Ash Development Association of Australia (ADAA)

Coal Combustion Products (CCPs) End of Waste Code Public Consultation Submission

to

Department of Environment and Science

October 2018

Published on DESI Disclosure Log
RTI Act 2009

Table of Contents

1.0 Introduction 3
2.0 Summary of amendments 3
3.0 Who we are.....5
4.0 Production and Utilisation of CCPs 6

Published on DESI Disclosure Log
RTI Act 2009

1.0 Introduction

The Ash Development Association of Australia ('the Association') makes the following submission to the Department of Environment and Science ('the Department') in relation to the End of Waste (EOW) Code for the use of coal combustion products (CCP) provided on the Department's website for public consultation.

The EOW Code has been developed to replace our existing "General Approval of a Resource — Coal Combustion Products", which is due to expire on 31st December 2018.

The Association supports the Department's implementation of EOW Codes under the *Waste Reduction and Recycling Act 2011* to further promote the implementation of the waste and resource management hierarchy.

Our submission is made on the basis that the Department has a well-developed understanding of Coal Combustion Products (CCPs) given the Department has been instrumental in the development and granting of the initial General Approval in 2006 and subsequent amendments over the past 12 years.

2.0 Summary of amendments

Section/page reference	Summary of issue	Comments
General	Formatting. Key terms, e.g resource etc. are inconsistent throughout the document in terms of **bold** formatting.	Minor editorial for clarity
General	Terminology. Recommend using ***'Soil ameliorant'*** throughout document in preference to 'soil conditioner'. It has meaning within agricultural applications.	Minor editorial for clarity
Section 2 – Guidance, 2.1	A waste becomes a resource when it has been determined to meet the requirements of an EOW code. It may be necessary to treat or process the waste prior to (ie. in order to) ***meet those requirements***.	Minor editorial for clarity
Section 2.2	A resource ***which*** is approved under an EOW code, is also deemed to be a waste when it is disposed of at a waste disposal facility, or if it is deposited at a place in a way that would, apart from its use approved under an EOW code, constitute a contravention of the general littering provision or the illegal dumping of waste provision under the WRR Act —when the ***disposal occurs or the*** depositing starts.	Minor editorial for clarity
Section 2.3	Please refer to Appendix A of this EOW code for general obligations for all persons ***operating under this EOW code***, which includes the resource users.	Minor editorial for clarity
Section 3	We support the EoW Code remaining in force until it is cancelled, amended or suspended.	No details provided as to what triggers cancellation, suspension or amendment. Investment decisions to install production capacity will require more detail around this.
Section 4	Some power stations use liquid fuel oil or liquid petroleum gas for ignition support. So as to avoid confusion we recommend including the word 'solid'. …no other ***solid*** source of fuels is mixed.	

Published on DES Disclosure Log RTI Act 2009

Section/page reference	Summary of issue	Comments
Section 6.1, Table 1	The current BUA 'Resource Monitoring Frequency' requires that statistical analysis is undertaken on 95% confidence interval ('CI') for any individual grab sample as composite samples are not used. Using a 95% CI we can address potential outliers. We suggest 'definition' sampling and resource testing results are based on a 95% CI.	
Section 6.1, Table 1 – Chromium (VI)	The current BUA has 100 mg/kg for unbound and 1 mg/kg for soil ameliorants. We propose based on our data that Cr (VI) be amended to 1.5mg/kg	This is a 66 times reduction
Section 6.2	In addition to meeting the criteria in Table 1 – Resource quality criteria, the resource must not **have any properties nor contain any other contaminants** at concentrations which may cause environmental harm when used in accordance with this EOW code.	The wording **"have any properties nor contain any other contaminants"** is very broad. Is this the trigger to 'cancel, amend or suspend'? Q. Have there been examples of this in relation to the current BUA for CCPs?
Section 6.3	We suggest that a monitoring frequency of 12 months is reinstated for ash produced from a power station supplied by a single-source, known coal deposit, as variability in ash is minimal given it all comes from the same deposit.	
Section 6.4	Composition of the resource has changed	Please define 'change' e.g. +/- 30% change in composition, change of source coal, change of operating conditions
Section 6.8 - Records	Given the concept of EoW, we recommend the following amendments. ***The registered resource producer must keep the following records each time the resource is provided for use:*** ***a) origin of the resource;*** ***b) date of dispatch of the resource;*** ***c) the relevant person taking resource;*** ***d) contact details for the relevant person receiving the resource; and*** ***e) quantity of the resource collected in tonnes.***	Under trade practices law the requirement of a 'relevant person' to be obligated to provide customer details or 'ultimate destination' to the producer of a resource is problematic. In effect this requirement obliges the processor or reseller to provide commercial sensitive or confidential customer details to the producer. The user of resource may, process, blend, package or use trade secrets and or patents to create new value. The resource is generally supplied by weight (determined by weighbridges) and not volume. Densities vary from site to site.
Section 7.1, Table 2 – Soil ameliorant or	We note the removal from Table 2 of use by direct application to land, given that selected sources may have pH up to 12.5.	Removal of soil ameliorant or direct application to land condition from original

Published on DESI Disclosure Log
FOI Act 2009

Section/page reference	Summary of issue	Comments
direct application to land	The Association proposes reinstating the ability to use the resource for unrestricted use and in soil ameliorant use based on an identified control (ie. max pH). For example, low pH soils or acid soils could benefit from the addition of ash with pH < 12.5.	BUA has not been justified. The Association has spent considerable time and resources consulting with the Department to incorporate these applications into the BUA, supported with published reports – we believe this application and use should remain to encourage new market innovation.
Section 7.5 -	Resource users undertaking soil conditioner or soil product use of the resource under this EOW code must notify the chief executive of their name, address, contact information and details of intended resource usage, in writing using the approved form **no less than** 10 business days **prior to** using the resource	Minor editorial for clarity
Section 8 – Definitions	Amend 'coal combustion products' to include the word 'solid'. Ie. *…no other **solid** source of fuels is mixed.*	Minor editorial for clarity
Section 8 - Definitions	Amend 'furnace bottom ash' so that internal reference to 'bottom ash' is to 'furnace bottom ash'. Ie. 'furnace bottom ash' means the agglomerated particles formed at the bottom of the furnace***. Furnace bottom*** ash is typically grey to black in colour, is quite angular, and has a porous surface structure.	Minor editorial for clarity
Section 8 - Definitions	Amend 'resources'. Suggested wording: *…, and does not **contain** contaminants at concentrations which may cause environmental harm.*	Minor editorial for clarity

Published on DEHP Disclosure Log RTI Act 2009

3.0 Who we are

Australian producers and marketers of power station ash formed the Association in 1991, with the primary objective to achieve the full and economic use of coal combustion products[1] (CCPs), commonly known as 'power station coal ash' or 'coal ash'.

The Association facilitates investigations (undertake research and development) of economic market opportunities leading to the increased utilisation of CCPs as valuable resources rather than see them managed through traditional methods, i.e. emplaced into onsite ash dams, thus providing no resource efficiency opportunities.

Increasing the producer, processor, regulator and user awareness of the ecologically sustainable benefits arising from the increased utilisation of CCPs from the coal energy sector and benefits to industry members, the environment, and the community are important objectives.

[1] Coal combustion products include fly ash, bottom ash, boiler slag, fluidized-bed combustion (FBC) ash, or flue gas desulfurization (FGD) material produced primarily from the combustion of coal or the cleaning of the stack gases. The term coal ash is interchangeable.

Putting these objectives into some perspective, coal energy is likely to continue to be the largest energy source for electricity generation within Australia, in particular for Queensland, for some time to come and accordingly significant volumes of CCPs will continue to be produced, used or stored annually.

The Association has long advocated for CCPs as resources, having negotiated with the Department on behalf of its members, one of the first 'General Approvals' (industry wide) back in 2006. This included the use of CCPs for bound applications, unbound applications and as a soil ameliorant.

The use of CCPs, as valued resources, is well established with more than 6 million tonnes used annually in a range of applications, which is under-pinned by significant investment. For example, for more than 30 years, CCPs have been supplied for use in asphalt as mineral fillers, cement manufacture, concrete manufacture, road and embankment construction applications, plus other novel applications such as carpet manufacture. These end use applications are well established and have proven economic and social benefits.

The use of CCPs as a direct replacement for natural resources used in construction has had numerous environmental benefits including:

- The reduced usage of non-renewable quarry resources, fuels, limestone, sand and coal, as well as the environmental impacts associated with mining these natural resources;
- The lowering of emissions through replacing virgin raw materials with processed or partially processed materials such as CCPs
- The reduction of some 20 million tonnes of GHGs since 1980's resulting from the effective use of CCPs in concrete alone.

Specifically for Queensland the 'BUA' has been effective in promoting sustainable and beneficial use of CCPs across many of the above applications during the period 2006-2018.

Published on DES Disclosure Log RTI Act 2009

4.0 Production and Utilisation of CCPs

CCPs are the solid particulates that remain after the combustion of Australian coals within a furnace of a coal fired power station. CCPs are composed of many types of non-combustible components, of which fly ash, furnace bottom ash, boiler slag and cenospheres are the most common.

The survey results for 2017 from generators, marketers and users for CCPs show;

- Approximately 12.1 Mt (million tonnes) of CCPs were produced within Australia. On a per capita basis, this equates to about 500 kg/person.
- Some 4.8 Mt or 40% of CCPs produced have been effectively utilised in various value-added products or to some beneficial end over the period. On a per capita basis, this equates to about 202 kg/person recycled or reused.
- Approximately 1.6 Mt or 69% of effectively utilised coal ash was used in high value-added applications such as cementitious binders, concrete manufacture or mineral fillers.
- About 0.50 Mt or 21% of effectively utilised coal ash was used in non-

cementitious applications such as flowable fills, structural fills, road bases, coarse/fine aggregates and mine site remediation.

- Some 2.3 Mt or 19% was used in projects offering some beneficial use (e.g. onsite remediation, local haul roads etc.). These uses typically generate no economic return, that is, cost avoidance or recovery only.
- Surplus CCPs of 9.6 Mt are typically placed into onsite storage ponds awaiting some future opportunity for economic reuse.
- More than 45 Mt of CCPs [fly ash] have been used in cementitious applications or concrete manufacture from 1975 to 2017 [42 years].

In summary, the recovery and reuse of CCPs provides positive and significant environmental impacts, including resource conservation and in this case, the reduction of Greenhouse Gas emissions from the processing of virgin resources, resulting in the reduction of almost 1.5 million of greenhouse gases.

Surplus CCPs represent a significant alternative raw material (ARM), with characteristics and properties lending themselves to a wide range of potential applications (cement, concrete manufacture and engineering fills), and when effectively utilised, CCPs can provide significant positive environmental outcomes and economic returns.

Ash Development Association of Australia

October 2018

Published on DESI Disclosure Log
RTI Act 2009

EFFECT OF CO-COMBUSTION OF COAL AND BIOMASS ON FLY ASH AND ITS PROPERTIES AS A SCM FOR USE WITH CEMENT

LITERATURE REVIEW

By

sch4 Contrary to public

Published on DESI Disclosure Log RTI Act 2009

IN CONFIDENCE TO
ASH DEVELOPMENT ASSOCIATION OF AUSTRALIA

Cement and Concrete Technology Group
North Ryde

DECEMBER 2002

© CSIRO 2002
This report was provided subject to the terms of a contract and may only be used in accordance with that contract. CSIRO retains copyright in the report and it can only be reproduced with CSIRO's express consent.

Table of Content

EXECUTIVE SUMMARY **1**

1 INTRODUCTION **4**

2 CO-COMBUSTION OF COAL AND BIOMASS IN POWER GENERATION SYSTEMS **5**

3 WOOD UTILIZATION AS BIOMASS IN CO-COMBUSTION PROCESS **6**

3.1 Composition of fly ash from wood **7**

3.2 Changes in fly ash composition at reported coal to biomass ratio **10**

4 POZZOLANIC PROPERTIES OF FLY ASH FROM CO-COMBUSTION AND THE INFLUENCE ON APPLICATIONS IN CONCRETE **12**

5 CHANGES TO FLY ASH STANDARDS DUE TO CO-COMBUSTION PROCESS **20**

6 FUTURE ACTION **22**

7 SUMMARY **24**

8 REFERENCES **27**

9 ANNEXES **29**

Published on DEST Disclosure Log
RTI Act 2009

Effect of Co-Combustion of Coal and Biomass (Timber Waste from Forestry Activities, Wood Processing and other Green Wood Waste) on Fly Ash and its Properties as a Supplementary Cementitious Material for Use with Cement

A Literature Review

EXECUTIVE SUMMARY

A literature review has been carried out with an aim to identify the influence of co-combustion of coal and biomass, specifically wood, on ash properties, particularly as a mineral admixture for use in cement and concrete.

Biomass is the term used for organic material, both living and dead. The types of biomass used world-wide in power generation production include energy crops (willows, aspen poplars), wood and wood waste, agricultural and agro-industrial wastes, sewage sludges and municipal solid waste. Therefore, wood and wood waste is only one of many types of biomass used in power generation.

The properties of wood ashes derived from wood and wood materials depend on various factors: type of plant, part of plant (wood, pulp, and leaves), geographical location (including type of soil), type of waste (clean wood from forestry activities, clean industrial wood, industrial treated wood, pulp, and paper residue), combination with other fuels sources and proportions, and conditions of combustion. The reported data indicate that wood ashes can contain high concentration of calcium, magnesium, potassium, phosphorous and some heavy metal elements (especially if the wood used is industrial treated wood). The variations in composition of fly ashes from wood are very large, but the contribution to the composition of fly ash resulted from co-combustion processes depend on type of biomass burned, the amount of resulting ash from biomass, which can vary between 1 and 20% (by weight) and the proportion of biomass used with coal. For clean wood the amount of resulting ash is small, less than 1 to 5 %, therefore it will not have an important contribution to the quality of fly ash from co-combustion process. Data from CSIRO Energy Technology database, which presents some total ash compositions, burned in laboratory conditions for different type of Australian wood, support the same findings. It is important that biomass/wood to be classified in two categories: (1) clean wood and clean waste wood and (2) industrial treated wood. The clean wood results from forestry activities and rejected wood (untreated) from industrial process (cuts, rejects from sawmills, sawdust).

The information about the composition of fly ashes derived from co-combustion of biomasses and coal indicates that there are no significant differences compared with the composition of fly ashes derived from coal only, if the proportion of biomass used is within 10% by weight. Changes are reported only when high percentages of biomass (some data up to 30% were found) are burned with coal: high level of potassium and/or magnesium, increased chloride content, and retention of heavy metals, such as zinc, cadmium, chromium (especially if the wood used is industrial treated wood).

The studies on the effects of fly ashes from co-combustion on the properties of cement and concrete are related to different types of biomass and not wood only. The biomasses used were: green sawdust, tree trimmings, paper mill wood, paper sludge, dried sewage sludge, switch grass at maximum 10% by weight (some data on 20 and 30% were also reported).

Based on the tests results, it was concluded that there are no significant differences compared with conventional fly ashes, at the maximum 10% (by weight) biomass addition. These fly ashes derived from co-combustion:

Published on DEST Disclosure Log
FOI Act 2009

- meet technical standards, no significant influence on strength development;
- no change in behaviour related to durability or in use of chemical admixture;
- can be used without any ecological problems;
- increased setting time was noted in some studies.

Based on a comprehensive research program undertaken by the Dutch Fly Ash Corporation in the Netherlands, a procedure was developed to verify if fly ashes from co-combustion (maximum 10%) are technically equal to conventional fly ashes. If the allowance program is passed, fly ashes from co-combustion can be sold to the market as regular coal fly ashes.

Since 1999 a sub-commission of CEN Technical Committee 154 is developing a new version of European Standard EN 450 –"Fly Ash for Concrete - Definitions, Requirements and Quality Control"; Part 1: Definition, Specifications and Conformity Criteria; Part 2: Conformity Evaluation." (CEN PREN 450, 450-1 and 450-2). In the new draft version the use of fly ashes from co-combustion is regulated. The proposed changes to European Standard EN-450 "Fly ash for concrete" are:

1. ❑ **Definition of fly ash**

   Fine powder of mainly spherical, glassy particles, derived from burning of pulverized coal, with or without co-combustion materials as described in Annex A (normative), which has pozzolanic properties and consists essentially of SiO_2 and Al_2O_3, the content of reactive SiO_2 as defined and described in EN 197-1, being at least 25% by mass.

   Fly ash is obtained by electrostatic or mechanical precipitation of dust-like particles from fuel gases of furnace fired with pulverized coal, with or without co-combustion materials.

2. ❑ **Establishment of suitability of fly ash obtained from co-combustion**
   - Limits of the type and maximum amount of co-combustion materials based on the aim that the amount of ashes derived from pure coal shall be at least 90% of the total ash.
   - Suitability is proven if the fly ash meet the requirements of EN 450 and additionally:
     - ✓ Reactive silicon oxide $SiO_2 \geq 25\%$
     - ✓ Sum of $SiO_2 + Al_2O_3 + Fe_2O_3 \geq 70\%$
     - ✓ Total alkalies (Na-eq) $\leq 5\%$
     - ✓ The initial setting time of a 25% fly ash plus 75% cement paste shall not deviate by more than 0 hour to +2 hours than the initial setting time of a 100% cement paste.

3. ❑**Type and maximum amount of co-combustion materials** [1)]

Co-combustion material	Maximum percentage by dry mass of co-combustion material related to coal (%)
Vegetable material like wood chips, straw, olive shells and other vegetable fibers	20
Green wood and cultivated biomass	8
Bone meal	2
Municipal sewage sludge	3
Paper sludge	5
Petroleum coke	10
Virtually ash free liquid fuels and gaseous fuels	20 [2)]

[1)] The maximum percentage of co-combustion material related to pure coal is based on an average ash content of 12% for pure coal and an average value for each co-combustion material. The limits are calculated based on the aim that the amount of ashes derived from pure coal shall be at least 90% of the total ash. If two or more co-combustion materials are used together the maximum percentage of each is calculated in proportion to the values given in the table.

[2)] Maximum percentage by caloric value of the co-combustion material related to coal.

Published on DEC Disclosure Log
RTI Act 2009

It can be concluded from the data found in the literature that there are no changes of the properties of the fly ashes from co-combustion of coal and maximum 10% by weight biomass (wood). This applies if the wood and wood waste used is clean wood from forestry activities or clean industrial wood (not treated wood). This is especially evident if the ash resulting from wood burning is 1% - 5%. Therefore, based on these data and the above assumptions (clean wood and maximum 10% wood addition), it is expected that fly ashes from co-combustion process to be comparable with conventional fly ashes from coal only burning process.

Published on DESI Disclosure Log
RTI Act 2009

1 INTRODUCTION

The utilization and disposal of fly ashes has been the subject of development activities for many decades. The emphasis has been as a constituent in cements, concrete and aggregate materials. The utilization of power station fly ashes, derived from coal burning, depends on their physical and chemical properties. The increasing development of co-combustion/co-firing of non-conventional fuels has resulted in the production of mixed materials. The issues of how these changes affect the quality of fly ashes and the impact on their utilization become more important.

The potential for waste to energy conversion and CO_2 abatement, as well as the reduction of other regulated emissions, is considered to be on offer by large scale co-combustion of coal and biomass in power plants.

Co-firing of biomass in coal fired boilers has been tested in European countries (Germany, Austria, France, Sweden, the Netherlands) starting since the early 1980's. EU clean coal Technology program conducted a 2-year project (1993 – 1994) on co-combustion of coal and biomass.

