General beneficial use approval for Drilling mud

Waste Reduction and Recycling Act 2011
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Version history

<table>
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<tr>
<th>Version</th>
<th>Date</th>
<th>Description of changes</th>
</tr>
</thead>
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<tr>
<td>1</td>
<td>August 2015</td>
<td>Original document.</td>
</tr>
<tr>
<td>1.00</td>
<td>16 August 2016</td>
<td>Added publication numbers (ESR/2016/2231 for this document) and effective date.</td>
</tr>
</tbody>
</table>
Explanatory statement

This notice of a general approval for drilling mud 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 drilling mud generated from coal seam gas projects 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 drilling mud 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 drilling mud 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 drilling mud 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\(^1\) 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 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.

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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)
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/2015/1626)\(^2\).

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 corporation\(^3\).

### Coal seam gas drilling mud

Coal seam gas drilling fluids are used in the petroleum industry to allow optimal operation of the drilling tools. They function as an aid for cooling and cleaning the drill bit, reducing friction, carrying the cuttings from the drill hole, maintaining the stability of the bore hole and keeping the cutting in suspension when drill circulation has stopped. They may also be required to transmit hydraulic power to the drilling bit, and control fluid loss through filtration.

In this document, the mix of drilling fluids (including fluid loss control additives, density control additives and viscosifiers) water and clays, including cuttings, is collectively called drilling mud. Further information on drilling fluids and mud can be found in the department’s Information sheet: Characterisation and Management of Drilling Fluids and Cuttings in the Petroleum Industry.

The chemical composition of drilling mud is varied, depending on the drill site substrate and the progression of drilling. Under the Code of Practice for constructing and abandoning coal seam gas wells and associated bores in Queensland (2013) records must be kept of the name, type and quantity of each chemical used on each well throughout the life of the well. These records should be used in characterising the drilling mud and determining whether it can be used under this approval.

If not characterised and managed appropriately, the use of drilling mud 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.

A review of the best practice approach to dealing with non-organic regulated waste (including drilling mud) in the composting process was conducted by GHD and findings published in a report in 2014\(^4\). This review identified the potential benefits of using drilling mud in compost manufacturing and recommended measures to appropriately manage the risks. It was found that drilling mud often contains bentonite which can be a valuable soil improvement product, but can be highly saline and sodic due to additives such as potassium chloride (KCl). Highly saline products can impact plant growth, and chloride can lead to plant toxicity including by increasing the plants uptake of cadmium. Salinity and chloride concentrations should be considered in accordance with the relevant standards for the product (e.g. AS4454). Products that have a high sodicity can impact soil structure causing it to be much more likely to disperse and erode. Both salinity and sodicity are to be considered when manufacturing a product that contains drilling mud to ensure that the overall product is suitable to be used and not likely to cause environmental harm.

### 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 producer’s site. Management of the material on the producer’s site must be conducted in accordance with any relevant licencing 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.

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\(^2\) Available at [www.qld.gov.au](http://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).

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.
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 drilling mud generated during coal seam gas drilling operations is a resource and not a waste. However, the approval does not mean that the user of the mud 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](http://www.ehp.qld.gov.au).

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

Period of approval
This approval takes effect from 11 September 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 identified in Table 1.

