with non-organic regulated waste (including foundry sand) in the composting process was conducted by GHD and findings published in a report in 2014⁴. This review identified the potential benefits of using foundry sand in compost manufacturing and recommended measures to appropriately manage the risks. These recommended measures have been used in developing the conditions of this approval.

How this general approval works

This approval is a general approval of which anyone who operates under it has the benefit. Any material being used as a resource under this general approval ceases to be a waste upon leaving the producers site. Management of the material on the producer’s site must be conducted in accordance with any relevant licence requirements for activities being conducted on that site. If the material is not being used under this approval, it is considered a waste and must be managed accordingly.

Definitions have been provided for words that are in **bold**. The approval conditions have four parts:

1. **General conditions**—these conditions apply to any person operating under the approval, unless otherwise stated in a condition.
2. **Requirements for use**—these conditions state what the resource can be used for and specific measures a producer and user must undertake for those particular uses. It includes limitations on the quality and characteristics of the resource. It is the responsibility of the generator and user to comply with their relevant requirements.

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² Available at www.qld.gov.au using the publication number (ESR/2015/1626) as a search term.

³ As at 7 November 2014. The value of a penalty unit is stated in the Penalties and Sentences Regulation 2005 (Qld).

3. Resource monitoring requirements—these conditions address how the resource is to be characterised and necessary ongoing monitoring.

4. Record keeping and reporting—these conditions state the information and records that must be kept. Maintaining these records not only ensures compliance with the conditions of the approval but may assist in demonstrating that you have met other environmental obligations under legislation.

If complied with, this general BUA approves that foundry sand is a resource and not a waste. However, the approval does not mean that the user of the sand does not need to carefully consider its ongoing use as a resource.

While the conditions of this approval minimise the potential for environmental harm, consideration must also be given to the quality of any other material the resource will be mixed with to ensure that the end product is suitable for use; particularly when manufacturing a product that will be released to land.

It is important that any person operating under this approval is aware of their general environmental duty\(^5\) and any other obligation under the EP Act. Further information on this can be found on the department’s website at www.ehp.qld.gov.au.

\(^5\) Defined in section 319 of the Environmental Protection Act 1994
General beneficial use approval – foundry sand

Period of approval
This approval takes effect from 02 October 2015 and remains in force until 31 December 2018 unless otherwise cancelled.

Conditions of approval

General conditions
1. The approved resource is the resource which meets the stated criteria in Table 1.

<table>
<thead>
<tr>
<th>Table 1: Approved resource</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resource</strong></td>
</tr>
<tr>
<td>Foundry sand</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

2. Any producer or user operating under this approval must notify the chief executive using the approved form at least 10 business days prior to beginning supply of or using the resource (whichever is applicable) under this approval.

3. Any breach of a condition of this approval must be reported to the chief executive as soon as practicable within 24 hours of becoming aware of the breach.

4. Prior to the initial supply of the resource to the user, or following any variation of the quality of the supply, the producer must advise the user of the quality of the resource in writing.

5. The resource must not be stored other than at a site where it is to be used.

6. The resource must not be stored for a period of longer than 14 calendar days.

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6 The approved form is available at www.qld.gov.au/, use the publication number ESR/2015/1638 (formerly EM1315) as a search term.

7 A breach of condition can be reported by contacting the Department of Environment and Heritage Protection Pollution Hotline on 1300 130 372.

8 The quality of the resource includes the quality characteristics in Table 3, and any other quality characteristic identified in characterising the resource.
Requirements for use

7. The resource may be used for a stated use in Table 2 where the relevant person complies with all of the relevant requirements in Table 2 for that use. Where the resource is to be used for more than one stated use, the relevant person must comply with all requirements for those uses.