IEA Bioenergy (http://www.ieabioenergy.com) is an organization set up in 1978 by the International Energy Agency (IEA) with the aim of improving cooperation and information exchange in bioenergy research, development and deployment. The work of IEA energy is carried out through a series of tasks, each with a defined program for duration of 3 years. Task 32: Biomass combustion and co-firing (http:// www.ieabioenergy-task32.com) works on expansion of the use of biomass combustion for heat and power generation, with emphasis, between others, on co-firing biomass with coal in traditional coal fired boilers. Australia is one of the participants.

Information on co-combustion of biomass with fossil fuel is reported from USA since 1987. The Electric Power Research Institute (EPRI) initiates a program in 1992 in order to commercialize co-firing across a broad range of utility generating stations. In 2001, it has been reported that 1.6% of total US energy supply accounts for biomass. Biopower, the use of biomass to produce electricity, is currently contributing about 7,000 MW in the U.S.

CSIRO, Energy Technology (http://www.det.csiro.au/science/energyresources/biomass.htm) set up a biofuel database that provides extended energy characteristics of a wide range of Australian biomasses. It also contains some ash elemental analysis and calculates average properties of coal/biomass blends. The ash originates from laboratory burning process; the resulting ash is a total ash, not a fly ash.

The literature search indicates an increasing attention to co-combustion/co-firing of two or more fuels in existing combustors. Efforts to develop ways of using biomass are currently supported by various national and international programs. However, the technique has influence on plant operations, emissions and residues. Therefore, the aim of the programs was mainly to clarify transport and fuel preparation, combustion mechanism, operational problems (corrosion, slagging, fouling). The economic and environmental effect of electricity production from different bio-fuels by means of co-combustion with coal in existing coal fired power plants was first priority of all testing programs. However the fly ashes derived from these processes were also investigated with the aim to understand the properties of the "new" fly ashes.

This report presents a brief review of the data from literature and aims to identify the influence of co-combustion of coal and biomass (wood) on ash properties, particularly as a mineral admixture for use in cement and concrete.

Published on DES Disclosure Log
RTI Act 2009

2 CO-COMBUSTION OF COAL AND BIOMASS IN POWER GENERATION SYSTEMS

Biomass is defined in very generic term as all vegetable materials (1). More specifically, biomass is the term used for organic material, both living and dead. According to reference (2), biomass fuels can be divided generally in few classes:

- Wood and wood materials,
- Herbaceous and other annual growth materials such straw, grasses, leaves,
- Agricultural by-products and residues including shells, hulls, pits, and animal manures,
- Other waste such as sludges, municipal.

The distinctions among these three classes are based on the structural compositions for hemicellulose, cellulose and lignin, and on the concentration and composition of inorganic materials that are also part of plant.

Co-combustion is practised with different types and amount of biomass in different combustion and gasification systems technologies, configuration and plant sizes (3). There are mainly three different types: direct and indirect co-combustion and parallel firing (3). In direct co-combustion, all components of the secondary fuel enter together with the primary fuel. For example, wood waste is pulverised and direct cofired in the pulverised coal furnace in power plants. In indirect co-combustion, the biomass is first gasified and the gas cooled and cleaned enters the main coal furnace. In these installations the ashes can be kept separate since the thermal conversion is done in a separate installation. For parallel firing, a fully separate combustion installation is used for the biomass and the steam is used to feed other installation. This technique is used in Municipal Solid Waste Incinerators. Currently, direct cofiring is the most applied technique.

The types of biomass used in power generation production include energy crops (willows, aspen poplars), wood and wood waste, agricultural and agro-industrial wastes, sewage sludges and municipal solid waste (4).

The EU clean coal technology program had duration of 2 years, in which the co-combustion in laboratory, pilot and full scale unit were investigated with the participation from eight European countries (5). The objectives were related to the processes of co-combustion and no data on fly ash are presented. Table 1 will give an idea of the type of installations and different combustion techniques used. The pilots plants ranging from 0.5 – 2.5 MW_{th} and full scales boilers of 100 and 120 MW_{el} were used. The secondary fuels used were; straw, wood, bark, fast growing energy plants, waste paper of domestic and industrial origin, residuals from sewage sludge processing.

In USA, the Electric Power Research Institute initiated a similar program (6, 7). The program started in 1992. All types of combustion technologies have been used to co-fire biomass with coal including cyclone boilers; wall fired and tangentially fired pulverized coal boilers, fluidized-bed boilers and stoker-fired boilers. Capacities used in tests and commercial application have ranged from 50 to >500 MW. The biomass used were very diverse: sawdust bark, bark, trims, diverse types of trees (poplar, willow, eucalyptus), orchard pruning, switch grass, rice hulls, walnut shells, paper, sewage sludge and some plastic wastes. The program focused on fuel properties, boilers performances, benefits from economical and environmental perspective.

Published on DES Publications Log
RTI Act 2009

Table 1. The installation, combustion techniques and types of biomass used (5)

Biomass					
Fluidized Bed				Pulverized Fuel	
Atmospheric bubbling	Pressure bubbling	Atmospheric Circulation		Low rank coal	High rank coal
		Low rank coal	High rank coal		
0.3 MW pellet, biomass 700 -900 ℃ 0 – 30%			0.3 MW straw, wood 700 -950 ℃ 0 – 50%	0.35 MW Misc. straw 900 -1200 ℃ 0 – 50%	0.35 MW Misc. straw 900 -1200 ℃ 0 – 50%
1 MW wood, straw 700 -900 ^{0}C 0 – 30%	1 MW Misc. straw 750 -950 ℃ 0 – 30%	1 MW Misc. straw 750 -950 ℃ 0 – 30%	1 MW wood, straw 700 -1000 ℃ 0 – 30%	1 MW Misc. straw 900 -1100 ℃ 0 – 30%	1 MW wood 1000 -1300 ℃ 0 – 30%
					2.5 MW waste paper, straw 1000 -1300 ℃ 0 – 50%
			80 MW straw 700 -900 ℃ 0 – 60%	100 MW Misc. wood 900 - 1100 ℃ 0 – 10%	131 MW straw 1300 ℃ 0 – 25%

Published on DESI Disclosure Log RTI Act 2009

In Scandinavia, fluidised bed combustion is the most commonly applied technology for co-combustion (3). Finland (8) reported experimental and full scale introduction of co-combustion of coal and different biomasses, since 1996. Most installations are fluid bed combustion technology (FBC) with capacities between 20 and 300 MW_{th}. In Sweden (8), biomass is co-fired in grate boilers, bubbling (BFB) and circulating (CFB) fluidised bed boilers and pulverised fuel boilers, with capacities 80 to 300 MW_{th}. In the Netherlands and Germany, biomass wastes (i.e. se4wage sludge, wood) are co-combusted at relative small percentages in coal fired power stations (3).

3 WOOD UTILIZATION AS BIOMASS IN CO-COMBUSTION PROCESS

This chapter of literature review will look at the possible consequences on the quality of the fly ash from co-combustion processes.

The properties of wood ash (9) depend on various factors: type of plant, part of plant (wood, pulp, and leaves), type of waste (wood, pulp, and paper residue), combination with other fuels sources and proportions, conditions of combustion. As a consequence, available data on the properties of wood ash are very variable. The quality of wood waste differs from market to market depending on different types, especially regarding the use of preservatives and other contaminants. Certain wastes contain materials with very low contaminants, whereas other are heavily contaminated due to the use of preservatives and paints. Consequently, it is useful to

classify the wood waste. It is practical to sort them in two categories and the "clean" fraction of the waste can be used in direct conventional plants.

3.1 Composition of Ash from Wood

Table 2 shows the composition of wood ash as resulted from different plants in Finland, as reported in (4). These compositions are from the burning of wood only. The data are shown to demonstrate the variations in composition due to species and geographical location. The dominant constituents of wood ash are calcium, potassium, magnesium and phosphorous.

Table 2. Composition of dominant elements of wood ash of some power plants in Finland (4)

Power Plant	Elemental Composition									
	(g/kg)							(mg/kg)		
	P	K	Ca	Mg	Mn	B	S	Cd	Cr	Pb
Mill UPM/V	7.2	25	144	13.2	7.7	0.21	-	6.2	99	46
Mill m-B/A	10.0	27	329	15.5	8.7	0.18	13.0	10.0	48	56
Mill Enocell	17.5	48	211	23.7	20.1	0.31	33.5	26.4	43	48

These fly ashes can have high concentration of heavy metals.

Some other data from Belgium (9) and Sweden (10) are presented in Table 3 and 4. The ashes are from direct combustion of wood. The paper (10) is attached in **Annex A**.

Table 3. Composition of dominant elements of wood ashes (9)

Ashes from wood and bark	Elemental composition									
	(g/kg)							(mg/kg)		
	P	K	Ca	Mg	Mn	B	S	Cd	Cr	Pb
Source 1	14	41.3	317.4	22.5	6.69	0.008	4.45	0.02	0.09	0.13
Source 2	6.9	28.6	109,4	16.2	3.47	0.127	6.8	0.003	0.014	0.06

Table 4. Composition of dominant elements of wood ashes compare with coal and peat (10)

Source	Elemental composition (%, w/w)										
	Si	Al	Ca	Mg	Mn	Na	K	Fe	S	Cl	LOI*)
Coal	11.0	3.43	15.2	0.41	0.03	0.34	0.63	4.97	2.75	0.1	34.0
Peat	18.6	11.2	6.78	0.60	0.48	0.31	0.72	7.44	0.79	0.1	2.8
Wood	13.7	3.03	12.0	1.24	0.91	0.69	4.70	3.16	4.01	1.0	6.2

*) LOI determined at different temperatures: 800, 550 and 550 °C, respectively.

The reported data indicate that wood fly ashes can contain high concentration in magnesium, potassium, manganese and other heavy metal elements. Wood ashes are generally high in potassium and magnesium which are essential plant nutrients. Trace elements such as manganese, zinc and cadmium can varies mostly due to soil composition and type of plant.

Data (11) from combustion experiments with clean wood and industrial rejected wood in a phased combustion apparatus, having a capacity of 35 KW_{th}, are presented in Table 5. The report (11) is attached in **Annex B**.

Published on DESI Disclosure Log RTI Act 2009

These examples are given to illustrate the diversity of composition. Care has to be taken as to what type of wood biomass is used in co-combustion process with direct consequence on ash formation, composition and therefore behaviour. The results reveal that calcium, potassium, magnesium, phosphorous and iron are among the main components of wood ashes.

Table 5. Chemical composition of wood ash (11).

Element	Content	Clean rejected wood	Industrial rejected wood (three-ply, five-ply, etc.)	Industrial treated wood
Ca	%	8.44 – 41.7	0.9 – 34.3	1.4 – 35,8
Fe	%	0.48 – 2.35	0.29 – 5,38	n.d
K	%	2.86 – 10.9	0.17 – 17,0	0.97 – 10.8
Mg	%	1.00 – 3.45	0.25 – 8.81	0.19 – 9.17
Mn	%	0.16 – 2.62	0.12 – 2.39	0.06 – 3.64
Na	%	0.06 – 0.97	0.08 – 7.67	0.03 – 4.12
P	%	0.67 – 3.52	0.11 – 1.44	0.1 – 2.48
Cl	µg/g	33 – 4,510	< 10 – 138,000	48 – 53,980
F	µg/g	1 – 530	<2 – 564	370 – 23,400
As	µg/g	< 1 - 35	< 2 – 60	n.d
Cd	µg/g	< 1 - 20	<5 – 17	n.d
Co	µg/g	6 - 27	<10 – 115	4,400 – 196,00
Cr	µg/g	< 10 – 592	16 – 810	4,000 – 156,000
Cu	µg/g	99 – 498	43 – 1,450	n.d
Ni	µg/g	20 – 250	18 – 235	n.d
Pb	µg/g	9 – 450	49 – 7,300	100 – 6,500
Zn	µg/g	54 – 1,900	16 – 6,200	n.d.

Published on DEST Disclosure Log RTI Act 2009

Another important factor is the quantity of ash that results from the combustion of different types of wood (11). The ash residue can be between 1 and 20% as is exemplified in Table 6.

Table 6. Formation of ashes in the combustion of wood (11)

Type of wood	Amount of ash (%)
Clean wood without bark	< 1
Clean bark	3 - 4
Contaminated bark	5 - 15
Clean rejected wood	0.5 - 3
Contaminated rejected wood	1 - 3
Impregnated wood (organic)	0.5 - 2
Impregnated wood (inorganic)	2 - 5
Contaminated rejected wood	0.5 - 19

It must be noted that although the variations in composition of wood ashes are very large, the contribution to the fly ash resulted from co-combustion processes depend also on the amount of ash resulting from each type of biomass burned and the proportion of biomass used with coal. For clean wood the amount of ash resulting from different types burned is small, < 1 up to 4 %, therefore it will not have an important contribution to the quality of ash.

CSIRO, Energy Technology (http://www.det.csiro.au/science/energyresources/biomass.htm) has a biofuel database that provides extended energy characteristics of a wide range of Australian biomasses (23). It also contains some ash elemental analysis and calculates average properties of coal/biomass blends. The ash originates from laboratory burning process; ***the resulting ash is a total ash, not a fly ash***. The database uses a classification system based on fuel type (coal, wood or tree derived, agriculture derived, fruit and nut derived and others), category (for wood and tree derived category: hardwood, softwood, woody weeds), species or plant type (hardwood: beech, birch, eucalypt, others; softwood: pine, spruce), form/treatment (bark, branches, sawdust, whole tree, wood chips, pellets, others) and origin. The elemental analyses of ashes given are averages, minimum and maximum contents, standards deviations and the number of samples considered. It have to be mention that the averages listed as "all states" origin does not necessarily include all state, but all the locations from where the samples were available. Some examples of ash compositions (23) are given in Table 7. Samples analyses are on dry basis and represent the average total ash composition.

Table 7. Elemental composition of some Australian wood ashes (23)

Element	Softwood, Pine, all forms, all states	Softwood, Pine, wood chips, NSW	Softwood, Pine, sawmill waste, NSW	Softwood, Radiata Pine, sawdust, NSW	Hardwood, Eucalypt, sawdust, NSW	Hardwood, mixture, wood chips, NSW
	wt. %					
Ash	0.6	1.1	0.2	0.6	4.3	0.4
Na	0.71	0.62	0.17	1.12	1.18	1.78
Mg	5.18	2.97	5.46	8.74	1.22	2.61
Al	4.43	2.50	2.11	9.09	17.6	4.49
Si	16.5	7.52	6.04	39.2	65.2	17.4
P	1.50	0.17	1.16	2.4	0.41	1.17
K	12.2	3.45	19.4	13.5	3.00	3.25
Ca	14.6	22.6	10.8	17.6	3.35	9.85
Ti	0.41	0.29	0.07	0.90	1.23	0.25
Mn	1.27	0.65	2.97	0.34	0.05	0.41
Fe	5.37	2.54	1.08	6.57	6.80	15.8

Published on DEEDI Disclosure Log RTI Act 2009

The data of Australian wood ashes presented in Table 7 indicate that the chemical composition can vary with the species, growing location, form/part of wood. It has to be noted that the ash resulting from any of these type of wood is not higher than about 4%, as for other types of clean wood biomasses from other origin presented in this chapter. Therefore it will not have an important contribution to the quality of ash when used as secondary fuel in co-combustion process.

3.2. Changes in Fly Ash Composition at Reported Coal to Biomass Ratio

The information found about the composition of fly ashes derived from co-combustion of biomasses and coal compared with the composition of fly ashes derived from coal only, where available, are presented. It is difficult to give to these data a uniform presentation because the content in elements was not given in similar format. Therefore the data are shown, as there were given in different studies.

Table 8 presents the fly ashes originated from a 165 MW circulating fluidised bed boiler (12). It has to be noted that high percentage of forestry waste was used in the burning process in this case.

Table 8. Composition of fly ashes from co-combustion (12)

Fuel	Elemental composition								
Forestry waste/Coal (% w/w)	Ca	Mg	K	Na	Fe	Mn	Zn	Cd	Cl
	% by wt.						mg/kg		
70/30	32.7	1,17	0.44	0.17	1,68	0.17	330	36	1850
70/30 (peat instead of coal)	29.2	1,79	10.9	0.18	0.12	0.16	4910	5	2730

The composition of fly ash derived from 5% biomass with coal co-combustion given by Lamers, Vissers and Berg (13) from KEMA (Consultancy Group on Power Generation, Transmission and Distribution of Energy), the Netherlands is presented in Table 9.

Published on DEST Disclosure Log FOI Act 2009

Table 9. Oxide composition of fly ashes from co-combustion tested - Dutch program (13)

Fly ash	Oxide composition (%)								
	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	K_2O	TiO_2	P_2O_5
Biomass pellets prepared from paper sludge, composed sewage sludge and thinning wood. 5% biomass with coal	51.7	27.6	8.7	5.4	0.64	0.64	1.46	1.4	0.8
Conventional fly ashes yearly average (1995)	60.0	23.0	5.6	3.7	0.37	0.37	1.30	1.2	n.a.

Some information on composition of fly ashes derived from coal and straw co-combustion are give in (14, 15). The measurements were conducted in a 150 MW_e wall fired boiler unit. The results are presented in Figure 1.

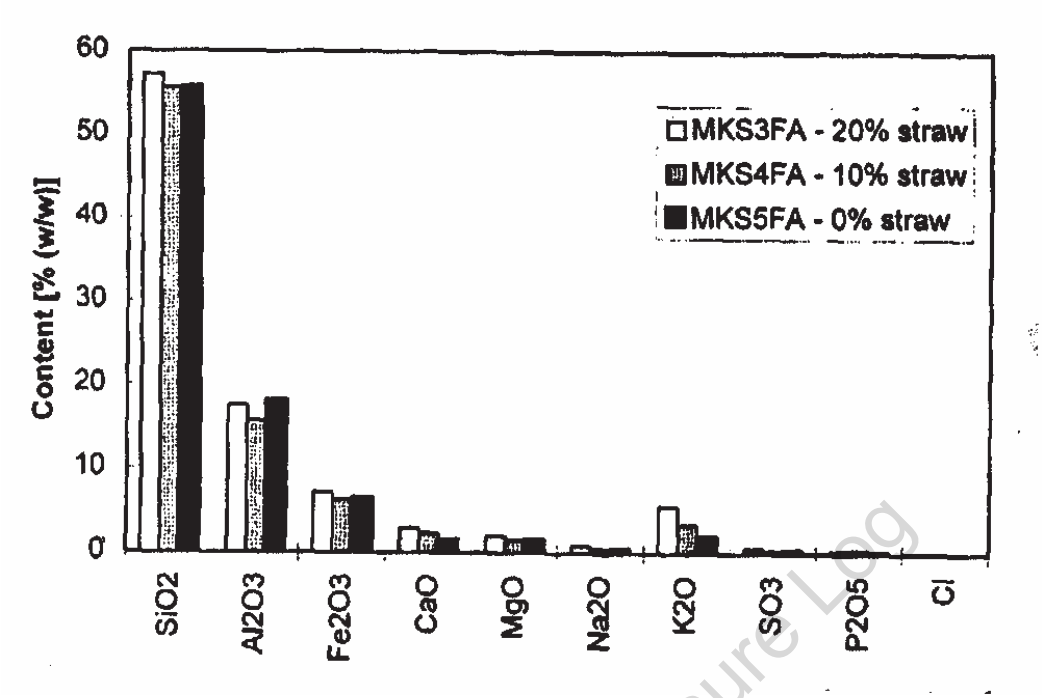


Figure 1. Chemical composition of fly ashes (14)

Published on DEST Disclosure Log RTI Act 2009

It can be seen that at 10% straw addition, the ashes with and without the straw are similar. Small differences are found in the content of CaO, Na_2O, K_2O SO_3, P_2O_5 and Cl, which increase with increasing straw fraction in the fuel. The conclusion from the experiments was that with up to 10% straw addition the requirements from the use in concrete were fulfilled.