Table 1: Approved resource

<table>
<thead>
<tr>
<th>Resource</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling mud</td>
<td>1. A mixture of naturally occurring rock, soil, and water based drilling fluid, generated by drilling through overburden (as opposed to coal seam formations) during coal seam gas drilling operations at a coal seam gas project.</td>
</tr>
<tr>
<td></td>
<td>2. Sourced from coal seam gas projects located within Queensland.</td>
</tr>
<tr>
<td></td>
<td>3. Has not been generated by drilling through soil contaminated by a hazardous contaminant.</td>
</tr>
<tr>
<td></td>
<td>4. Does not contain or have any of the following:</td>
</tr>
<tr>
<td></td>
<td>a. Restricted stimulation fluids</td>
</tr>
<tr>
<td></td>
<td>b. Any characteristics contained in List 2: Characteristics of controlled wastes, of Schedule A of the Movement of Controlled Waste NEPM (such as, being flammable or emitting flammable gases, liable to spontaneous combustion, oxidising, containing organic peroxides, poisonous, infectious, corrosive, toxic or giving off toxic gases or being ecotoxic)</td>
</tr>
<tr>
<td></td>
<td>5. Free from:</td>
</tr>
<tr>
<td></td>
<td>a. detectable offensive odours⁶;</td>
</tr>
<tr>
<td></td>
<td>b. glass, metal, plastics (including rigid, light, flexible or film), rubber and coatings; and</td>
</tr>
<tr>
<td></td>
<td>c. pest or vermin infestations (for example, fire ant infestation).</td>
</tr>
<tr>
<td></td>
<td>6. In a solid form that is generally able to be picked up by a spade or shovel.</td>
</tr>
</tbody>
</table>

2. Any producer or user operating under this approval must notify the chief executive using the approved form⁷ 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 executive⁸ 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 a variation of the quality of the supply, the producer must advise the user of the quality of the resource⁹ in writing.

⁶ Where drilling fluids containing a high concentration of barite (barium sulphate) are used there is potential for drilling mud to be odorous due to the sulphate present in the chemical. In anaerobic conditions some bacteria can reduce the sulphate to hydrogen sulphide, which is also toxic. This not only has the potential to cause a nuisance but can also affect the quality of the end product.

⁷ The approved form is available on the department's website at www.qld.gov.au, use the publication number ESR/2015/1638 (formerly EM1315) as a search term.

⁸ A breach of condition can be reported by contacting the Department of Environment and Heritage Protection Pollution Hotline on 1300 130 372.

⁹ The quality of the resource includes the quality characteristics in Table 3, and any other quality characteristic identified in characterising the
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.

**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>
</table>
| Manufacturing compost, mulch or soil conditioners (resource used as feedstock in manufacturing compost) | 1. The quality of the resource must not exceed any of the maximum contaminant levels (MCL) stated in Column A of Table 3. <br>2. Details of the constituents of any surfactants present must be provided in writing to the user. | 1. The resource must only be used in manufacturing products that meet the requirements of AS4454. <br>2. The resource must only be used in the following mixing ratios:<br> a) equal to or greater than 3:1 where the resource does not exceed the MCLs in Column A of Table 3<br> b) equal to or greater than 1:1 where the resource does not exceed the MCLs in Column C of Table 3<br>3. Where surfactants have been identified in the resource, a risk assessment must be conducted by an appropriately qualified person and the final product determined to present a low leachability/risk to surface water.

| Manufacturing compost, mulch or soil conditioners (resource added to manufactured compost to create a final product) | 1. The quality of the resource supplied must not exceed any of the maximum contaminant levels (MCL) stated in Column B of Table 3. <br>2. The resource must be free of viable plant propagules. <br>3. Details of the constituents of any surfactants present must be provided in writing to the user. | 1. The resource must only be used in manufacturing products that meet the requirements of AS4454. <br>2. The resource must only be used in the following mixing ratios:<br> a) equal to or greater than 3:1 where the resource does not exceed the MCLs in Column B of Table 3<br> b) equal to or greater than 1:1 where the resource does not exceed the MCLs in Column C of Table 3<br>3. Where surfactants have been identified in the resource, a risk assessment must be conducted by an appropriately qualified person and the final product determined to present a low leachability/risk to surface water.

| Manufacturing a general purpose soil | 1. The quality of the resource must not exceed any of the maximum contaminant levels (MCL) in Column B of Table 3. <br>2. The resource must be free of viable plant propagules. <br>3. Details of the constituents of any surfactants present must be provided in writing to the user. | 1. The resource must only be used in manufacturing products that: <br> a) meet the requirements of AS4419; and <br>b) have an exchangeable sodium percentage of less than 15%. <br>2. The resource must only be used in the following mixing ratios:<br> a) equal to or greater than 3:1 where the resource does not exceed the MCLs in Column B of Table 3<br>b) any ratio where the resource does not exceed the MCLs in Column C of Table 3<br>3. Where surfactants have been identified in the resource, a risk assessment must be conducted by an appropriately qualified person and the final product determined to present a low leachability/risk to surface water.