Table 2: Requirements of relevant persons for types of uses

<table>
<thead>
<tr>
<th>Use</th>
<th>Requirements of producer</th>
<th>Requirements of user</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing compost, mulch or soil conditioners (resource used as a feedstock in manufacturing compost)</td>
<td>1. The quality of the resource must not exceed any of the maximum contaminant levels (MCL) stated in Column A of Table 3.</td>
<td>1. The resource must only be used in manufacturing products that meet the requirements of AS4454.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. The resource must only be used in the following mixing ratios:***:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a) equal to or greater than 3:1 where the resource does not exceed the MCLs in Column A of Table 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) equal to or greater than 1:1 where the resource does not exceed the MCLs in Column C of Table 3</td>
</tr>
<tr>
<td>Manufacturing compost, mulch or soil conditioners (resource added to manufactured compost to create a final product)</td>
<td>1. The quality of the resource supplied must not exceed any of the maximum contaminant levels (MCL) stated in Column B of Table 3.</td>
<td>2. The resource must only be used in manufacturing products that meet the requirements of AS4454.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. The resource must only be used in the following mixing ratios:***:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a) equal to or greater than 3:1 where the resource does not exceed the MCLs in Column B of Table 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) equal to or greater than 1:1 where the resource does not exceed the MCLs in Column C of Table 3</td>
</tr>
<tr>
<td>Manufacturing a general purpose soil</td>
<td>1. The quality of the resource must not exceed any of the maximum contaminant levels (MCL) in Column B of Table 3.</td>
<td>1. The resource must only be used in manufacturing products that: ****</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a) meet the requirements of AS4419; and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) have an exchangeable sodium percentage of less than 15%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. The resource must only be used in the following mixing ratios:***:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a) equal to or greater than 3:1 where the resource does not exceed the MCLs in Column B of Table 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) any ratio where the resource does not exceed the MCLs in Column C of Table 3.</td>
</tr>
<tr>
<td>Bound applications</td>
<td>1. The quality of the resource must not exceed any of the maximum contaminant levels (MCL) stated in Column A of Table 3.</td>
<td>1. The resource must only be used in manufacturing processes and applications which encapsulate or chemically transform and incorporate the resource into a final product that complies with relevant Australian Standards for that product.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Use of the resource for bound applications is limited to the following final products:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Bitumen and asphalt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Brick and paver products</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Cement clinker products</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Concrete products</td>
</tr>
<tr>
<td>Unbound applications</td>
<td>1. The quality of the resource must not exceed any of the maximum contaminant levels (MCL) in Column D and TCLP leachable concentration</td>
<td>1. The resource must only be used in the following applications on standard areas:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Fill in construction projects</td>
</tr>
</tbody>
</table>

\*\*\*\* Ratios expressed as other material to foundry sand (dry mass). For example a ratio of 3:1 equals 3 parts other material to 1 part foundry sand (dry mass).
of Table 3.
2. The resource must have a pH between 6.0 – 10.0 (range).
3. The resource must have an electrical conductivity of less than 10 dS/m.

b. Pipe bedding
c. Road base materials
d. Top cover at landfills approved under the Environmental Protection Act 1994

Table 3: Maximum contaminant levels (MCL)

<table>
<thead>
<tr>
<th>Quality characteristic</th>
<th>MCL (mg/kg)*</th>
<th>TCLP leachable concentration*</th>
<th>Limit type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column A</td>
<td>Column B</td>
<td>Column C</td>
<td>Column D</td>
</tr>
<tr>
<td>Arsenic (As)</td>
<td>80</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>Barium (Ba)</td>
<td>8000</td>
<td>8000</td>
<td>2000</td>
</tr>
<tr>
<td>Boron (B)</td>
<td>20</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Cadmium (Cd)</td>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Chromium (Cr III)</td>
<td>400</td>
<td>400</td>
<td>100</td>
</tr>
<tr>
<td>Chromium (Cr VI)</td>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Copper (Cu)</td>
<td>600</td>
<td>600</td>
<td>150</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>600</td>
<td>600</td>
<td>150</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Nickel (Ni)</td>
<td>240</td>
<td>240</td>
<td>60</td>
</tr>
<tr>
<td>Selenium (Se)</td>
<td>20</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Silver (Ag)</td>
<td>40</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>Vanadium (Va)</td>
<td>400</td>
<td>400</td>
<td>100</td>
</tr>
<tr>
<td>Zinc (Zn)</td>
<td>1200</td>
<td>1200</td>
<td>300</td>
</tr>
<tr>
<td>Phenols (non-halogenated)</td>
<td>240</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Phenols (halogenated)</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Benzene</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Fluoride</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Triethylamine (TEA)***</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

NS = No specific concentration specified

*All maximum contaminant levels are for dry mass are expressed in milligrams per kilogram (mg/kg) except where otherwise specified, measured using reference test methods.
Resource monitoring requirements

8. The following must be undertaken by the **producer** prior to supplying the **resource** for use:
   a) A detailed assessment of the waste source and constituents, including:
      i. identification of the waste source including how it is generated (including sands from different processes within the foundry);
      ii. identification of the constituents or inputs to the waste stream (including any binders, catalysts or other additives that may leave contaminants such as Triethylamine (TEA)); and
      iii. determination of whether the source will be consistent/constant or variable with time.
   b) Characterisation of the initial batch of waste with a sampling density in accordance with Environmental Protection Authority Victoria Industrial Waste Resource Guideline IWRG 702 requirements and analytical suite determined based on the detailed assessment undertaken and the quality characteristics listed in Table 3.

9. The **producer** must conduct ongoing sampling and characterisation of the **resource** as follows:
   a) If the waste stream is determined to be consistent and inputs do not change, verification sampling and analysis to confirm the waste still matches initial characterisation must be undertaken at an appropriate frequency to ensure consistency of inputs.
   OR
   b) If the waste stream is determined to be variable and heterogeneous or if inputs change, each batch is to be subject to characterisation as for the initial batch (for all analytes).

10. Any determination of the suitability or characterisation of the **resource** (including ongoing sampling) must be made by an **appropriately qualified person**.

11. All analyses required under this approval must be carried out by a laboratory that has National Association of Testing Authorities (NATA) certification, or an equivalent certification, for such analyses.