The increases in chloride content and alkalies content (15) with the increased straw content (from 0 to 10 and 20%) are from 0.001, 0.002 to 0.054% chloride and from 1.72, 2.85 to 4.4% total alkalies.

Table 10 presents ***calculated*** average elemental analyses of coal/ wood blends from CSIRO, Energy Technology database (23). The database can calculate properties of a mixture of a selected coal and 1 and/or 2 selected biomasses at different proportions between the selected combinations. The table presents some examples of the results of calculated ashes when Eraring coal is combine with pine sawdust or eucalypt sawdust in proportion of 90/10 wt. %. The elemental analyses of saw dusts only are those presented in Table 7. It can be seen that at 10% addition, the ashes with and without the sawdust are similar, mainly because the ash proportion of wood is very small compare with the ash resulting from coal.

All data presented indicate that up to 10% use of biomass in co-combustion process, the derived fly ashes show no significant differences compared with conventional fly ashes.

It has to be mentioned that there are some information related to the leachability of biomass (heave metal elements) for possible use as fertilizers and trace element emissions from co-combustion. These data are not presented because they are beyond the scope of this report. The information will be made available to the ADAA on request.

Table 10. Elemental composition of ashes from coal/Australian wood mixture (23)

Element	Eraring Bituminous Coal Ash	90 wt. % Eraring coal 10 wt. % Radiata Pine, sawdust, NSW	90 wt. % Eraring coal 10 wt. %, Eucalypt, sawdust, NSW
	wt. %		
Ash	22.8	20.6	20.9
Na	0.26	0.26	0.28
Mg	0.29	0.31	0.31
Al	10.6	10.6	10.7
Si	34.6	34.6	35.2
P	0.05	0.06	0.06
K	0.92	0.96	0.96
Ca	0.49	0.54	0.55
Ti	0.48	0.48	0.50
Mn	0.05	0.05	0.05
Fe	2.28	2.29	2.37

Published on DESI Disclosure Log FOI Act 2009

4 POZZOLANIC PROPERTIES OF FLY ASH FROM CO-COMBUSTION AND THE INFLUENCE ON APPLICATIONS IN CONCRETE

The published data related with pozzolanic properties and utilisation in cement and concrete applications of the fly ashes from co-combustion, specifically with only wood, are very scarce. Therefore this chapter will review all data available on the subject; they are related not only to wood co-firing, but to different biomasses used.

The data presented in the above chapters show evidence that in some cases, the properties of fly ash produced by co-combustion could be different from fly ash from coal only product. This is particularly evident at high biomass inputs levels.

The main changes reported were:

- some biomass crops may have high level of potassium or/ and magnesium and
- some biomass waste may contain heavy metals.

World-wide, the majority of fly ash generated from coal combustion (16) is used in the manufacturing of cement, concrete and concrete products. As a result, starting with early 1990's programs, such as EU clean coal technology (5) and the Electric Power Research Institute (EPRI) in USA (6), acknowledge the unresolved issues related to co-firing process:

- the influence on fly ash properties as a pozzolanic material,
- the consequence on fly ash utilisation and sales, and
- the question of changing the standards which do not allow its utilisation if the ash is partly from biomass origin.

Still there are few published data on the subject, possibly because in these years the focus of all programs was mainly to clarify and develop databases related to transport, fuel preparation, combustion characteristics, boilers performance, operational problems(corrosion, slagging, fouling), and emissions.

The most significant papers related with properties of cement and concrete containing fly ashes from biomasses and coal co-combustion are as follows:

1. Boyan, Larrimore and Fouad (17) presented the results on the effects of fly ashes from co-firing of up to 30% wood (by weight) with coal. The study was conducted in 1996-1998 by University of Alabama and others. The paper is attached in **Annex C**.

The fly ashes were obtained from three plants: one was a mixture of bituminous coal with ***8% (by weight) green sawdust;*** the second was mixture of bituminous coal with ***10% (by weight) tree trimming waste and sawdust*** and the third was wood fly ash from a paper mill wood-fired boiler. The ash from paper mill wood fired boiler was used to make ***artificial blends with coal ash at 0 and up to 30% wood co-firing*** (by weight of fuel).

The test program includes the manufacturing of 60 fly ash mixes and was designed to cover a variety of cement content combined with coal ash and wood/coal ash and the corresponding controls. The slump and air content were fixed. Fresh concrete properties of concretes were determined: slump (3 to 5 inches), air content (3.5 to 5.5%), setting time. Hardened concrete properties determined were compressive and flexural strength, rapid chloride permeability and freeze – thaw behaviour. All tests were performed in accordance with relevant ASTM standards.

There was a very large amount of data generated, with tests performed on about 1000 concrete samples. Based on the tests results, the authors (17) conclude the followings:

- There was no drastic change on water demand, workability, air admixture dosage or setting time.
- The addition of wood ash appeared to make little difference in compressive strength development and flexural strength was not affected.
- It appeared that the wood ash in the fly ash did not have detrimental effect on concrete‘s permeability (chloride penetration).

In order to illustrate the results, Figures 2, 3 and 4 present setting time, some compressive strengths and rapid chloride permeability, respectively.

Published on DEWI Disclosure Log
RTI Act 2009

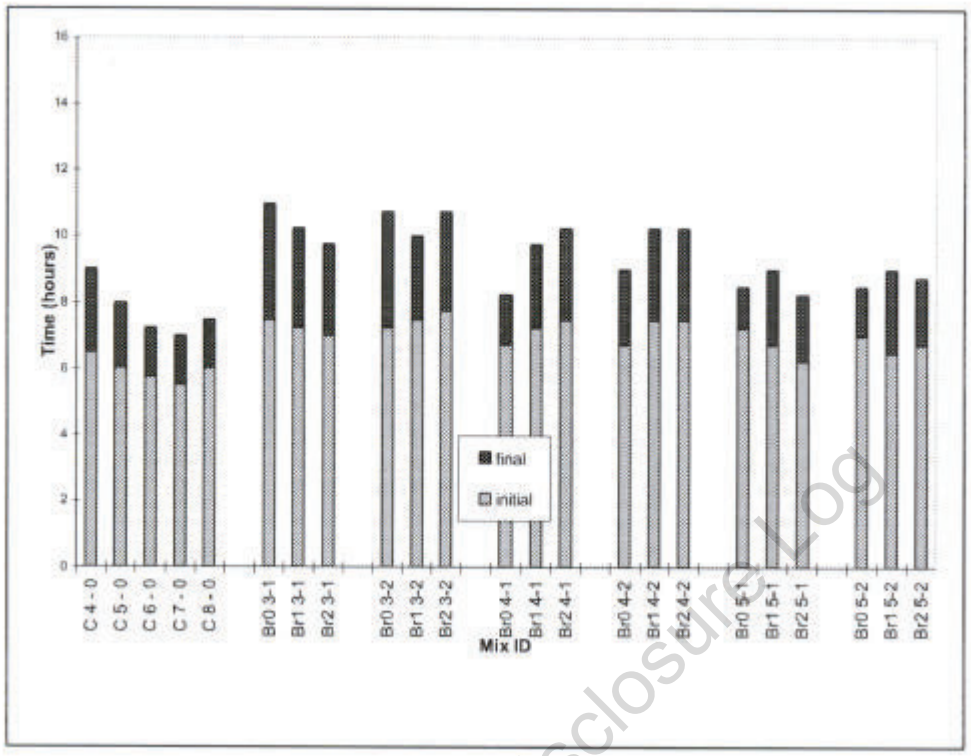


Figure 2. Setting time. **C** mixes – control (no fly ash); **Br 0** mixes – coal fly ash; **Br 1** and **Br 2** mixes - 4% and 8% respectively wood in co-combustion with coal (17).

Published on DESI Disclosure Log
RTI Act 2009

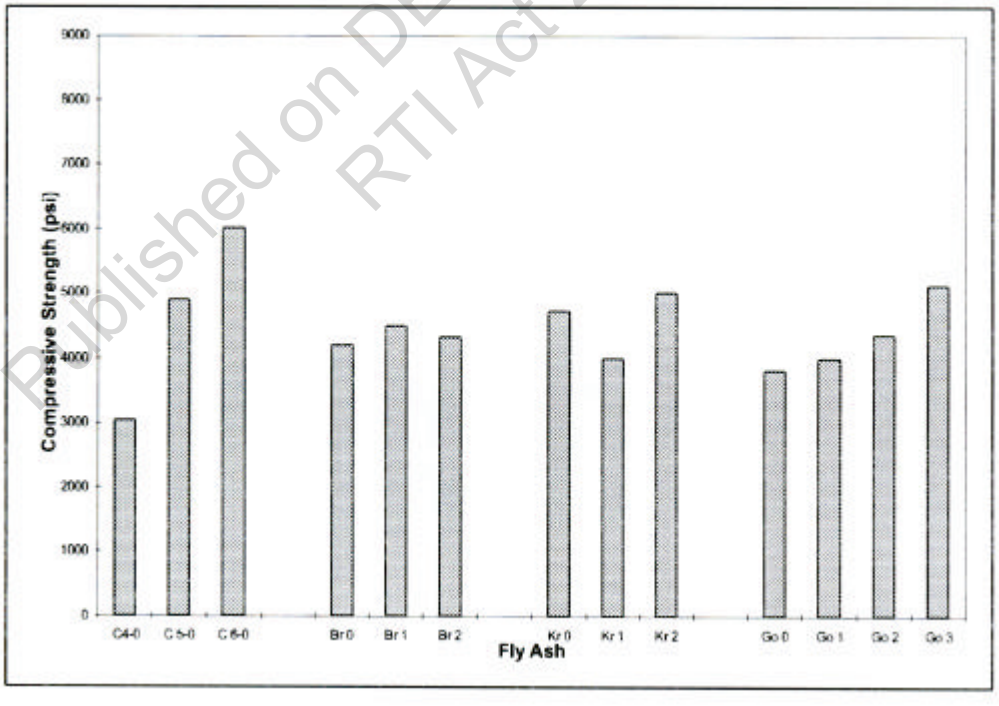
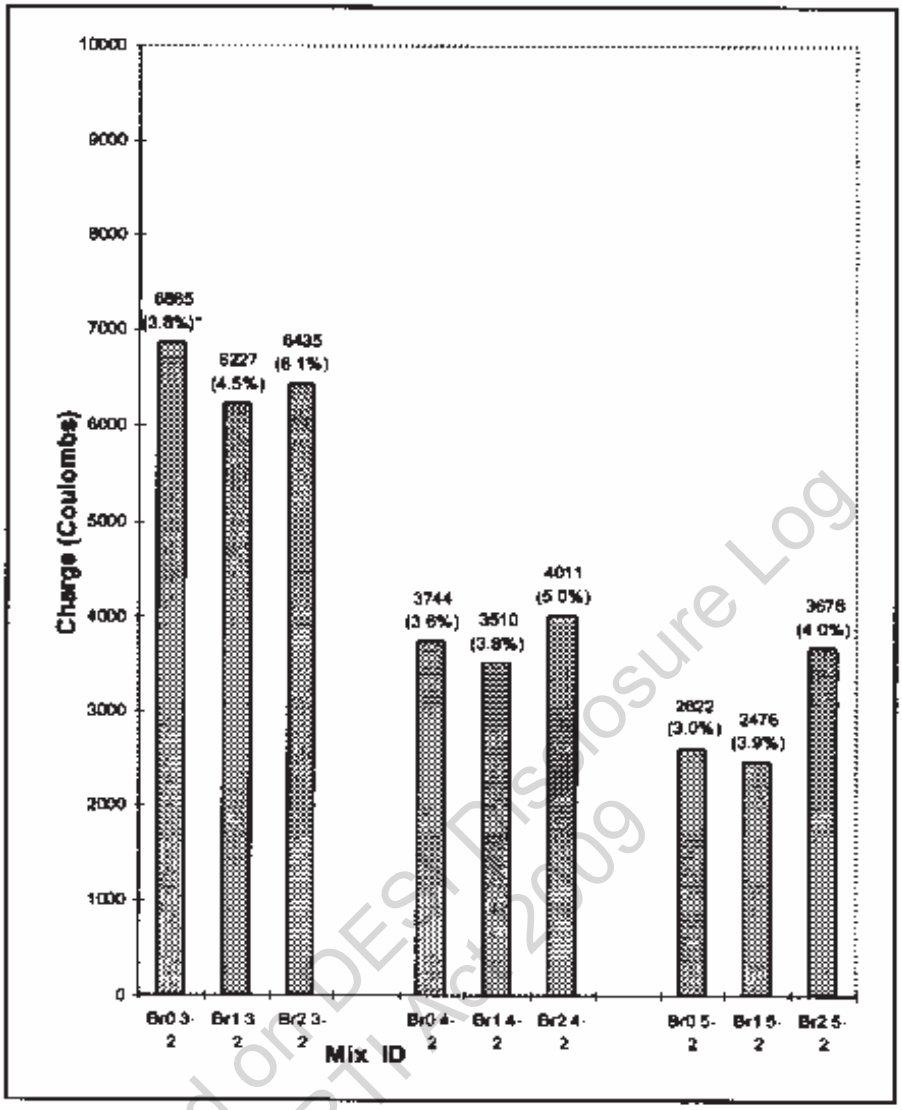


Figure 3. Compressive strength. **C** mixes – control (no fly ash); **Br 0, Kr 0, Go 0** mixes – coal fly ash; **Br 1** and **Br 2** mixes with 4% and 8%**, Kr 1 and Kr 2** mixes with 5 and 10%, **Go 1, Go 2** and **Go 3** with 10, 20 and 30% respectively wood in co-combustion with coal (17).



Published on DES Disclosure Log RTI Act 2009

Figure 4. Rapid chloride permeability. **Br 0** mixes – coal fly ash; **Br 1** and **Br 2** mixes 4% and 8% respectively wood in co-combustion with coal (17).

There are two main studies (13, 18) related strictly to co-combustion ashes, recently presented at the 12th European Biomass Conference, Workshop 5: Biomass Co-firing in June 2002, Amsterdam. The Conference was organised by IEA Bioenergy Task 32: Biomass Combustion and Co-firing.

2. Lamers, Vissers and Berg (13) from KEMA (Consultancy Group on Power Generation, Transmission and Distribution of Energy), the Netherlands, presented a broad research program in which the technical and the environmental quality of concrete prepared with fly ashes from co-combustion were evaluated in comparison to the quality of concrete with reference fly ashes. The full reports can be found in **Annex D**. The tests runs were performed at different power plants in 1995/1996. The research was granted by the Dutch power plants. The biomasses used were sewage sludge, paper sludge, pet cokes, wood chips and liquid hydrocarbons. The coal used was the same coal mixture in the same power plant in the same period. The samples of fly ashes were taken from a steady operation situation (minimum 3 days of operation were maintained) in all cases. All secondary fuels added to coal were up to 10%.

It can be seen that not only wood as biomass was considered, but a wide range of other possible secondary fuels.

The quality of fly ashes was assessed according with European Standard EN 450 "Fly ash for concrete, definitions, demands and quality control" and Dutch standard CUR 70 that sets requirements on the Activity Index in concrete. Table 11 presents fly ash samples tested.

Table 11. Fly ash samples from co-combustion tested in Dutch program (13)

Sample Code	Secondary fuel used	% of secondary fuel	Location of tests
PET 1	Pet cokes from oil refining operations	10	Geertruidenberg
PET 2		10	
REF-PET		0	
PA 10	Paper sludge, not dry	10	Geertruidenberg
REF-PA		0	
RWZI	Dried sewage sludge	6	Amsterdam
REF- RWZI		0	
BIO	Biomass pellets prepared from paper sludge, composed sewage sludge and thinning wood	5	Rotterdam
REF 1995	Conventional fly ashes with quality certificate, yearly average(1995)		

Published on DESI Disclosure Log
RTI Act 2009

The assessment procedure of the suitability of fly ashes as cement replacement consisted the followings:

- verification of the quality as standards requirements, such as composition, fineness, strength;
- concrete properties, such as durability and action of plasticisers and air-entraining admixture
- verification of leachability of concrete.

Results of the chemical characterisation are presented in Tables 12 and 13.

The results indicate that there are ***no significant differences*** compared with conventional fly ashes**.** ***Some difference in silica content, calcium oxide content was observed from paper sludge ash, high phosphate content for dried sewage sludge and biomass pellets. Some fly ashes (biomass pellets and paper sludge) did not meet standard requirements for LOI (loss on ignition).*** The morphology of fly ashes, examined by Scanning Electron Microscope, showed no differences between reference samples and those resulting from co-combustion.

Regarding the LOI, from the results presented, it is an indication that the increased LOI is due to the operation system rather then due to the fuel used.

The normal consistency and setting time were tested with pastes consisting of 80% cement and 20% fly ashes. The consistency and setting time of pastes with fly ashes from co-combustion showed no significant differences to their references. The soundness was not tested because none of the fly ash samples showed a free lime content more then 1%. The workability and strength development were tested on standard mortars prisms (40x 40 x 160 mm). Mortars were prepared according to EN 450 (1350 g sand, 450g binder, for fly ash binder the proportion were 75% cement and 25% fly ash, and W/B of 0.5). The Activity Index is the ratio between strength of fly ash mortar and reference mortar. These data are presented in Table 14.

Table 12. Oxide composition of fly ash samples from co-combustion tested in Dutch program (13)

Sample Code	Oxide composition (%)								
	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	K_2O	TiO_2	P_2O_5
PET 1	65.3	20.8	9.1	1.51	1.43	0.57	1.97	0.88	0.18
PET 2	66.3	20.4	8.8	1.46	1.39	0.55	1.92	0.86	0.18
REF-PET	65.9	21.1	8.8	1.55	1.20	0.48	1.89	0.87	0.19
PA 10	46.7	26.6	5.7	14.7	1.6	0.45	1.5	1.2	0.79
REF-PA	58.2	27.9	6.1	3.0	1.1	0.39	1.9	1.5	0.13
RWZI	53.2	21.0	10.3	5.6	1.0	0.41	1.0	1.1	3.6
REF-RWZI	58.4	23.0	8.2	3.4	0.9	0.42	1,1	1.1	0.39
BIO	51.7	27.6	8.7	5.4	0.64	0.64	1.46	1.4	0.8
REF 1995	60.0	23.0	5.6	3.7	0.37	0.37	1.30	1.2	n.a.