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resource, such as Total Dissolved Solids and surfactants present.

10 Ratios expressed as other material to drilling mud (dry mass). For example, a ratio of 3:1 equals 3 parts other material to 1 part drilling mud (dry mass).

11 Although surfactants are unlikely to present a risk to human health or plants, there is a potential for environmental harm to be caused by runoff or leaching to surface water bodies.
Table 3: Maximum contaminant levels (MCL)

<table>
<thead>
<tr>
<th>Quality characteristic</th>
<th>MCL (dry mass)</th>
<th>Unit</th>
<th>Limit type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Column A</td>
<td>Column B</td>
<td>Column C</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>Total Petroleum Hydrocarbons (TPH) C6-C9</td>
<td>400</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Total Petroleum Hydrocarbons (TPH) C10-C36</td>
<td>4000</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>Benzene</td>
<td>4</td>
<td>1</td>
<td>1</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>
</tbody>
</table>
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;
      ii. identification of the constituents or inputs to the waste stream, including any drilling fluids used as well as the lithology and composition of the formation water; 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. The characterisation should also include Total Dissolved Solids and surfactants if present.

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 (e.g. drilling fluid or significant lithology changes likely to adversely impact drilling mud quality), 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 (including drill well identification);
   b) quantity (in tonnes);
   c) date of collection;
   d) date of delivery; and
   e) destination (including the site address and name of the user).

14. All records must be kept for a period of at least five years and provided to the chief executive upon request.

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12 A copy of this guideline can be found on the Environment Protection Authority Victoria’s website.

13 Where the resource has been sourced from multiple wells, each well is to be identified.
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.

'coal seam gas project' means an activity authorised under petroleum authority (under petroleum legislation including the Petroleum Act 1923, the Petroleum and Gas (Production and Safety) Act 2004 and the Petroleum (Submerged Lands) Act 1982 for the extraction of coal seam gas.

'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.

'hazardous contaminant' has the meaning in Schedule 4 of the Environmental Protection Act 1994 and means a contaminant, other than an item of explosive ordnance, that, if improperly treated, stored, disposed of or otherwise managed, is likely to cause serious or material environmental harm because of—

(a) its quantity, concentration, acute or chronic toxic effects, carcinogenicity, teratogenicity, mutagenicity, corrosiveness, explosiveness, radioactivity or flammability; or

(b) its physical, chemical or infectious characteristics.

'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.

'overburden' means the material overlying the formation of interest to the coal seam gas project.

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

'producer' means the holder of the petroleum authority by which petroleum activities for a coal seam gas project are authorised.

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

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

'resource' means the approved resource in Table 1.

'restricted stimulation fluids' has the meaning in section 206 of the Environmental Protection Act 1994 and means fluids used for the purpose of stimulation, including fracturing, that contain the following chemicals in more than the maximum amount prescribed under a regulation (the Environmental Protection Regulation 2008)-

a. petroleum hydrocarbons containing benzene, ethylbenzene, toluene or xylene;
b. chemicals that produce, or are likely to produce, benzene, ethylbenzene, toluene or xylene as the chemical breaks down in the environment.

'soil conditioner(s)' has the meaning in AS4454 and is any composted or pasteurised organic product, that is 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.

'stored' means storing the resource for a period of greater than 24 hours. Note that Condition 6 of the approval imposes a maximum storage time of 14 calendar days.

'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.

'variation' 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) an increase in the concentration of surfactants; or

(c) 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.

'viable plant propagules' means any living parts (including but not limited to seeds, bulbs, roots and vegetation) of plants that are generally considered to be weeds that could generate a new plant.

'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.