Record keeping and reporting

12. The **producer** must record details of the following:
   a) the assessment and characterisation of the waste required by condition 8;
   b) results of ongoing sampling and characterisation, including how the verification sampling frequency was determined for consistent waste streams, as required by condition 9; and
   c) a written agreement between the **producer** and **user** to use the **resource** in accordance with the conditions of this approval.

13. The following **records** must be kept by the **producer** and **user** for each load of the **resource** transported:
   a) origin of the **resource**;
   b) quantity (in tonnes);
   c) date of collection;
   d) date of delivery; and
   e) destination (including the site address and name of the **user**).

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** TCLP Leachable Concentration is the leachable concentration of any chemical contaminant using the toxicity characteristics leaching procedure (TCLP), expressed as milligrams per litre (mg/L).

***Triethylamine (TEA) can only be monitored for the resource which is produced from the foundries that use TEA in their process. In other words, it is not a requirement to monitor TEA for the resource produced from foundries that do not use TEA in their process.

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10 A copy of this guideline can be found on the Environment Protection Authority Victoria’s website.
14. All records must be kept for a period of at least five years and provided to the chief executive upon request.

Definitions

'appropriately qualified person' means a person or persons who has professional qualifications, training, skills and experience relevant to the approval requirement and can give authoritative assessment, advice and analysis in relation to the requirement using the relevant protocols, standards, methods or literature.

'AS4454' means Australian Standard 4454 Composts, soil conditioners and mulches (2012), or its most recent version.

'AS4419' means Australian Standard 4419 Soils for landscaping and garden use (2003), or its most recent version.

'chief executive' means the chief executive of the Waste Reduction and Recycling Act 2011, being the Department of Environment and Heritage Protection or its successor.

'compost' has the meaning in AS4454 and is the organic product that has undergone controlled aerobic and thermophilic biological transformation through the composting process to achieve pasteurisation and reduce phytotoxic compounds, and achieved a specified level of maturity required for compost.

'environmental harm' has the meaning in section 14 of the Environmental Protection Act 1994 and is any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance.

'general purpose soil' has the meaning in AS4419 being a material consisting of natural soil, a blend of sand and organic material or a blend of sand, natural soil materials and organic materials, which is suitable for the culture of plants usually grown in domestic gardens and landscaped areas.

'Movement of Controlled Waste NEPM' means the National Environment Protection (Movement of Controlled Waste between States and Territories) Measure, as varied in 2012, or the most recent version.

'mulch' has the meaning in AS4454 and is any organic product (excluding polymers that do not degrade, such as plastics, rubber and coatings) that is suitable for placing on soil surfaces.

'offensive odours' means odours that affect the general life, health and wellbeing of an individual as a result of the intensity, character, frequency and duration of the odours.

'pasteurisation' means a process whereby organic materials are treated to significantly reduce the numbers of plant and animal pathogens and plant propagules.

'producer' means a person who is generating the foundry sand.

'records' include breach notifications and subsequent actions, written procedures, analysis results, monitoring reports and monitoring programs required under a condition of this approval in addition to transport records required under a condition of this approval.

'reference test methods'—The reference test methods for determining both the contaminant and TCLP leachable concentration are as described in the most recent version of the United States Environmental Protection Agency's Test Methods for Evaluating Solid Waste, Physical/Chemical Methods [available December 2013 at www.epa.gov/epaoswer/hazwaste/test/sw846.htm, also known as SW-846]. The following procedures for leachate preparation are recommended:

4. The standard pH for the leaching solutions used must be either 4.93 ± 0.05 if the pH of the waste sample is less than 5.0, or 2.88 ± 0.05 if the pH of the waste sample is greater than 5.
5. To determine the pH of the waste sample, use the test method specified in Clause 7.5 (Selection of Leaching Fluid) of AS 4439.3–1997 (above).

'relevant person' means either a producer or a user of the resource.

'resource' means the approved resource in Table 1.

'soil conditioner(s)' has the meaning in AS4454 and is any composted or pasteurised organic product suitable for adding to soils. This also includes products termed ‘soil amendment’, ‘soil additive’, ‘soil improver’ and similar, but excludes polymers that do not biodegrade, such as plastics, rubber and coatings.

'standard areas' means land use including residential, parks, recreational play fields, open spaces and commercial and industrial sites, excluding waters and the bed and banks of waters.

'stored' means storing the resource for a period of greater than 24 hours, including during transit.

'user' means a person who has entered into a written agreement with a producer to use the resource, for a stated use in Table 2.

'verification' means:

(a) a change in concentration for one or more of the quality characteristics listed in Table 3 that affects the type of use of the resource permitted under Table 2; or

(b) any other change in the quality of the resource that has the potential to cause significant or material environmental harm when the resource is used in accordance with the conditions of this approval.

'waters' includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water, natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part thereof.

Approved By

Chris Hill

Signature

23 September 2015

Date

A/Executive Director, Industry and Development Assessment
Delegate of the Chief Executive
Waste Reduction and Recycling Act 2011

Enquiries:
Waste and Contaminated Land Assessment
Industry and Development Assessment
Ph. 13 QGOV (13 74 68)