Published on DFSI Disclosure Log FOI Act 2009

Table 13. Other chemical characteristics and the fineness of fly ash samples from co-combustion tested in Dutch program (8)

Property	SO_3	LOI	Free CaO	Glass Content	Fineness (% >45µm)
Units	% m/m	% m/m	% m/m	% m/m	% m/m
Method/Standard	**CUR 70 EN 450**	**EN 450**	**EN 450**	**NEN 5435**	**EN 450**
Requirement	**≤ 3.0**	**≤ 5.0**	**≤ 1.0**	**≥ 50**	**≤ 40**
PET 1	0.86	3.3	< 0.1	69.0	13.8
PET 2	0.43	2.3	< 0.1	69.0	14.3
REF-PET	0.98	1.6	< 0.1	71.0	13.6
PA 10	1.30	4.35	0.52	48.0	34.9
REF-PA	-	6.12	0.07	62.0	32.8
RWZI	0.09	1.51	0.26	59.2	30.0
REF- RWZI	0.15	1.85	0.63	56.1	23.0
BIO	0.6	6.70	0.23	55.8	26.8
REF 1995	0.61	2.56	0.29	56.6	27

Table 14. Compressive strength of mortar prisms (25% fly ash replacement). Dutch program (13)

	Compressive strength in N/mm^2					Activity Index in %	
Age (days)	**1**	**3**	**7**	**28**	**91**	**28**	**91**
Requirement						**75**	**85**
Reference Cement	17.8	40.1	50.0	61.2	69.9	100	100
PET 1	11.9	29.8	41.3	51.8	62.5	85	89
PET 2	12.7	29.9	40.3	51.8	62.2	85	89
REF-PET	12.1	28.8	40.1	51.8	65.7	85	94
PA 10	12.7	31.9	40.7	55.4	65.7	91	95
REF-PA	-	30.3	40.4	54.6	64.0	85	92
RWZI	-	29.4	39.1	53.9	71.1	86	105
REF- RWZI	-	29.7	39.1	51.9	68.9	82	102
BIO	12.7	31.2	40.8	54.0	63.6	88	91
REF 1995	13.2	31.8	42.3	54.3	62.7	89	90

The results presented in Table 14 indicate that ***is no significant influence from co-combustion on strength development.***

Concrete strength was determined on standard cubes (150x150x150 mm) according to CUR 70. Concrete had a binder content of 320 kg/m^3, with 80% cement and 20% fly ash, aggregates, sand and gravel with maximum size 31.5 mm, and water content to reach a slump of 70±10 mm. The strength and Activity Index of concrete is presented in Table 15.

Table 15. Compressive strength of concrete (20% fly ash replacement). Dutch program (8)

	Compressive strength in N/mm^2		Activity Index in %	
Age (days)	**7**	**28**	**7**	**28**
Requirement			**≥ 70**	**≥ 80**
PET 1	29.2	40.1	82	88
PET 2	30.2	41.3	84	90
REF-PET	30.6	41.4	85	91
PA 10	30.9	41.0	83	87
REF-PA	30.0	38.2	80	81
RWZI	31.1	45.3	80	89
REF- RWZI	28.9	42.4	74	83
BIO	28.8	37.8	80	83
REF 1995	29.7	40.4	83	88

It was concluded that the ***fly ashes from co-combustion meet the technical standards and are comparable in this respect with conventional fly ashes.***

Published on DFSI Disclosure Log RTI Act 2009

The assessment of influence of fly ashes from co-combustion on concrete durability was performed based on water sorptivity (suction) after 28 and 91 days, carbonation, chloride penetration and freeze-thaw-salt resistance. Figure 5 presents the results of chloride content of concrete samples at different depth after 35 days immersion in 16.5 % sodium chloride solution. The results show that there is no significant difference between fly ashes from co-combustion and the reference fly ash.

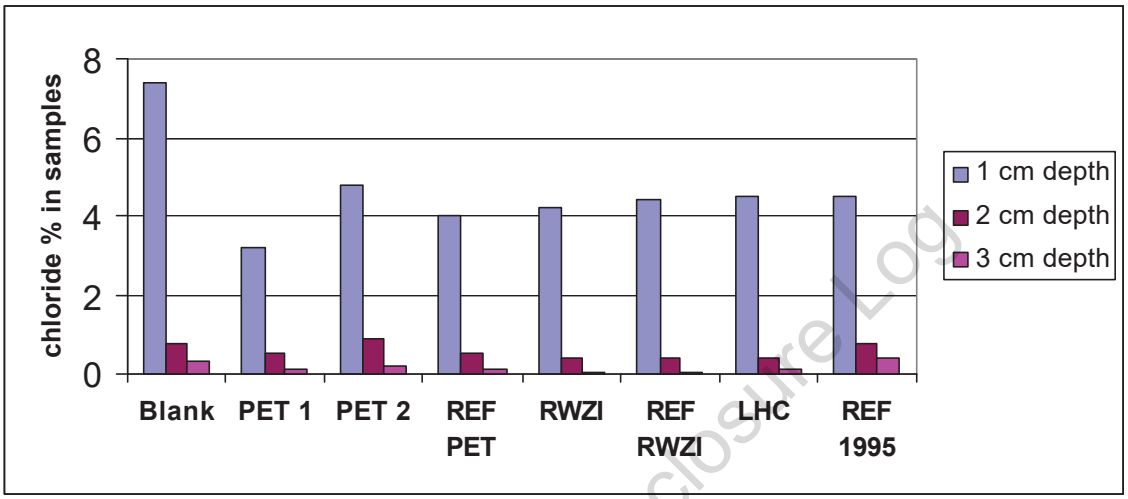


Figure 5. Chloride content of concrete samples after 35 days of chloride immersion (13).

Published on PESI Disclosure Log
RTI Act 2009

The action of three types of super-plasticisers (naphthalene formaldehyde, melamine resin and lignosulphonate), one type of air-entraining admixture and one type of retarding admixture were tested. It was concluded that ***fly ashes from co-combustion did not show any significant different behaviour in combination with chemical admixture.*** Some differences noticed in conjunction with air-entraining agent were attributed to higher LOI in the sample, which were considered to be due to combustion process in particular plant and not to the use of bio-fuel.

Leaching behaviour of concrete prepared with fly ashes from co-combustion was measured and it was concluded as well that these ***fly ashes can be used without any ecological problems.***

Following the research program, ***a procedure was develop to show that fly ashes from co-combustion (maximum 10%) are technically equal to conventional fly ashes*** from only coal combustion. The procedure consists of the tests required in accordance to EN 450 "Fly ash for concrete" extended with a "conformity analysis" in which the effect of fly ashes on durability and on the use of chemical admixture are established. The procedure has been made part of the Dutch technical standard. ***If the allowance program is passed, fly ashes from co-combustion can be sold to the market as regular coal fly ashes***.

Since 1999 fly ashes from co-combustion of paper sludge and biomass pellets (prepared from paper sludge, composed sewage sludge and thinning wood) have been shown to be conforming to the established procedure. The secondary fuels that are now considered for testing are wood, poultry litter, sewage sludge, coffee grounds and cocoa shell.

3. Baxter (18), from Brigham Young University, showed the results of recent projects in the USA on the characterisation of concrete produced with biomass derived fly ashes. The biomass used in co-firing was switch grass in proportion of 10 and 20%. The fly ashes were used as 25% cement replacement; no details data about the concrete were given. The data present comparatively the setting time and strength of concrete prepared with cement only, class C and F coal fly ashes (25% replacement) and fly ashes from co-combustion.

Figure 6 presents the compressive strengths, which are given comparatively without and with class F fly ash (and class C).

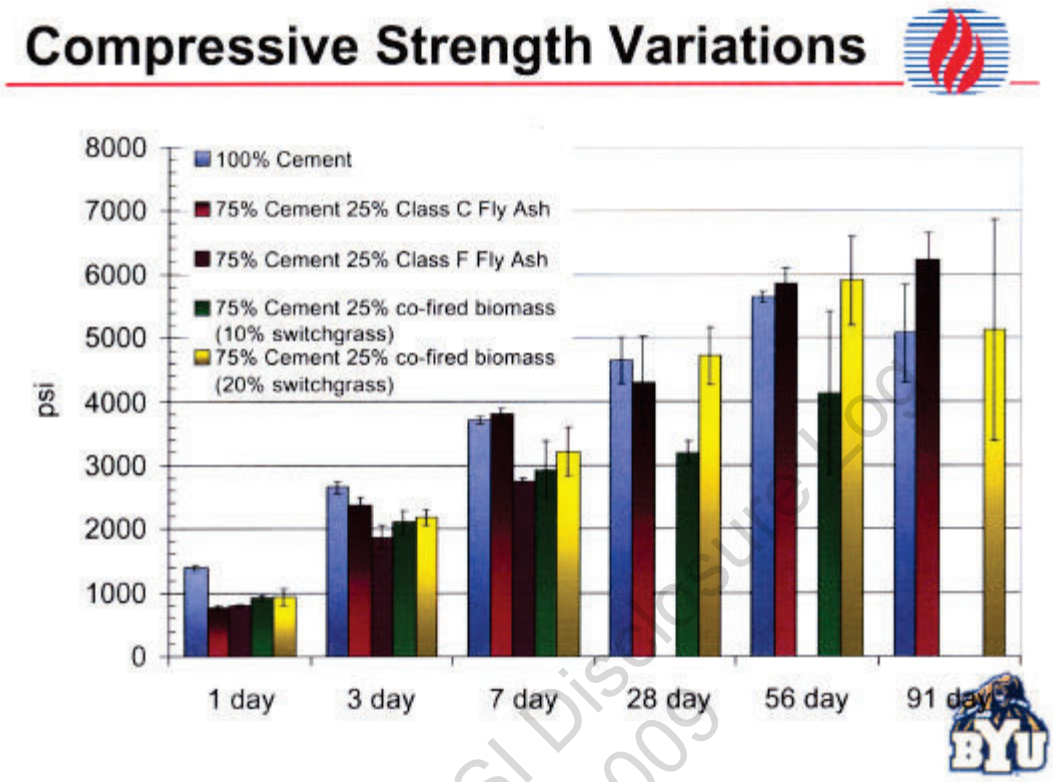


Figure 6. Compressive strengths as presented by Baxter (18).

Published on DESI Disclosure Log RTI Act 2009

The strengths seem not to be affected. Some differences in compressive strength development can be noticed in Figure 6 especially at 28, 56 and 91 days with fly ash derived from 10% biomass used in co-combustion. These differences can not be discussed or explained because no details were given.

All data presented indicate that technically the use of fly ash from co-combustion of coal and, not only wood, but different type of biomass in small proportions, up to 10%, can be used in cement and concrete application without any particular adverse implications on concrete properties. However, there are still not a very comprehensive body of data available for all types of biomasses, such as different types of wood waste, herbaceous materials. Some data may suggest that alkali, chlorine, magnesium derived from these biomasses may compromise some important properties of concrete, such as setting time and long term properties.

5 CHANGES TO FLY ASH STANDARDS DUE TO CO-COMBUSTION PROCESS

The current standards world-wide preclude the use of fly ash as a component material in cement and concrete from any source other than coal.

A review of the current status of the standards related to fly ash for use with cement and/or concrete in Europe, USA and Canada indicate that existing standards specify the use of fly ashes from coal only combustion.

The most recent edition of ASTM C 618- 01 “Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete” (19), still maintains the same definition of fly ash as in previous edition of this standard.

"3.1.2 fly ash – the finely divided residue that results from the combustion of ground or powdered coal and that is transported by fuel gases."

Note 2 – This definition of fly ash does not include, among other things, the residue resulting from: (1) the burning of municipal garbage or any other refuse with coal; (2) the injection of lime directly into the boiler for sulfur removal; or (3) the burning of industrial or municipal garbage in incinerators commonly known as 'incinerator ash'."

This definition, including the note, excludes the use in concrete the ash which is partly from biomass origin.

Therefore, it is recognized around the world that one of the major barrier to the introduction of co-combustion in power plants is the utilization and marketing of the power plant fly ash if the biomass is used as a secondary fuel with coal.

Since 1999 a sub-commission of CEN technical Committee 154 is developing a new version of European Standard EN 450 –"Fly Ash for Concrete - Definitions, Requirements and Quality Control"; Part 1: Definition, Specifications and Conformity Criteria; Part 2: Conformity Evaluation." (CEN PREN 450, 450-1 and 450-2). In the new version the use of fly ashes from co-combustion is regulated. The new EN standard was mainly developed based on the comprehensive research program undertaken with the leadership of the Dutch Fly Ash Corporation, The Netherlands (13).

The changes proposed to EN 450 are found in (20) that it is attached in **Annex E**.

The followings present the proposed changes to European Standard EN-450 "Fly ash in concrete" (20):

1. ❑ **Definition of fly ash**

   Fine powder of mainly spherical, glassy particles, derived from burning of pulverized coal, with or without co-combustion materials as described in Annex A (normative), which has pozzolanic properties and consists essentially of SiO_2 and Al_2O_3, the content of reactive SiO_2 as defined and described in EN 197-1, being at least 25% by mass.

   Fly ash is obtained by electrostatic or mechanical precipitation of dust-like particles from fuel gases of furnace fired with pulverized coal, with or without co-combustion materials.

2. ❑ **Establishment of suitability of fly ash obtained from co-combustion**

   - Limits of type and maximum amount of co-combustion materials based on the aim that the amount of ashes derived from pure coal shall be at least 90% of the total ash.
   - Suitability is proven if the fly ash meet the requirements of EN 450 and additionally:
     - ✓ Reactive silicon oxide $SiO_2 \geq 25\%$
     - ✓ Sum of $SiO_2 + Al_2O_3 + Fe_2O_3 \geq 70\%$
     - ✓ Total alkalies (Na-eq) $\leq 5\%$
     - ✓ The initial setting time of a 25% flay ash plus 75% cement paste shall not deviate by more than 0 hour to +2 hours than the initial setting time of a 100% cement paste.

Published on DESI Disclosure Log RTI Act 2009

3. ❑Type and maximum amount of co-combustion materials [1)]

Co-combustion material	Maximum percentage by dry mass of co-combustion material related to coal (%)
Vegetable material like wood chips, straw, olive shells and other vegetable fibers	20
Green wood and cultivated biomass	8
Bone meal	2
Municipal sewage sludge	3
Paper sludge	5
Petroleum coke	10
Virtually ash free liquid fuels and gaseous fuels	20 [2)]

[1)] The maximum percentage of co-combustion material related to pure coal is based on an average ash content of 12% for pure coal and an average value for each co-combustion material. The limits are calculated based on the aim that the amount of ashes derived from pure coal shall be at least 90% of the total ash. If two or more co-combustion materials are used together the maximum percentage of each is calculated in proportion to the values given in the table.
[2)] Maximum percentage by caloric value of the co-combustion material related to coal.

Published on DESI Disclosure Log RTI Act 2009

6 FUTURE ACTIONS

It is clear that that there is an increase in the utilisation of biomass fuels as secondary fuels in co-combustion in power plants and a necessity for effective management of the by-products and the maximisation of their utilisation.

There is therefore a requirement for redrafting the standards and specifications associated with the utilisation of ashes from power station that will use co-combustion of coal with non-conventional fuels.

At the present time, the literature review indicates that the Nederland is most advanced in successfully operating co-combustion of secondary fuels in power plants on a large scale. The maximum use is set at 10%. Accordingly, future research (21, 22) on the coal combustion by-products will be focussed at the influence of higher percentages of co-combustion on the technical quality and environmental issues.

The main trends and issues related to direct co-combustion (in boilers) reported to be the future activities on the subject (21) are:

- Higher percentage utilisation of biomass;
- By-products (fly ashes, bottom ashes) market not prepared for their utilisation;
- Standardisation of these by-products is not yet in place, EN 450 revision not yet approved and higher percentages of co-combustion will not be possible under EN 450;
- There is a need for R&D programs, focussed at quality and utilisation of "new ashes.
- Lobby work at CEN is necessary to make utilisation in cement and concrete of ashes from direct co-combustion at higher percentage possible.

Within IEA Bioenergy agreement, Task 32: Biomass Combustion and Co-firing works on further expansion of the use of biomass combustion for heat and power generation (22). One of

new task proposals is "Activities on wood waste combustion". A report will be compiled on results of different R&D projects on wood waste combustion. It was agreed to organise a workshop on the subject in conjunction with the final meeting of Task 32 in Japan in autumn 2003. The focus, apart from processes, deposits formation, corrosion and emissions, is on fuel classification. The quality of wood differs from place to place; certain wood materials contain very low contaminants others are heavily contaminated by wood preservatives. The practical experience of using waste wood in Sweden is considered and several studies are in progress.

Published on DESI Disclosure Log
RTI Act 2009

7 SUMMARY

Combustion of biomass and waste is an increasingly important option, both as an environmental and economical means of disposal and potential conversion of waste to energy. The increasing development of co-combustion/co-firing of non-conventional fuels has resulted in the production of mixed residues/by-products.

Efforts to develop ways of using biomass are currently supported by various national and international programs. The technique has influence on plant operations, emissions and residues. Therefore, the aim of the programs was to clarify transport and fuel preparation, combustion mechanism and operational problems (corrosion, slagging, fouling). The economic and environmental effect of electricity production from different bio-fuels by means of co-combustion with coal in existing coal fired power plants was the first priority of testing programs. However the fly ashes derived from these processes were also investigated with the aim to understand the properties of the "new" fly ashes.

This report presents a brief review of the data from literature and aims to identify the influence of co-combustion of coal and biomass, specifically wood, on ash properties, particularly as a mineral admixture for use in cement and concrete.

Co-firing of biomass in coal fired boilers has been tested in European countries starting since the early 1980's. IEA Bioenergy is an organization set up in 1978 by the International Energy Agency (IEA) with the aim of improving cooperation and information exchange in bioenergy research, development and deployment. The work of IEA Bioenergy is carried out through a series of tasks, each with a defined program for duration of 3 years. Task 32: Biomass Combustion and Co-firing works on expansion of the use of biomass combustion for heat and power generation. Australia is one of the participants.

Information on co-combustion of biomass with fossil fuel is reported from USA since 1987. In 2001, it has been reported that 1.6% of total US energy supply accounts for biomass. The use of biomass to produce electricity is currently contributing to about 7,000 MW in the US.

Biomass is the term used for organic material, both living and dead. The biomass fuels can be divided generally in a few classes:

- Wood and wood materials,
- Herbaceous and other annual growth materials such straw, grasses, leaves,
- Agricultural by-products and residues including shells, hulls, pits, and animal manures.
- Other waste such as sludges, municipal

The types of biomass used in power generation production include energy crops (willows, aspen poplars), wood and wood waste, agricultural and agro-industrial wastes, sewage sludges and municipal solid waste.

The properties of ashes derived from wood depend on various factors: type of plant, part of plant (wood, pulp, and leaves), type of waste (wood, pulp, and paper residue, industrial waste), combination with other fuels sources and proportions, conditions of combustion.

The reported data indicate that wood fly ashes can contain high concentration of calcium, magnesium, potassium, phosphorous and some heavy metal elements. The variations in composition are mainly due to species and geographical location. Trace elements, such as manganese, zinc, chromium and cadmium can varies mostly due to soil composition and type of plant. Other important factor is the quantity of ash that results from the combustion of different types of wood. The ash residue can be between 1 and 20% (by weight). The contribution to the composition of fly ash resulted from co-combustion processes, however, depends on type of biomass burned, the proportion of biomass used with coal, and the amount of ash resulting from each type of biomass burned.

Published on DFSI Disclosure Log RTI Act 2009

For clean wood the amount of ash resulting is small, <1 up to 4 %, therefore it will not have an important contribution to the quality of fly ash from co-combustion process. Data from CSIRO Energy Technology database that present some total ash compositions, burned in laboratory conditions, for different type of Australian wood, support the same findings.

The information about the composition of fly ashes derived from co-combustion of biomasses and coal indicates that there are no significant differences compared with the composition of fly ashes derived from coal only, if the proportion of biomass used is up to 10% (by weight). Changes are reported only when high percentages (some data of up to 30% were found) of biomass is burned with coal: high level of potassium and/or magnesium, increased chloride content, potentially retention of heavy metals, such as zinc, cadmium, chromium.

There are very few published data related to the pozzolanic properties and utilisation in cement and concrete of the fly ashes from co-combustion specifically with only wood. The most comprehensive data came from programs by the U.S. Electric Power Research Institute and the EU clean coal technology with the broadest research program in the Netherlands. These studies have been looking at the effects of fly ashes from co-combustion on the properties of cement and concrete. Biomasses used were: green sawdust, tree trimmings, paper mill wood, paper sludge, dried sewage sludge, switch grass at maximum 10% (some data on 20 and 30% were also reported). The proportion of fly ash used as cement replacement was 20 and 25% (some artificial blends of conventional and wood ash - not co-combustion process - up to 30%).

The tests include fresh cement and concrete properties (normal consistency on paste and setting time on paste and concrete, concrete slump), strength development on mortars and concrete, durability of concrete (rapid chloride permeability), action of plasticisers and air-entraining admixture, and verification of leaching behaviour of concrete. Tests were performed in accordance with ASTM standards or EN standards and some national standards.

Based on tests results, it was concluded that there are not significant differences compared with conventional fly ashes. The following are findings regarding the fly ashes derived from co-combustion:

- meet technical standards, no significant influence on strength development;
- any significant change in behaviour related to durability or in the use of chemical admixture;
- can be used without any ecological problems;
- increases in setting times were noted in some studies;
- increase in setting times and shrinkage of mortars, reduction of long term strength were found in case of fly ash from municipal waste incineration (not co-combustion) due to high LOI, alkalies, chloride and heavy metals (zinc and lead).

Published on DES Disclosure Log
RTI Act 2009

Based on the Dutch research program, a procedure was developed to evaluate if fly ashes from co-combustion (maximum 10%, by weight) are technically equal to conventional fly ashes. If the allowance program is passed, fly ashes from co-combustion can be sold to the market as regular coal fly ashes.

A review of the current status of the standards related to fly ash for use with cement and/or concrete in Europe, USA and Canada indicates that existing standards specify the use of fly ashes from coal only combustion. Therefore, it is recognized around the world that one of the major barrier to the introduction of co-combustion in power plants is the utilization and marketing of the power plant fly ash if the biomass is used as a secondary fuel with coal.

Since 1999 a sub-commission of CEN Technical Committee 154 is developing a new version of European Standard EN 450 –"Fly Ash for Concrete - Definitions, Requirements and Quality Control"; Part 1: Definition, Specifications and Conformity Criteria; Part 2: Conformity Evaluation." (CEN PREN 450, 450-1 and 450-2). In the new draft version the use of fly ashes from co-combustion is regulated. The new draft EN standard was mainly developed based on

the comprehensive research program undertaken with the leadership of Dutch Fly Ash Corporation, the Netherlands.

The proposed changes to European Standard EN-450 "Fly ash for concrete" are:

1. ❑ **Definition of fly ash**

   Fine powder of mainly spherical, glassy particles, derived from burning of pulverized coal, with or without co-combustion materials as described in Annex A (normative), which has pozzolanic properties and consists essentially of SiO_2 and Al_2O_3, the content of reactive SiO_2 as defined and described in EN 197-1, being at least 25% by mass.

   Fly ash is obtained by electrostatic or mechanical precipitation of dust-like particles from fuel gases of furnace fired with pulverized coal, with or without co-combustion materials.

2. ❑ **Establishment of suitability of fly ash obtained from co-combustion**

   - Limits of type and maximum amount of co-combustion materials based on the aim that the amount of ashes derived from pure coal shall be at least 90% of the total ash.
   - Suitability is proven if the fly ash meet the requirements of EN 450 and additionally:
     - ✓ Reactive silicon oxide $SiO_2 \geq 25\%$
     - ✓ Sum of $SiO_2 + Al_2O_3 + Fe_2O_3 \geq 70\%$
     - ✓ Total alkalies (Na-eq) $\leq 5\%$
     - ✓ The initial setting time of a 25% flay ash plus 75% cement paste shall not deviate by more than 0 hour to +2 hours than the initial setting time of a 100% cement paste.

3. ❑**Type and maximum amount of co-combustion materials** [1)]

Co-combustion material	Maximum percentage by dry mass of co-combustion material related to coal (%)
Vegetable material like wood chips, straw, olive shells and other vegetable fibers	20
Green wood and cultivated biomass	8
Bone meal	2
Municipal sewage sludge	3
Paper sludge	5
Petroleum coke	10
Virtually ash free liquid fuels and gaseous fuels	20 [2)]

[1)] The maximum percentage of co-combustion material related to pure coal is based on an average ash content of 12% for pure coal and an average value for each co-combustion material. The limits are calculated based on the aim that the amount of ashes derived from pure coal shall be at least 90% of the total ash. If two or more co-combustion materials are used together the maximum percentage of each is calculated in proportion to the values given in the table.

[2)] Maximum percentage by caloric value of the co-combustion material related to coal.

It can be concluded from the data found in the literature that there are not changes of the properties of the fly ashes from co-combustion of coal and maximum 10% by weight biomass (wood) if the wood and wood waste used is clean wood from forestry activities or clean industrial wood (not treated wood). This is especially evident if the ash resulting from wood burning is, as indicated in the literature, less than 1% to 5%. Therefore, based on these data and the above assumptions (clean wood and maximum 10% wood addition), it is expected that fly ashes from co-combustion process to be comparable with conventional fly ashes from coal only burning process.

Released on DES Disclosure Log RTI Act 2009

8 REFERENCES

1. Green Energy, "Green energy in Europe", June 2001.

2. Jenkins, B. M., Baxter, L. L., Miles Jr., T. R., Miles, T. R., "Combustion properties of biomass", Fuel Processing Technology, 54, 1998, pg 17 – 46.

3. Report of the final seminar held at 1st World Conference and Exhibition on Biomass for Energy and Industry, June 2002, Seville, from http://www.ieabioenergy-task32.com.

4. Zevenhoven, M., "The Utilisation of Biomass Ash", Report 01-08, 2002, ? bo Akademi, Faculty of Chemical Engineering, Combustion and Materials Chemistry, Finland.

5. Hein, K. R. G. and Bemtgen, J. M., "EU clean coal technology – co-combustion of coal and biomass", Fuel Processing Technology, 54, 1998, pg 159 – 169.

6. Hughes, E. E. and Tillman, D. A., "Biomass cofiring: status and prospects 1996", Fuel Processing Technology, 54, 1998, pg 127 – 142.

7. Sondreal, E. A., Benson, S. A. and others, "Review of advances in combustion technology and biomass cofiring", Fuel Processing Technology, 54, 2001, pg 7 – 38.

8. Addressing the constraints for successful replication of demonstrated technologies for co-combustion of biomass/waste, DIS/1743/98-NL, Energie publication of European Commission, from http://www.ieabioenergy-task32.com.

9. Demeyer, A., Voundi Nkana, J. C., Verloo, M. G., "Characterisation of wood ash and influence on soil properties and nutrient uptake: an overview", Bioresource Technology, 77, 2001, pg. 287 – 295.

10. Steenari, B. –M., Schelander, S. and Lindqvist, O., "Chemical and leaching characteristics of ash from combustion of coal, peat and wood in a 12 MW CFB – a comparative study", Fuel, 78, 1999, pg. 249 – 258.

11. Alkemade, M. M. C., Loo, S. and Sulilatu, W. F., "Exploratory investigation into the possibilities of processing ash produced in the combustion of rejected wood", Report TNO-MEP – R 99/357, August 1999, The Institute of Environmental Sciences, Energy Research and Process Innovation, The Nederland, from http://www.ieabioenergy-task32.com.

12. Camerani, M. C., Steenari, B-M., Sharma, R., Beckett, R., "Cd speciation in biomass fly ash particles after size separation by centrifugal SPLITT", Fuel, 81, 2002, pg. 1739 – 1753.

13. Lamers, F. J. M., Vissers, J. L. J. And van der Berg, J. W., "Effects of co- combustion of secondary fuels on fly ash quality", Presentation at Cofiring Seminar, 20 June 2002, from http://www.ieabioenergy-task32.com.

14. Hansen, L. A., Frandsen, F. J. And Dam-Johansen, K.,"Characterisation of ashes and deposits from high-temperature coal-straw co-firing", Energy and Fuel, 13, 1999, pg. 803 – 816.

15. Wieck-Hansen, K., Overgaard, P. and Larsen, O.H., "Cofiring coal and straw in a 150 MW_e power boiler experiences", Biomass and Bioenergy, 19, 2000, pg. 395 – 409.

16. Hall, M. L. and Livingstone, W. R., "Fly ash quality, past, present and future, and the effect of fly ash on the development of novel products", Journal of Chemical Technology and Biotechnology, 77, 2002, pg. 234 – 239.

17. Boylan, D. M., Larrimore, C. L. and Fouad, F., "Properties of concrete containing wood/coal fly ash mixtures", Proceedings of 16th Annual International Pittsburgh Coal Conference, October 1999, Pittsburgh, USA.

18. Baxter, L., Kaer, S. and Hall, M., "Cofiring Biomass and Coal", Presentation at Cofiring Seminar, 20 June 2002, from http://www.ieabioenergy-task32.com.

Published on DESI Disclosure Log
FOI Act 2009

19. Ferreira, C., Ribeiro, A. and Ottosen, L., "Possible applications for municipal solid waste fly ash", Journal of Hazardous Materials, B96, 2003, pg. 201 – 216.

20. ASTM C 618 -01 "Standard Specification for Coal Fly Ash and Raw or Calcinated Natural Pozzolan for Use as a Material Admixture in Concrete".

21. Holcim Presentation by Stefan Dietz, courtesy of Jason Nairn.

22. Lamers, F. "Ashes from direct and indirect co-combustion: utilisation issues", Presentation at Cofiring Seminar, 20 June 2002, from http://www.ieabioenergy-task32.com.

23. Minutes of the 2nd Task Meeting, Task 32 – Biomass Combustion and cofiring, June 2002, Amsterdam, Netherlands, from http://www.ieabioenergy-task32.com

24. CSIRO, Energy Technology, Biofuel Database, http://www.det.csiro.au/science/energyresources/biomass.htm

Published on DESI Disclosure Log RTI Act 2009

9 ANNEXES

- Annex A: Steenari, B. –M., Schelander, S. and Lindqvist, O., "Chemical and leaching characteristics of ash from combustion of coal, peat and wood in a 12 MW CFB – a comparative study", Fuel, 78, 1999, pg. 249 – 258.
- Annex B: Alkemade, M. M. C., Loo, S. and Sulilatu, W. F., "Exploratory investigation into the possibilities of processing ash produced in the combustion of rejected wood", Report TNO-MEP – R 99/357, August 1999, The Institute of Environmental Sciences, Energy Research and Process Innovation, The Nederland, from http://www.ieabioenergy-task32.com.
- Annex C: Boylan, D. M., Larrimore, C. L. and Fouad, F., "Properties of concrete containing wood/coal fly ash mixtures", Proceedings of 16th Annual International Pittsburgh Coal Conference, October 1999, Pittsburgh, USA.
- Annex D: Lamers, F. J. M., Vissers, J. L. J. And van der Berg, J. W., "Effects of co-combustion of secondary fuels on fly ash quality", Presentation at Cofiring Seminar, 20 June 2002, from http://www.ieabioenergy-task32.com.
- Annex E: Holcim Presentation by Stefan Dietz, courtesy of Jason Nairn.

Published on DESI Disclosure Log
RTI Act 2009

Notice

Waste Reduction and Recycling Act 2011

Decision to amend a general approval of a resource—Coal Combustion Products

This Notice is issued by the chief executive to advise of a decision made under section 172 of the Waste Reduction and Recycling Act 2011 *(WRR Act) to amend a general approval for a resource for beneficial use.*

Published by DESI Disclosure Log
RTI Act 2009

This notice amends and replaces general approval referenced ENBU01043609 issued on 12 June 2014 and is a general approval of coal combustion products as a resource of which everyone has the benefit where they are able to meet the conditions imposed on the approval. This approval is subject to the following conditions imposed in accordance with s. 166 of the WRR Act and remains in force until **31 December 2018** (the period of the approval).

The granting of this approval does not warrant or imply the lawfulness of the activity under all legislation, or that approvals necessary under other legislation have or will be approved. It is the responsibility of each person operating under this approval to identify and obtain all other approvals necessary for the proposed activity.

The granting of this approval also does not remove the obligation to take all reasonable and practicable measures to prevent and/or to minimise the likelihood of environmental harm being caused (the 'general environmental duty' in accordance with s. 319 of the *Environmental Protection Act 1994* (EP Act)).

Environmental harm 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. It also does not remove the obligation to comply with the notification provisions contained in the EP Act where an event causes or threatens to cause serious or material environmental harm.

Advice about this general approval

Persons wishing to use the resource under this general approval must comply with the approval conditions. Any resource that is not used as stated in the conditions of this approval is considered a waste and must be managed in accordance with the *Environmental Protection Act 1994* and *Waste Reduction and Recycling Act 2011*, and their subordinate legislation.

This general approval is limited to the State of Queensland. Waste transport and tracking requirements must be complied with, if transporting the material outside of Queensland. Any use of coal combustion products outside of Queensland must be conducted in accordance with the law of the relevant jurisdiction.

Failure to comply with a condition of this approval is an offence carrying a maximum penalty of 1665 penalty units for an individual, and 8325 penalty units for a corporation.

ABN 46 640 294 485

Approved by:

Chris Hill
Director, Industry and Development
Delegate of the chief executive
Waste Reduction and Recycling Act 2011
Date:

Enquiries:

Permit and Licence Management
Department of Environment and Heritage Protection
Ph: 13 QGOV (13 74 68)
Fax: (07) 3896 3342
Email: palm@ehp.qld.gov.au

Published on DESI Disclosure Log
RTI Act 2009

CONDITIONS

Contents

Contents 3
Section 1—General conditions 4
Section 2—Additional conditions for generators 6
Section 3—Additional conditions for transporters 7
Section 4—Additional conditions for suppliers 8
Section 5—Additional conditions for users 8
Section 6—Definitions 9

Published on DESI Disclosure Log
RTI Act 2009

Section 1—General conditions

Limits on the resource

1. The approved resource is limited to **coal combustion products** for use in Queensland (Table 1: Beneficial uses for the resource) and that complies with the associated quality characteristics for the use (Table 2: Resource quality characteristics).

Table 1: Beneficial uses for the resource

Class of beneficial use	Description of beneficial use
Bound applications	The resource can 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. Final products for the purpose of this approval are limited to: a. cementitious mixes b. cement products c. concrete products d. asphalt e. binder for road stabilisation pavements f. rigid and composite pavements structures g. ceramic products h. insulators i. varnishes, plastics, ceramics, ultra-light concrete and metal alloys j. paints, coatings and adhesives k. geopolymers l. rubbers.
Unbound applications	The resource can be used in the following applications on standard areas[1]: a. pipe bedding materials b. sub-surface drainage c. selected backfill for structures d. road pavement, base, sub-base and subgrade structures e. structured and engineered fill f. select layers which act as working platforms at the top of earthworks g. fill for reinforced soil structures (including geo-grid applications).
Soil ameliorant[2]	The resource can be used: a. as a soil ameliorant for direct application to land in agricultural and horticultural activities throughout Queensland. b. in manufacturing a compost, soil conditioner or soil product.

Published on RTI Disclosure Log RTI Act 2009

[1] Standard areas mean land use including residential, parks, recreational play fields, open spaces and commercial and industrial sites; excluding waters and the bed and banks of waters.

[2] A soil ameliorant must have a property that corrects an identified agronomic deficiency in land to which it is applied.

Table 2: Resource quality characteristics

Quality characteristic	Limits for specific uses *				Limit type
	Bound applications (mg/kg)	Unbound applications		Soil ameliorant applications (mg/kg)	
		Total Concentration (mg/kg)	TCLP Leachable Concentration (mg/L)		
Arsenic (total)	NS	100	0.5	20	maximum
Barium	NS	NS	10	NS	maximum
Beryllium	NS	60	NS	60	maximum
Boron	NS	4500	NS	10**	maximum
Cadmium	NS	20	0.05	1	maximum
Chromium (total)	NS	NS	0.5	100	maximum
Chromium (III)	NS	NS	NS	100	maximum
Chromium (VI)	NS	100	NS	1	maximum
Cobalt	NS	100	NS	100	maximum
Copper	NS	6000	10	100	maximum
Lead	NS	300	0.5	150	maximum
Manganese	NS	3800	NS	3800	maximum
Mercury	NS	10	0.01	1	maximum
Molybdenum	NS	NS	NS	10	maximum
Nickel	NS	400	0.5	60	maximum
Selenium	NS	200	0.1	5	maximum
Vanadium	NS	NS	NS	NS	maximum
Zinc	NS	7400	50	200	maximum
Electrical conductivity (dS/m)	NS	NS	NA	10	maximum
pH (pH units)	NS	5 - 14	NA	5 – 14	range

NA = Not applicable
NS = Not specified (monitoring of each element is still required).
* measured using **reference test methods**
**measured using hot $CaCl_2$ method

Published on DESI Disclosure Log RTI Act 2009

Applicability of conditions

2. Any person operating under this approval must comply with the general conditions and all additional conditions relevant to their role(s) and class of beneficial use. Roles specified in this approval are:

    a) **generator**
    b) **transporter**
    c) **supplier**
    d) **user**

Notification of operation under this approval

3. Any generators, suppliers and users operating under this approval must notify the **chief executive** of their name, address, contact information and details of intended resource usage, in writing using the approved

form[3] within 10 business days of beginning supply of or using the resource (whichever is applicable) under this general approval.

Preventing environmental harm

4. The resource must not be released directly or indirectly to land, air, or **waters** in a way that causes or may cause actual or potential environmental nuisance or environmental harm.
5. As soon as the **relevant person** becomes aware of any release of the resource that causes or may cause actual or potential environmental harm, the release must be stopped, and any actual or potential environmental harm must be rectified as soon as practical with the necessary equipment and remediation methods, and all reasonable actions taken to prevent a recurrence of the release.

Storage

6. The resource must be stored in a way that will not cause actual or potential environmental harm, or environmental nuisance.

Exception reporting

7. Any breach of a condition of this approval must be reported to the chief executive within 24 hours of becoming aware of the breach, and full details of the breach and any subsequent actions and results recorded.

Records

8. The following information must be recorded for each load[4] of the resource transported by a person occupying the relevant role[5]:
    a) origin of the resource
    b) quantity of the resource
    c) quality characteristics of the resource (for at least the parameters stated in Table 2)
    d) date of the collection of the resource
    e) destination of the resource.
9. All records required by the conditions of this approval must be kept for at least five (5) years and provided to the chief executive on request.

Other

10. If any supplied resource is surplus to user requirements, it must be returned to the generator, or supplier or disposed of to a waste management facility suitably licensed to accept and manage such material.

Section 2—Additional conditions for generators

Monitoring of the resource

11. Monitoring of the resource quality characteristics to determine compliance with condition 1 (including TCLP leachable concentration testing) must be conducted for the quality characteristics in Table 2: Resource

[3] The approved form is available on the chief executives website at www.ehp.qld.gov.au.
[4] The volume of resource put in or on something for conveyance or transportation, carried at one time. A truck and trailer carrying the resource is considered as one load as well as multiple bins travelling by rail. Where the resource is transported via conveyor systems, information should be recorded on a daily basis until the transfer ceases.
[5] As described in condition 2.

Published on DESI Disclosure Log RTI Act 2009

quality characteristics not less frequently than specified in Table 3: Resource monitoring frequency, and records kept.

Table 3: Resource monitoring frequency

Resource variability	Frequency
Proven resource[6]—Where statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of **contaminant concentrations** and TCLP leachable concentrations with 80% statistical power (chance of detecting a significant difference).	Annually
Unproven resource—Not a proven resource as above.	Once every 500 tonnes or every three months, whichever is more frequent.

12. In addition to the monitoring conducted in accordance with condition 11, where the composition of the resource has changed or is likely to change, more frequent monitoring must be conducted sufficient to detect and characterise the extent of any change.
13. All determinations of the quality of the resource must be carried out on appropriately representative samples.
14. Analysis of samples taken as a requirement of a condition of this approval must be undertaken by a National Association of Testing Authorities (NATA) accredited laboratory or one holding an equivalent certification.

Information to be provided

15. The generator, supplier and transporter of the resource must provide any person to whom they provide the resource (i.e, whichever is relevant - transporters, suppliers or users), information detailing the contaminant concentrations and TCLP leachable concentrations of the resource for at least the characteristics listed in Table 2, a safety data sheet[7].

Published on DESI Disclosure Log RTI Act 2009

Section 3—Additional conditions for transporters

16. The resource must be transported in a manner that prevents the release of the resource to the environment.
17. Should the resource not be accepted at its destination, it must be returned to the generator, supplier or a facility that can lawfully receive the material as soon as practicable.
18. Any resource residue that comes off the vehicle when cleaning, must be returned to the load or taken to a facility that can lawfully accept the material.

[6] Any resource that was determined to be a 'proven resource' under specific approval ENBU00682907 while the approval was in force (effective from 22 January 2008, expiring 30 June 2014) is taken to be a 'proven resource' under this general approval only in relation to bound and unbound applications.

[7] A Safety Data Sheet (SDS) is a document that provides information on the properties of hazardous chemicals and how they affect health and safety in the workplace. SDS shall be compliant with Safe Work Australia's code of practice for production of SDS.

19. Information about the date of delivery must be recorded for each load[8] of the resource.

Section 4—Additional conditions for suppliers

Information to be provided

20. The suppliers of the resource must provide any person to whom they provide the resource, a safety data sheet[9] and information detailing the concentration (Total and TCLP, whichever is applicable) of contaminants in the resource for at least the characteristics listed in Table 2.

21. Information about the date the resource is received must be recorded for each load[10].

Section 5—Additional conditions for users

22. In addition to condition 1, the resource must not have any properties nor contain any other contaminants at concentrations which may cause environmental harm[11] when used in accordance with the conditions of this approval.

23. Information about the date the resource is received must be recorded for each load[12].

24. The use of the resource must be undertaken in accordance with written procedures that:

    a) identify potential risks of environmental harm for the use of the resource during routine operations and emergencies;

    b) establish and maintain control measures that minimise the potential for environmental harm;

    c) ensure, where the resource is incorporated into a product, the product complies with the relevant Australian Standards (where applicable); and

    d) ensure reviews of environmental performance are undertaken at least annually.

Unbound applications

25. Users undertaking an **unbound application** must not use the resource:

    a) below the groundwater table

    b) within 50m of a water supply bore.

Published on DES Disclosure Log RTI Act 2009

[8] The volume of resource put in or on something for conveyance or transportation, carried at one time. A truck and trailer carrying the resource is considered as one load as well as multiple bins travelling by rail. Where the resource is transported via conveyor systems, information should be recorded on a daily basis until the transfer ceases.

[9] A Safety Data Sheet (SDS) is a document that provides information on the properties of hazardous chemicals and how they affect health and safety in the workplace. SDS shall be compliant with Safe Work Australia's code of practice for production of SDS.

[10] The volume of resource put in or on something for conveyance or transportation, carried at one time. A truck and trailer carrying the resource is considered as one load as well as multiple bins travelling by rail. Where the resource is transported via conveyor systems, information should be recorded on a daily basis until the transfer ceases.

[11] See section 14 of *Environmental Protection Act 1994*. Environmental harm includes any adverse effect or potential adverse effect on public amenity and safety, waters, and health of stock grazed and plants grown on land ameliorated by the resource.

[12] The volume of resource put in or on something for conveyance or transportation, carried at one time. A truck and trailer carrying the resource is considered as one load as well as multiple bins travelling by rail. Where the resource is transported via conveyor systems, information should be recorded on a daily basis until the transfer ceases.

Soil ameliorant use

26. Users undertaking **soil ameliorant applications** must only apply the resource to the land where the:
    a) resource applied contains elements, compounds or other qualities that have been identified as being deficient in the relevant land and cropping system to which it will be applied by an **appropriately qualified person**
    b) application is conducted at an agronomic loading rate calculated to correct the deficiency identified in clause (a), considering the resource composition, crop and soil characteristics, having been determined by an appropriately qualified person
    c) application does not cause an adverse impact on the vegetation or soil characteristics or any stock grazing on the land
    d) quality of groundwater and stormwater runoff is not adversely affected.

27. Users undertaking **soil ameliorant applications** involving resource application to land (excluding application of a soil ameliorant material in which the resource has been used, as described in condition 26) must keep the following records of each resource application to land:
    a) details of the land on which the application occurs
    b) date when the resource is applied
    c) the application rate.

28. Users undertaking **soil ameliorant applications** may only mix, blend, or otherwise incorporate the resource into a material to be used as a soil ameliorant for supply to another user where the material to be provided complies with Australian Standard 4454: *Composts, soil conditioners and mulches*, or Australian Standard 4419: *Soils for landscaping and garden use*, including monitoring and keeping records of product quality.

Published on DESI Disclosure Log RTI Act 2009

Section 6—Definitions

Words and phrases used throughout this approval are defined below. Where a definition for a term used in this approval is sought and the term is not defined within this permit the definitions provided in the relevant legislation shall be used.

"appropriately qualified person" means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

"cenosphere(s)" means inert, hollow, essentially thin-walled glass spheres of approximately 10–350 microns having a typical density of 0.4–0.8g/cm^3, comprised largely of silica and alumina and filled with air and/or gasses which are formed from coal combustion ash when in a molten state.

"chief executive" means the Department of Environment and Heritage Protection or its successor.

"contaminant concentration" means the specific contaminant concentration of any chemical contaminant in the resource, expressed as milligrams per kilogram (mg/kg), and quality parameters of pH (expressed in pH units) and electrical conductivity (expressed in decisiemens per metre (dS/m)).

"coal combustion products" means **fly ash**, **furnace bottom ash** and **cenospheres** produced primarily from the combustion of coal within coal fired power stations.

"environmental value" as defined in Chapter 1 of the *Environmental Protection Act 1994*.

"fly ash" means solid material extracted from the flue gasses of a boiler fired with pulverised coal, consisting essentially of the oxides of silicon, aluminium, iron and some calcium of which particle sizes range from less than 1µm (micrometre) to 200µm and are irregular to spherical shape.

"furnace bottom ash" means the agglomerated particles formed at the bottom of the furnace. Bottom ash is typically grey to black in colour, is quite angular, and has a porous surface structure.

"generator" means a person who generates the resource to be used.

“relevant approval” means the relevant permit, authority, certificate, licence, warrant or document that lawfully authorises the carrying out of an activity.

"relevant person" means a generator, supplier, transporter or user.

"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:

1. *AS 4439.1–1999: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Preliminary Assessment* (Australian Standard 1999b).
2. *AS 4439.3–1997: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Bottle Leaching Procedure* (Australian Standard 1997a).
3. *AS 4439.2–1997: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Zero Headspace Procedure* (Australian Standard 1997b).
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).

"site" means the land on which the resource is being used in accordance with the conditions of this approval.

"supplier" means a person who receives the resource and provides it to another supplier or user, or further processes the resource (under the relevant approval) to supply to another supplier or user.

"surface water" means waters excluding groundwater.

"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).

"transporter" means a person who is transporting the resource.

"user" means a person who uses the resource, whether in a raw or processed state, for uses specified in Table 1.

"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.

END OF CONDITIONS

Published on DES Disclosure Log
RTI Act 2009

Project Plan

Industry and Development

Environmental Services and Regulation Branch

PROJECT NAME: End of Waste Code for Coal Combustion Products	
Driver for Project	One submission was received for the development of code for coal combustion products (CCP) from industry body during the 2016 call out for submissions for End of Waste (EOW) Code. After considering the submission and following amendment of EOW framework under the *Waste Reduction and Recycling Act 2011* (WRR Act) on 13 September 2017, the department has decided to develop a code to enable the stakeholders to continue using CCP as a resource under the EOW framework.
Business Unit:	Waste and Contaminated Land Assessment
Project Manager:	Isha Sharma, Team Leader (WCLA) and Radhika Rao, Senior Environmental Officer (WCLA)
Project Duration:	Five months
Project Start Date:	27 October 2017
Project End Date:	27 March 2018
Project Reference:	ENEW07359717 (101/0024168)

Published on DESI Disclosure Log
RTI Act 2009

PROJECT DEFINITION	
Project background and description	**Project description** The project is to develop an end of waste (EOW) Code pursuant to s159 of the *Waste Reduction and Recycling Act 2011* (WRR Act) for the use of CCPs in bound and unbound applications as well as a soil ameliorant in agricultural and horticultural systems. The legislative changes from the beneficial use approval (BUA) framework to the EOW framework commenced on 08 November 2016. Under the new framework, a waste can be used as a resource either under an EOW approval (as a trial) or under an EOW Code. The WRR Act was amended as of 13 September 2017 and now includes the provisions for imposing conditions on the user of the resource through the EOW Codes. The EOW Code will allow for any person to reuse CCP as resource provided that the conditions of the Code are complied with. The project supports the strategic direction of the department by encouraging the continued sustainable reuse of waste through removing the need for each individual to apply for their own EOW approval if they wish to use the material. **Project background** Solid by-products produced from the combustion of coal in a power station boiler

	(including fly ash, bottom ash and cenospheres) are commonly known as CCPs. There is a current general approval for the reuse of CCPs (ENBU01043609) for which the department. Sixty notifications from 31 companies have been received by department for use of CCP as resource under this general approval.. This general approval expires on 31 December 2018. There are also two current specific approvals for the reuse of CCPs with the earliest expiry date of these being 29 September 2019.
Scope of Project:	Develop an EoW Code allowing sustainable reuse opportunities for CCPs in Queensland.
Purpose of Project:	Develop a new EOW Code for coal combustion products prior to the expiry of the existing general approval on 31 December 2018.
Deliverables:	EOW Code in accordance with the WRR Act.

PROJECT GOVERNANCE	
Project Directors:	Kelly Gleeson, Director, Industry and Development, Brisbane, (07) 4699 4360
Project Sponsor	Andrew Connor, Executive Director, Industry, Development and South Queensland Compliance, (07) 3330 6335
Project Manager	Isha Sharma, Team Leader , (07) 3330 5714, and Radhika Rao, Senior Environmental Officer (07) 3181 2429
Consultation management	**Internal consultation within Department of Environment & Heritage Protection (EHP)**: • Waste and Contaminated Land Assessment (project lead) • Industry Sector Regulatory Support (consistency with the departments strategic directions and to assist with external consultation) • Compliance Support (CS) • Communication Services – Nathalie Sengers, Director. Phone: (07) 3339 5854; Email: nathalie.sengers@ehp.qld.gov.au **External consultation with key contacts**: Where relevant, the draft code will be consulted with relevant professional associations representing power station operators, other industry members and member of the community include but not limited to: Ash Development Association of Australia
File Repository	Z:\Contaminated Land\BUA\EOW\EOW Codes\EOW Code development\Coal combustion products A copy of this project plan will be saved in e-Docs (101/0024166) following delegate's approval.

PROJECT IMPLEMENTATION	
Project Outcomes:	• Develop an EOW code in accordance with the WRR Act to provide for reuse of CCPs. • Support the implementation of the waste and resource management hierarchy as defined in s9 of the WRR Act by maximising the reuse potential for CCPs classed as a regulated waste while minimising the potential for environmental

Published on DES Disclosure Log
RTI Act 2009

	harm.
Implementation strategy:	1. Publish an up-to-date schedule of draft EOW codes the department has decided to prepare on the department's website stating the following: - the particular waste to be the subject of the draft code; - the proposed use of a resource under the draft code; - when the process for making the draft code will start and end; - whether a technical advisory panel will be established to prepare the draft code and, if so, when the panel will be required to give the draft code to the chief executive; - that a person may register the person's interest in being consulted when the draft code is being prepared. 2. Develop draft conditions and record considerations made in a draft assessment report. 3. Identify internal representatives for the EHP key stakeholder groups listed in this plan and circulate draft conditions for internal consultation. 4. Notify stakeholders of the publishing of the notice and how they can make a submission. 5. Receive submissions regarding the proposed draft code. 6. Consider submissions made, consult with submitters and negotiate draft conditions where appropriate. Update draft assessment report. 7. Final peer review of document. 8. Get the code approved. 9. Publish a gazette notice containing details of the code, including the name of the code, the date the code was made, and details of where a copy of the code can be obtained. Minister approval not required (i.e. no briefing note or MECS item required). 10. Notify key stakeholders of the making of the code and where a copy of the code can be obtained. 11. Conduct an evaluation of the success of the project, including identifying areas which contributed to the efficient running of the project and those which could be improved in future similar projects.
Project Milestones:	

	Milestone Progress Description	Date (week ending)
1.	Publish schedule of draft EOW codes to be prepared on department's website	27 October 2017
2.	Develop draft conditions and supporting report for internal consultation	27 October 2017
3.	Internal consultation	10 November 2017
4.	Review comments and make necessary changes	24 November 2017
5.	Review of web content and the notice by Communication Services	8 December 2017
6.	Publish Notice on the departments website for external consultation	8 December 2017
7.	All submissions received (legislative submission period is a minimum of 28 days, however, 48 days has been allowed due to the holiday period)	25 January 2018
8.	Review and consideration of submissions	16 February 2018

Published on QLD Disclosure Log RTI Act 2009

	9.	Final draft of the Code approved	2 March 2018
	10.	Gazette notice published	9 March 2018
	11.	Notify department staff of making of the Code	Prior to or within 3 BD of the gazette notice publishing
	12.	Notify industry representatives of making of the Code	Prior to or within 3 BD of the gazette notice publishing
Project Risks:	There is a risk of EHP not being able to finish the project on time and develop the EOW code for CCPs prior to the expiry of the general approval (on 31 December 2018) pending any delays in the consultation processes. There is a risk that external consultation representatives may not have the resources to participate effectively within the consultation period. Industry will be notified of the consultation timeframes in advance to assist with their resource planning.		
Project Resourcing:	WCLA: 1 x Project Manager (AO6), 1 x Project Officer (AO5) and Manager (AO8) will be required to manage delivery of this project. ISRS: 1 x A05/AO6 and Manager (AO8) to support as required in the consultation and gazettal process. Compliance and Litigation Units will be required to review the drafted Code to ensure the conditions are enforceable.		
Ongoing Monitoring, Evaluation and Reporting	The conditions of the code will require that anyone who wishes to operate under the code registers with the department as resource producer. Usefulness of the code can be gauged by the number of operators undertaking activities in accordance with the conditions of the code. Strategic compliance will also assess the effectiveness of the code. The Waste and Contaminated Land Assessments team of Industry and Development Assessments, Environmental Services and Regulation, will be responsible for the ongoing management of the code.		

Published on EDSI Disclosure Log
RTI Act 2009

Reviewed by:

Signed: sch4 Contrary to public interest Date: 28/9/2017.

Name: Stacey McLennan

Title: Manager (Assessment) - Industry and Development

Project Director's authorisation to implement this project plan a business requirement for the ESR Branch.

I authorise the commencement of the project as described in this plan.

Signed: sch4 Contrary to public interest Date: 6/10/17

Name: ~~Kelly Gleeson~~ Chris Mooney

Title: Director – Industry and Development, Brisbane

From: SHARMA Isha
To: VENTURA Simone
Subject: RE: Tech Work Request_CCP and FS Draft EOW Codes
Date: Tuesday, 26 June 2018 6:29:00 PM
Attachments: image001.png
image002.png
image003.jpg
image004.png
image005.png
image008.png
image011.jpg
image012.jpg
image018.png
image019.png
image020.png
image021.png

Hey Simone,

As discussed, considering the document is a draft going out for public consultation, I think we could just have 'nil' as a limit for Formaldehyde and TEA for unrestricted use, and see if industry comes back with any concerns during submission and go from there.

Regarding pH for unrestricted use, I just revised the limit to 7-8 (pH units) based on the values given in GHD report for use as primary growth media, i.e, the most upper layer of soil placed over rehabilitation area. We will see what we get back from industry.

If you are happy with this approach, I am happy to have this gone out for public consultation without consultation with Tech Support at this stage.

Happy to discuss further.

Kind regards,
Isha

Published on DES Disclosure Log
RTI Act 2009

From: GLEESON Kelly
Sent: Tuesday, 26 June 2018 5:00 PM
To: Technical Support DES <technicalsupport@des.qld.gov.au>; VENTURA Simone <Simone.Ventura@des.qld.gov.au>; LOVEDAY Chris <Chris.Loveday@des.qld.gov.au>
Cc: SHARMA Isha <Isha.Sharma@des.qld.gov.au>
Subject: RE: Tech Work Request_CCP and FS Draft EOW Codes

Ok, I definitely understand but am not sure where that leaves us. I'll follow up tomorrow & hopefully work something out.

Kind regards,

Kelly Gleeson
Director
Industry and Development Assessment
Environmental Services and Regulation
Department of Environment and Science

Level 8, 400 George Street, Brisbane
GPO Box 2454, Brisbane Qld 4001
Tel 07 3330 5066 | **Mobile** sch4 Contrary to

From: Technical Support DES
Sent: Tuesday, 26 June 2018 4:45 PM
To: GLEESON Kelly; Technical Support DES; VENTURA Simone; LOVEDAY Chris
Cc: SHARMA Isha
Subject: RE: Tech Work Request_CCP and FS Draft EOW Codes

Hi Kel

I think sciences are in the same boat.

There was an email sent out this afternoon about their capability.

sch4 C may be a good option.

Sorry but with sch4 Contrary to public interest the work is piling up.

David Cook
Manager
Technical Support
Department of Environment and Science.
P 07 3330 5583 **M** sch4 Contrary t
E david.cook@des.qld.gov.au
Level 9, 400 George Street
Brisbane QLD 4000

Published on DESI RTI Disclosure Log 2009

From: GLEESON Kelly
Sent: Tuesday, 26 June 2018 4:04 PM
To: Technical Support DES; VENTURA Simone; LOVEDAY Chris
Cc: SHARMA Isha
Subject: RE: Tech Work Request_CCP and FS Draft EOW Codes

Can the science division assist? Do you guys have any contacts that could assist? If we could at least focus on the highlighted question below, that would assist? Perhaps we could outsource? What about sch4 Contrar

Simone/Isha - how essential is the advice for the draft codes?

Kind regards,

Kelly Gleeson
Director
Industry and Development Assessment
Environmental Services and Regulation
Department of Environment and Science

Level 8, 400 George Street, Brisbane
GPO Box 2454, Brisbane Qld 4001
Tel 07 3330 5066 | **Mobile** sch4 Contrary t

From: Technical Support DES
Sent: Tuesday, 26 June 2018 4:00 PM
To: VENTURA Simone
Cc: SHARMA Isha; GLEESON Kelly
Subject: RE: Tech Work Request_CCP and FS Draft EOW Codes

HI Simone,

I am sorry to let you know but technical support will not be able to complete your work request.

We cannot meet timeframes and have a critical amount of statutory timeframes that we need to meet.

The reasoning is staff vacancies and unable to fill those positions and the current workload.

I suggest you brief this up to senior managers so they are aware.

Sorry

David Cook
Manager
Technical Support
Department of Environment and Science.

P 07 3330 5583 **M** sch4 Contrary to
E david.cook@des.qld.gov.au
Level 9, 400 George Street
Brisbane QLD 4000

Published on DESI Disclosure Log RTI Act 2009

From: VENTURA Simone
Sent: Monday, 11 June 2018 5:09 PM
To: COOK David
Cc: Technical Support DES; SHARMA Isha
Subject: FW: Tech Work Request_CCP and FS Draft EOW Codes

Hi Dave,

We have revised to that which is considered absolutely necessary and amended the requested response dates where possible.

Please let me know if this helps at all. Attached is the original request.

Thanks

Simone Ventura
A/Manager
Industry and Development Assessment
Environmental Services and Regulation | Industry and Development
Department of Environment and Science
P 07 3330 5729
Level 8, 400 George Street, Brisbane Qld 4000
GPO Box 2454, Brisbane Qld 4001

From: SHARMA Isha
Sent: Thursday, 7 June 2018 11:59 AM
To: VENTURA Simone
Subject: RE: Tech Work Request_CCP and FS Draft EOW Codes

Hi Simone,

As discussed, according to the draft schedule published up on the web, proposed dates for the completion of the draft codes , i.e, for public consultation are as below:

Foundry sand (FS) – 29/06/2018
Coal combustion products (CCP) – 28/07/2018

I am wondering, if the scope of the attached Tech Work Request is narrowed, whether it would be possible for Tech Support to provide response earlier?

As discussed before, the advice we need would be on the following:

- **Formaldehyde, TEA and pH limits** for unrestricted use for FS by COB 25/06/2018; and

- ***Table 1- Resource Quality Criteria*** for CCPs by COB 18/07/2018.

Happy to discuss further.

Thanks and regards,
Isha

Isha Sharma
Team Leader
WCLA | Industry and Development
Department of Environment and Science

Published on DESI Disclosure Log
PTI Act 2009

P 07 3330 5714 | www.ehp.qld.gov.au
Level 8 | 400 George Street | Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

EHP Cultural capability_web graphic APPD

From: Technical Support DES
Sent: Wednesday, 6 June 2018 12:52 PM
To: GLEESON Kelly <Kelly.Gleeson@des.qld.gov.au>; Technical Support DES <technicalsupport@des.qld.gov.au>
Cc: VENTURA Simone <Simone.Ventura@des.qld.gov.au>; SHARMA Isha <Isha.Sharma@des.qld.gov.au>; BURKHARDT Marni <Marni.Burkhardt@des.qld.gov.au>; ALLSOPP Ryan <Ryan.Allsopp@des.qld.gov.au>
Subject: RE: Tech Work Request_CCP and FS Draft EOW Codes

Hi All,

Really sorry but we are unable to complete this request by the due date. At the moment the likely date will be in July sometime.

sch4 Contrary to public interest this puts a major strain on the teams capacity.

Let me know if the timeframe is flexible.

Sorry

Dave

David Cook
Manager
Technical Support
Department of Environment and Science.
P 07 3330 5583 **M** sch4 Contrary to
E david.cook@des.qld.gov.au
Level 9, 400 George Street
Brisbane QLD 4000

From: GLEESON Kelly
Sent: Tuesday, 5 June 2018 12:49 PM
To: Technical Support DES

Published on RTI S1 Disclosure Log 2009

Cc: VENTURA Simone; SHARMA Isha
Subject: FW: Tech Work Request_CCP and FS Draft EOW Codes

Hi tech support, I endorse the attached work request thankyou.

Kind regards,

Kelly Gleeson
Director
Industry and Development Assessment
Environmental Services and Regulation
Department of Environment and Science

Level 8, 400 George Street, Brisbane
GPO Box 2454, Brisbane Qld 4001
Tel 07 3330 5066 | **Mobile** sch4 Contrary

...make the move

Published on DES Disclosure Log
RTI Act 2009

Register to be a Connect Customer
The Department of Environment and Science (DES) have changed the way we do business. We have a new digital platform for online services and transactions called Connect. Connect allows for fast, efficient and 24/7 access with us on any device (i.e. desktop, mobile, tablet). Benefits of being a Connect customer include being able to manage your contact details and business information, submit and pay instantly for environmental applications, lodge annual returns and communicate with us via email.

We encourage you to do business with us online and register to become a Connect customer. Please visit our website at www.ehp.qld.gov.au/connect.

If you are an existing DES customer, your details are already in Connect and you can get your Connect DES Customer Reference by emailing connecthelp@ehp.qld.gov.au.

From: VENTURA Simone
Sent: Tuesday, 5 June 2018 12:16 PM
To: GLEESON Kelly
Cc: SHARMA Isha
Subject: FW: Tech Work Request_CCP and FS Draft EOW Codes

Hi Kelly,

Can you please endorse the attached tech support request for assistance in relation to resource quality characteristics for the coal combustion products and foundry sand End of Waste codes.

The response request date is 10BD from now.

Thanks

Simone Ventura
A/Manager
Industry and Development Assessment
Environmental Services and Regulation | Industry and Development
Department of Environment and Science
P 07 3330 5729
Level 8, 400 George Street, Brisbane Qld 4000
GPO Box 2454, Brisbane Qld 4001

From: SHARMA Isha
Sent: Tuesday, 5 June 2018 11:03 AM
To: VENTURA Simone
Subject: Tech Work Request_CCP and FS Draft EOW Codes

Hey Simone,

As discussed, please see attached the revised version of the Tech Request form regarding the draft EOW codes for coal combustion products and foundry sands.

Would appreciate if you could please get Kelly's approval and send this to Tech Support team for advice.

Thanks and regards,
Isha

Published on DESI Disclosure Log
RTI Act 2009

Assessment report

Waste Reduction and Recycling Act 2011

Draft end of waste code for public consultation

Use this assessment report when deciding to make a draft end of waste EOW code for public consultation under the processes prescribed under section 165 of the Waste Reduction and Recycling Act 2011 *(WRR Act).*

PART A: PREPARATION OF DRAFT EOW CODE

EOW code name and number	Coal Combustion Products (ENEW07359717)
Preparation of draft EOW Code	☒ The draft EOW code was prepared by the chief executive ☐ The draft EOW code was prepared by a technical advisory panel
Provide a summary of: the waste; the proposed use of the waste as a resource and any environmental risks associated with using the waste as a resource.	

Coal combustion products (CCPs) are solid by-products produced from the combustion of coal, mostly, in a power station boiler and includes fly ash, bottom ash and inert cenospheres. Submissions were received from Ash Development Association Australia (ADAA) regarding the proposed development of a draft end of waste (EOW) code for the reuse of CCPs in the following applications:

- Bound applications
- Unbound applications
- Soil ameliorant applications

Bound applications

Bound applications include using the resource in manufacturing processes and applications which encapsulate or chemically transform and incorporate the resource into the following final products:

- cementitious mixes;
- cement products;
- concrete products;
- asphalt; ceramic products;
- insulation;
- paints, coatings and adhesives;
- plastics;
- geopolymers; and
- rubbers.

Unbound applications

Unbound applications include using the resource in the following applications:

- pipe bedding materials;
- sub-surface drainage;
- selected backfill adjacent to structures;
- road pavement, base and sub-base structures;
- binder for road stabilisation pavements;

Published on DESI Disclosure Log
RTI Act 2009

ABN 46 640 294 485

Queensland Government

Release

- composite filler in asphalt pavements structures;
- select layers which act as working platforms at the top of earthworks; and
- fill for reinforced soil structures (including geo-grid applications).

Manufacturing of soil conditioner or soil product

This includes the use of the resource in manufacturing a soil conditioner or soil product which meets the relevant Australian Standards for that product. The existing General beneficial use approval for CCPs ENBU01043609 (General Approval) also allows for the use of the resource in agricultural and horticultural uses. However, the direct application of the resource for agricultural and horticultural systems has been removed from this draft EOW code based on the fact that the resource is highly alkaline.

It is considered that the reuse of CCPs in the above mentioned uses are also justified by its use allowed under the existing General Approval which expires on 31 December 2018. There is no evidence that the Department of Environment and Science (the department) is aware of any serious or material environmental harm caused by the use of CCPs under the existing General Approval.

Four users and one generator have notified the department to operate under the General Approval. After considering the EOW submission received, the department has decided to develop a draft EOW code for the reuse of CCPs in the above uses.

Please refer to Part B of this Assessment Report for consideration of s. 163(1) of the WRR Act against the environmental risks associated with the proposed uses.

Provide details of internal and/or external consultation held on the draft code prior to public consultation

Waste and Contaminated Land Assessment (WCLA) developed the draft EOW code in close consultation with the industry peak body ADAA. Following this, the draft was provided to the following relevant teams within the department for internal consultation on 26 April 2018:

- **Regulation Support, Strategy Support and Compliance:**
  - Ashleigh Fowler, A/Manager
  - Jacqui Elliot, Manager
  - Scott Mears, Senior Environmental Officer
  - April Hoyles, Environmental Officer
  - Louise Rankin, Principal Environmental Officer
  - Sarah Shumack, Senior Environmental Officer
- **Compliance Support (generic email address)**
- **Waste Policy and Legislation (WPL)**
  - Chris Hambling, Program Manager
  - Mark Hilton, Senior Policy Officer
- **Coal and Central Qld Compliance**
  - Dayna Claybourn, Compliance Delivery Manager

Following the internal review, the draft EOW code was consulted with the **Technical Support - Impact Assessment and Operational Support** team to ensure that the contaminant concentrataions for the proposed uses are appropriate, provided the TCLP limits were removed. The Technical Work Request along with the draft EOW code was provided to the Tech Support team on 05 June 2018 for which the response was received back on 24 August 2018. The technical advice was provided by:

- Ryan Allsopp – Technical Specialist, Technical Support - Impact Assessment and Operational Support

Published on DES Disclosure Log
RTI Act 2009

PART B: MATTERS TO BE CONSIDERED

Assess the draft EOW code against the following criteria.

Note: In preparing a draft EOW code the chief executive or a technical advisory panel must have regards to the matters prescribed under s163 of the WRR Act.

The objects of the Act - s163(1)(a)

Polluter and user pays principle – the only significant financial costs associated with complying with the approval conditions, relate to monitoring and characterisation of the resource, which are borne by the generator of the resource. No cost will be borne by the public.

The proposed use of a particular resource under the end of waste code - s163(1)(b)

The proposed uses include the use of the resource in bound applications, unbound applications and manufacturing of soil conditioner or soil product which meets relevant Australian Standard for the product as detailed in the summary section of Part A of this assessment report.

Whether the proposed use of a particular resource is likely to cause any serious environmental harm or material environmental harm - s163(1)(c)

It is not considered that there is a likelihood of serious or material environmental harm or environmental nuisance resulting from the use of CCPs in the given uses, provided that the requirements and conditions of the EOW approval, including the resource quality criteria are complied with.

The department does not have any evidence that the use of CCPs in the given applications (under the existing General Approval) has led to serious or material environmental harm or nuisance that should result in the given uses no longer being permitted. Moreover, the resource quality criteria has been revised in the EOW code to make it better quality with more restrictive limits.

ADAA provided more stringent quality criteria based on the industry monitoring data compiled in the last several years. The review of the resource quality criteria to more stringent limits meant the toxicity characteristics leaching procedure (TCLP) analysis requirement could be removed, and the conditions of use at the user end could also be reduced. Also, the maximum concentrations are in accordance with AS4454 and Victoria Environmental Protection Authority (EPA) clean fill criteria which does not require leach testing of products.

The revised quality criteria was reviewed further by the Technical Support Team within the department, following which, limits for some of the parameters were made more stringent to align with existing relevant national standards and interstate guidelines.

It is important to note that the reuse of the waste as a resource only permits its use subject to conditions, it does not authorise environmental harm under the *Environmental Protection Act 1994* (refer to s. 493A). All environmental obligations, including those relating to littering and dumping still apply.

Suitability of the resource

Majority of the risk of environmental harm lies in ensuring that the resource is of suitable quality to be used for the given purpose. The EOW code does not include any limits on resource quality for bound aplications as it was not considered necessary due to negligible risk of release of any contaminants to the environment through bound applications. There are limits specified for the contaminants for unbound applications and soil ameliorant uses which ensure that the quality of the resource is suitable to prevent or minimise the risk of environmental harm.

To manage the quality of the resource being used for unbound and soil ameliorant applications, proposed conditions require the resource to comply with the quality characteristic limits stated in *Table 1 – Resource quality characteristics*. The table is included below with reference to where the limit was derived from and considerations of quality characteristics that were determined not to be included in the table.

The following main documents were considered in deriving appropriate quality characteristic limits:

- *AS4454 Composts, soil conditioners and mulches – 2012*
  AS4454 has been referred to for an indication of concentrations that are considered acceptable for

Published on DES Disclosure Log
RTI Act 2009

unrestricted use with human contact and also safe for unrestricted use based on environmental considerations.

- *Industrial Waste Resources Guideline - Soil Hazard Categorization and Management, Victoria EPA.*
- *Environmental Guidelines on Use and Disposal of Biosolids Products, New South Wales EPA*

More details provided in Table below regarding how the imposed limits were derived.

Quality criteria	Limits for specific uses *			
	Bound applications	Total Maximum Concentration (mg/kg)		
		Unbound applications	Soil ameliorant applications	Sources
Arsenic (total)	NS	20	20	**Unbound applications total –** Below HIL-A (100 mg/kg), NEPM Schedule B5c indicates an EIL level of 20 mg/kg for urban residential / public open space for fresh arsenic contamination. This is also consistent with the VIC EPA clean fill material guidelines. **Soil ameliorant –** In accordance with the AS4454-2012 and Vic EPA Clean Fill material limits.
Beryllium	NS	NS	60	**Soil ameliorant** - Beryllium is a naturally occurring element and with low background levels in air, water and food. Beryllium can enter the environment from rocks, soil, and industrial emissions and waste. In high concentrations (typically through acidic conditions) it is toxic to both animals and plants. Soils tend to fix beryllium in water soluble compounds in forms that are not bioavailable to plants (Department of Sustainability, Environment, Water, Population and Communities <http://www.npi.gov.au/substances/beryllium/environmental.html>). The HIL for Beryllium is 60mg/kg for standard residential areas with garden/accessible soil. No EILs have been determined. Trace element in the environment with an average concentration in soil of 2.8 to 5 mg/kg (NEPM). Beryllium in the ash is between 0.5 and 3mg/kg, well below the HIL A and consistent with average soil concentrations. As there is risk of harm being caused as a result of beryllium in CCPs, it is considered appropriate to adopt HIL A levels from the NEPM to protect public health.
Boron	NS	100	10**	**Unbound applications total –** Below HILA (4,500 mg/kg). There is no VIC EPA Clean Fill Criteria. Based on the advice from the department's Technical Support Team, concentrations of 100 mg/kg are included in AS4454 and in the absence of EILs and clean fill criteria, it is considered that the contaminants meet this level.

Published on DESI Disclosure Log
RTI Act 2009

Release

				Soil ameliorant – Below AS4454. The standard laboratory method for determining Boron concentrations in soils is the hot $CaCl_2$ method as it provides a more accurate reflection of plant available Boron (as opposed to acid digestion which also reflects unavailable). Available Boron is typically 5% of total Boron.
Cadmium	NS	3	1	**Unbound applications total** – Based on AS4454, below Vic EPA Clean fill material **Soil ameliorant** – Based on AS4454-2012, Below Vic EPA Clean Fill material limits
Chromium (total)	NS	100	100	**Unbound applications** – Based on AS4454 **Soil ameliorant** – Based on AS4454-2012
Chromium (III)	NS	NS	100	**Soil ameliorant** – Based on AS4454-2012
Chromium (VI)	NS	1	1	**Unbound applications** – Based on VIC EPA Clean fill material limits **Soil ameliorant** – Interim Urban EIL in the NEPM prior to amendment in 2013, VIC fill material limits
Cobalt	NS	100	100	**Unbound applications** – HIL A, Schedule B1, Table 1A(1), NEPM **Soil ameliorant** – HIL A, Schedule B1, Table 1A(1), NEPM.
Copper	NS	100	100	**Unbound applications** – AS4454, Vic EPA Clean Fill **TCLP** – Maximum concentrations are in accordance with AS4454 and VIC clean fill which does not require leach testing of products. **Soil ameliorant** – AS4454, Vic EPA Clean Fill
Lead	NS	300	150	**Unbound applications** – Vic EPA Clean Fill Criteria **Soil ameliorant** – Below AS4454-2012
Mercury	NS	1	1	**Unbound applications** – Based on VIC EPA fill material limits **Soil ameliorant** – AS4454-2012, VIC EPA fill material limits
Molybdenum	NS	40	10	**Unbound applications** – Based on VIC EPA fill material limits **Soil ameliorant** –The background levels of Molybdenum in horticultural soils are <1 to 5.17 mg/kg with a median value averaging 0.97mg/kg of soils 0-30cm deep. *Total Heavy Metal Status of Horticultural Soils in Queensland*, Final Report to the Horticultural Research and Development Corporation on Project VG40, March 1997, prepared by G.A. Barry and published by the Resource Sciences Centre, DNR. There is limited evidence for the phytotoxic impacts of molybdenum in soils and irrigation water. However, Molybdenum accumulation in plant tissue may be harmful to livestock consuming contaminated feed,

Published on DESI Disclosure Log
RTI Act 2009

Release

				causing molybdenosis and may induce copper deficiency. Toxic effects of molybdenum in forage crops are considered to occur at above 5 mg/kg for cattle and 10 mg/kg for sheep. The level of molybdenum in plants reflects the level in the soils in which they are grown. The National Research Council (1980) has estimated a maximum tolerable level of 10 mg/kg in the diet of cattle and sheep for short-term intake (ANZECC). Considering the potential impacts on livestock and the fact that concentration in the ash is significantly higher than background levels, it is considered appropriate to impose a limit of 10mg/kg for Molybdenum.
Nickel	NS	60	60	**Unbound applications –** AS4454-2012, VIC fill criteria **Soil ameliorant –** AS4454-2012, VIC fill material limits
Selenium	NS	10	5	**Unbound applications –** VIC EPA clean fill criteria **Soil ameliorant –** AS4454-2012, Below VIC EPA fill material limits
Zinc	NS	200	200	**Unbound applications –** VIC EPA fill material limits **Soil ameliorant –** AS4454-2012. NSW biosolids Guidelines and National biosolids standards also state 200mg/kg. Background ranges in Qld horticultural soils have been demonstrated to reach up to 270mg/kg.
Electrical conductivity	NS	NS	10,000(uS/cm)	**Soil ameliorant –** AS4454 - 2012
pH	NS	5 – 12.5 (pH units)	5 – 12.5 (pH units)	**Unbound applications –** Less than pH 14 which is allowed under the existing General Approval. Additionally, there are conditions in place which restricts the unbound application below the goundwarter table, within 50m of a water supply, and in areas with pH greater than 8. **Soil ameliorant -** Less than pH 14 which is allowed under the existing General Approval. Ash produced tends to be slightly to moderately alkaline. Many heavy metals become mobilised in acidic conditions and alkaline qualities of the ash may be desired in pH correction. Considering this, it is appropriate to only limit the acidic potential of the resource. The resource is allowed for use in manufacturing soil products or conditioner which meet relevant Australian Standard for the product.

NS = Not specified (monitoring of each element is still required).

* measured using **reference test methods**

** measured using hot $CaCl_2$ method

Published on DESI Disclosure Log
RTI Act 2009

Unbound applications

In addition to a person being required to conduct a use in accordance with the appropriate written procedures, any unbound application must not occur below the groundwater table or within 50m of any surface waters or water supply bore. This requirement minimises the potential for contaminants to be released to waters, including groundwater and is included in the existing General Approval for unbound applications. Based on

the suggestion from the Technical Support team, a requirement has also been added to not use the resource in areas which are already highly alkaline, and hence have been restricted to areas with pH <8. Soil conditoner and soil product use There is a market where the resource can be incorporated in the composting process or mixed with compost to produce a soil ameliorant product. To ensure that the resource is used in manufacturing a product suitable for unrestricted use, conditions have been imposed requiring users to only mix, blend, or otherwise incorporate the resource into a material to be used as a soil ameliorant product for supply to another user where the material to be provided complies with the relevant Australian Standard which would mean, Australian Standard 4454: *Composts, soil conditioners and mulches*, or Australian Standard 4419: *Soils for landscaping and garden use*, including monitoring and keeping records of product quality. These standards include final product quality criteria for heavy metals and other contaminants of concern.
The waste and resource management hierarchy - s163(1)(d)
CCP is considered regulated waste and can be disposed at landfills authorised to accept regulated waste. Disposal however, is the least preferred method of managing waste as per the waste and resource management hierarchy. The proposed use under the draft EOW code is reuse and recycle whereby the CCP will be reused in bound applications, unbound applications and manufacturing of soil ameliorant/compost product that meets the relevant Australian Standard for that product. This reuse will not generate any waste as the resource will be used in its entirety. As such, there are no other preferred uses higher in the order of management for the resource stated in the waste management hierarchy.
Any other matter prescribed by regulation - s163(1)(e)
There are currently no other matters prescribed by regulation.
Any other matter that the chief executive considers to be relevant - s163(2) *Note: Where a technical advisory panel prepared the draft EOW code include details of any requirement in the draft EOW code that the chief executive required the technical advisory panel to include in the draft EOW code and how this requirement was addressed.*
The department considers that the resource authorised for use under the EOW code is of high quality and where the resource is used according to the conditions of the draft EOW code for CCPs, environmental nuisance is unlikely to occur. Also, in addition to any environmental authority conditions which may be applicable to CCP generators and users, the general environmental duty provision of the EP Act would also apply. The department considers that a demand exists for the reuse of CCPs based on the forty-two notifications from the generators, suppliers and users for reuse of this material received under the General approval for CCPs as well as the submissions received from the peak industry body ADAA in support of the development of a code for CCP.

Published on DES Disclosure Log
RTI Act 2009

PART C: TECHNICAL ADVISORY PANEL (TAP)

Was a TAP established for this draft EOW code?	☒ No - not applicable proceed to **PART D**. ☐ Yes - complete details below
Did the TAP adequately address the matters assessed in PART B of this report (provide details below)? *Note: Under s164(3), if a technical advisory panel prepares a draft EOW code but the chief executive is not satisfied that the panel has had sufficient regards to certain matter or requests, the chief executive can ask the panel to amend the EOW code, or may refuse to accept the EOW code.*	
Not applicable.	
Are any amendments required to the draft EOW Code (provide details below)? *Note: Under s164(4) the chief executive may amend the draft code before publishing it under s166.*	
Not applicable.	

PART D: DECISION

It is recommended that the chief executive:

☒ Approves the draft EOW code for public consultation under s165 of the WRR Act.

☐ Amends the draft EOW code, prepared by a TAP, under s164(4) of the WRR Act and publishes the amended draft EOW code for public consultation under s165 of the WRR Act.

☐ Asks the TAP to amend the draft EOW code under s164(3)(a) of the WRR Act.

☐ Refuses to accept the draft EOW code prepared by the TAP under s164(3)(b) of the WRR Act

PROVIDE REASONS FOR THE RECOMMENDATION BELOW:
It is recommended that a draft EOW code authorising CCPs reuse is developed and published on the department's website for public consultation sch4 Contrary

Isha Sharma		13/09/2018
Assessing Officer	**Signed**	**Date**

Review and endorsement
I endorse the recommendation based on the reasons stated in this report.

Scott Blanchard	sch4 Contrary to public interest	13/9/2018
Manager	**Signed**	**Date**

Approval
I approve the recommendation based on the reasons stated in this report.

Kelly Gleeson	sch4 Contrary to public interest	14/9/2018
Delegate		**Date**

Published on RTI Disclosure Log

Published on DESI Disclosure Log
RTI Act 2009

Draft End of Waste Code

Coal Combustion Products (ENEW07359717)

Waste Reduction and Recycling Act 2011

Release

Version history

Version	Date	Description of changes
1	11 September 2018	Consultation draft

Prepared by: Waste and Contaminated Land Assessment, Department of Environment and Science

© State of Queensland, 2018

The Queensland Government supports and encourages the dissemination and exchange of its information. The copyright in this publication is licensed under a Creative Commons Attribution 3.0 Australia (CC BY) licence.

Under this licence you are free, without having to seek our permission, to use this publication in accordance with the licence terms.

You must keep intact the copyright notice and attribute the State of Queensland as the source of the publication.

For more information on this licence, visit http://creativecommons.org/licenses/by/3.0/au/deed.en

If you need to access this document in a language other than English, please call the Translating and Interpreting Service (TIS National) on 131 450 and ask them to telephone Library Services on +61 7 3170 5470.

This publication can be made available in an alternative format (e.g. large print or audiotape) on request for people with vision impairment; phone +61 7 3170 5470 or email <library@des.qld.gov.au>.

September 2018

Published on DES Disclosure Log
CONSULTATION DRAFT
RTI Act 2009

Contents

1. Explanatory Statement 4
2. Guidance 4
2.1 Resource use versus Activity 4
2.2 Resource versus Waste 4
2.3 Failure to comply 4
2.4 Lawfulness of the activity 5
3. Period of this EOW code 5
4. Waste to which this EOW code applies 5
5. Person to whom this EOW code applies 5
5.1 Registered resource producers of the resource 5
5.2 Resource users 5
6. Registered resource producer requirements 6
7. Conditions of use 7
8. Definitions 9
Appendix A —General obligation for all persons 11
9. Approved by 13

Published on DESI Disclosure Log
CONSULTATION DRAFT
RTI Act 2009

1. Explanatory Statement

This End of Waste (EOW) code for **coal combustion products** has been issued by the Queensland Government in accordance with section 159 of the *Waste Reduction and Recycling Act 2011* (WRR Act).

This EOW code states when a waste becomes a resource and any relevant requirements and/or conditions for its use. It supports the vision of Queensland's Waste Strategy 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 the waste is not being used in accordance with the relevant requirements and/or conditions of this EOW code, or another type of permit that allows for its use, it is considered a waste and must be disposed of appropriately at a facility that is lawfully able to receive the waste.

2. Guidance

2.1 Resource use versus Activity

An EOW code states when a waste stops being a waste following any necessary processing or treatment.

A waste becomes a **resource** when it has been determined to meet the requirements of an EOW code. It may be necessary to treat or process the waste prior to that point. An Environmental Authority (EA) under the *Environmental Protection Act 1994* (EP Act) is required where an activity being undertaken triggers the threshold for any environmentally relevant activity (ERA). This means that treating or processing the waste to meet the resource quality criteria under the EOW code may require an EA under the EP Act if the activity meets the threshold for an ERA.

2.2 Resource versus Waste

A waste that is considered a **resource** under an EOW code is considered a resource only for the purpose of the use(s) approved in an EOW code. In the event, a resource does not meet the requirements of the EOW code and/or is not used in accordance with the EOW code, it is deemed to be a waste and must be managed in accordance with waste management requirements under the EP Act and the WRR Act, and their subordinate legislation.

A resource, approved under an EOW code, is also deemed to be a waste when it is disposed of at a waste disposal facility, or if it is deposited at a place in a way that would, apart from its use approved under an EOW code, constitute a contravention of the general littering provision or the illegal dumping of waste provision under the WRR Act —when the depositing starts.

2.3 Failure to comply

Any **person** operating under this EOW code must comply with the relevant requirements and conditions of use of the EOW code. It is an offence to not comply with the relevant requirements and conditions, carrying a maximum penalty of 1665 penalty units for an individual and 8325 penalty units for a corporation[1].

Please refer to Appendix A of this EOW code for general obligations for all persons which includes the **resource users**.

[1] The value of a penalty unit is stated in the Penalties and Sentences Regulation 2015 (Qld).

Published on DES Disclosure Log
Contains QRTI Act 2009 Exempt
DRAFT

2.4 Lawfulness of the activity

The issuing of this EOW code for the use of the **resource** does not warrant or imply the lawfulness of the activity under all legislation, or that approvals necessary under other legislation have or will be approved. It is the responsibility of the **registered resource producer** and **resource user** to identify and obtain all other approvals necessary for the relevant activities.

3. Period of this EOW code

This EOW code takes effect from **DD MM 2018** and remains in force until it is cancelled, amended or suspended.

4. Waste to which this EOW code applies

This EOW code is limited to **coal combustion products** sourced from coal fired power stations and coal fired boilers where no other source of fuels is mixed.

This waste becomes a **resource** when the requirements and conditions under this EOW code are met.

5. Person to whom this EOW code applies

5.1 Registered resource producers of the resource

5.1.1 Prior to operating under this EOW code, the producer of the **resource** must register with the **chief executive** by giving a notice in the approved form[2] that the **person** intends to become a **registered resource producer** for this EOW code.

5.1.2 A registered resource producer for this EOW code must comply with the stated registered resource producer requirements.

5.2 Resource users

5.2.1 The **resource user** must only use the **resource** for a purpose allowed under this EOW code.

5.2.2 The resource user must comply with the stated conditions of use.

Published on DES Disclosure Log
CONSULTATION DRAFT
RTI Act 2009

[2] The approved form, *Registered Resource Producer for an EOW code,* is available on the **Queensland Government** website at www.des.qld.gov.au, and can be searched using the term ESR/2018/4082

6. Registered resource producer requirements

(6.1)	The **registered resource producer** must not use, sell or give away the **resource** unless it meets the criteria in *Table 1 – Resource quality criteria* for the approved use in accordance with this EOW code.

Table 1 – Resource quality criteria

Quality criteria	Limits for specific uses *		
	Bound applications	Total Maximum Concentration (mg/kg)	
		Unbound applications	Soil ameliorant applications
Arsenic (total)	NS	20	20
Beryllium	NS	NS	60
Boron	NS	100	10**
Cadmium	NS	1	1
Chromium (total)	NS	100	100
Chromium (III)	NS	NS	100
Chromium (VI)	NS	1	1
Cobalt	NS	100	100
Copper	NS	100	100
Lead	NS	50	50
Mercury	NS	1	1
Molybdenum	NS	NS	10
Nickel	NS	60	60
Selenium	NS	10	5
Zinc	NS	200	200
Electrical conductivity	NS	NS	10,000(uS/cm)
pH	NS	5 – 12.5 (pH units)	5 – 12.5 (pH units)

NS = Not specified (monitoring of each element is still required).

* measured using **reference test methods**

** measured using hot $CaCl_2$ method

(6.2)	In addition to meeting the criteria in *Table 1 – Resource quality criteria*, the resource must not have any properties nor contain any other **contaminants** at concentrations which may cause **environmental harm** when used in accordance with this EOW code.

Resource monitoring

(6.3)	The **registered resource producer** must conduct monitoring of the **resource** quality to determine compliance with *Table 1 - Resource quality criteria* and at a frequency of at least every six months.

Published on DESI Disclosure Log
RTI Act 2009

(6.4)	Where the composition of the **resource** has changed or is likely to change, additional monitoring must be conducted which is sufficient to detect and characterise the extent of any change, until such time that results demonstrate that the material is compliant with *Table 1 – Resource quality criteria* before it is used as a resource under this EOW code.
(6.5)	Any determination of the suitability or characterisation of the **resource** (including ongoing sampling) must be made by an **appropriately qualified person**.
(6.6)	All analysis required under this EOW code must be carried out by a laboratory that has **NATA** certification, or an equivalent certification, for such analyses.
Information to be provided	
(6.7)	The **registered resource producer** must make the following available to any **person** to whom they provide the **resource** each time the resource is provided for use: a) confirmation in writing that the resource being supplied is compliant with the requirements of this EOW code; b) a current certificate of analysis for the quality of the resource being supplied for at least the quality criteria in *Table 1 – Resource quality criteria*; and c) **Safety Data Sheet** for the resource.
Records	
(6.8)	The **registered resource producer** must keep the following **records** each time the **resource** is provided for use: a) origin of the resource; b) date of delivery of the resource; c) destination of the resource; d) contact details for the **person** receiving the resource; and e) quantity of the resource supplied measured in cubic meters.
(6.9)	The **registered resource producer** must keep **records** of all requirements, including monitoring requirements, under this EOW code for a period of at least five (5) years and provide the records to the **chief executive** upon request and in the format requested.

7. Conditions of use

Approved uses	
(7.1)	The approved **resource** is **coal combustion products** that comply with the quality criteria listed in *Table 1 - Resource quality criteria* and is used for the purpose stated in *Table 2 – Approved uses of the resource*.

Unlimited DES Disclosure Log
RTI Act 2009
DRAFT

Table 2 - Approved uses of the resource

Purpose	Description of approved use
Bound applications	The resource can 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. Final products for the purpose of this EOW code are limited to: a) cementitious mixes; b) cement products; c) concrete products; d) asphalt; e) binder for road stabilisation pavements; f) rigid and composite pavements structures; g) ceramic products; h) insulators; i) varnishes, plastics, ceramics, ultra-light concrete and metal alloys; j) paints, coatings and adhesives; k) geopolymers; and l) rubbers.
Unbound applications	The resource use is limited to the following applications on **standard areas**: a) pipe bedding materials; b) sub-surface drainage; c) selected backfill for structures; d) road pavement, base, sub-base and subgrade structures; e) structured and engineered fill; f) select layers which act as working platforms at the top of earthworks; and g) fill for reinforced soil structures (including geo-grid applications).
Manufacturing of soil conditioner or soil product	The resource can be used in manufacturing a soil conditioner or soil product which meets the relevant Australian Standards for that product.

Records

(7.2) For each **load** of the **resource** received, the **resource user** must keep the following **records** for a minimum of five (5) years and must provide to the **chief executive** upon request and in the format requested:

a) quantity of the resource;
b) date of receipt; and
c) name and address of the **person** who supplied the resource.

Unbound applications

(7.3) **Resource users** undertaking an unbound application must not use the resource:

a) below the groundwater table;
b) within 50m of a water supply bore; and
c) in areas with pH greater than 8.

Published on DES Disclosure Log
RTI Act 2009
DRAFT

Soil conditioner or soil product use	
(7.4)	**Resource users** manufacturing the soil conditioner or soil product may only mix, blend, or otherwise incorporate the **resource** into a material to be used as a **soil ameliorant** where the material to be provided complies with the Australian Standard 4454: *Composts, soil conditioners and mulches*, or Australian Standard 4419: *Soils for landscaping and garden use*, including monitoring and keeping records of product quality.
(7.5)	**Resource users** manufacturing the soil conditioner or soil product under this EOW code must notify the **chief executive** of their name, address, contact information and details of intended resource usage, in writing using the approved form[3] 10 business days prior to using the resource.
Notification of **emergencies**, incidents and exceptions	
a)	Any breach of a condition of this EOW code must be reported to the **chief executive** as soon as practicable within 24 hours of becoming aware of the breach. **Records,** including full details of the breach and any subsequent actions taken, must be kept and provided to the chief executive upon request.

8. Definitions

Words and phrases used throughout this EOW code **in bold** are defined below. Where a definition for a term used in this EOW code is sought and the term is not defined within this EOW code, the definitions provided in the relevant legislation shall be used.

'appropriately qualified person' means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

'cenosphere(s)' means inert, hollow, essentially thin-walled glass spheres of approximately 10–350 microns having a typical density of 0.4–0.8g/cm^3, comprised largely of silica and alumina and filled with air and/or gasses which are formed from coal combustion ash when in a molten state.

'chief executive' means the Department of Environment and Science or its successor.

'coal combustion products' means **fly ash**, **furnace bottom ash** or **cenospheres** resulting from the burning of coal within coal fired power stations and coal fired boilers where no other source of fuel is mixed with.

'contaminants' (as defined in Section 11 of the *Environmental Protection Act 1994*), unless authorised under this EOW code means —

a) a gas, liquid or solid; or
b) an odour; or
c) an organism (whether alive or dead), including a virus or parasite; or
d) energy, including noise, heat, radioactivity and electromagnetic radiation; or
e) a combination of contaminants.

'emergency(ies)' means a situation where either human health or safety is threatened, or serious or material environmental harm has been or is likely to be caused; and urgent action is necessary to protect the health or safety of persons, or prevent or minimise the harm, or rehabilitate or restore the environment because of the harm.

'environmental harm' means environmental harm as defined in Chapter 1 of the *Environmental Protection Act 1994.*

[3] The approved form is available on the chief executive's website at www.des.qld.gov.au

Published on DES Disclosure Log
RTI Act 2009
DRAFT

'fly ash' means solid material extracted from the flue gasses of a boiler fired with pulverised coal, consisting essentially of the oxides of silicon, aluminium, iron and some calcium of which particle sizes range from less than 1µm (micrometre) to 200µm and are irregular to spherical shape.

'furnace bottom ash' means the agglomerated particles formed at the bottom of the furnace. Bottom ash is typically grey to black in colour, is quite angular, and has a porous surface structure.

'load' means the volume of resource put in or on something for conveyance or transportation, carried at one time. A truck and trailer carrying the resource is considered as one load as well as multiple bins travelling by rail. Where the resource is transported via conveyor systems, information should be recorded on a daily basis until the transfer ceases.

'NATA' is the National Association of Testing Authorities.

'person(s)' means an individual or a corporation.

'records' include breach notifications, analysis results, monitoring reports and monitoring programs required under a condition or requirement of this EOW code.

'reference test methods'—The reference test methods for determining the contaminant and 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].

'registered resource producer' means a **person** who has registered with the **chief executive** to use, sell or give away the **resource** to be used under this EOW code.

'resource(s)' means **fly ash**, **furnace bottom ash** or **cenospheres** produced from the combustion of coal, at coal fired power stations and coal fired boilers, that meet the resource quality criteria in *Table 1 – Resource quality criteria* of this EOW code, and does not have contaminants other than what is listed in *Table 1– Resource quality criteria* .

'resource user(s) means a **person** who uses the **resource** for the use approved under this EOW code and in such a manner which does not cause any **environmental harm**, and includes the producer who uses the resource.

'Safety Data Sheet' means a document containing data regarding the properties of the resource which provides information on handling or working with that substance in a safe manner; and includes information such as physical data toxicity, environmental characteristics, health effects, first aid, reactivity; and storage, disposal, protective equipment and spill handling procedures. The Safety Data Sheet must be compliant with Safe Work Australia's code of practice for production of Safety Data Sheets.

'soil ameliorant' means a substance added to soil to improve the growing conditions for plant roots by providing nutritional requirements.

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

'surface water' means waters excluding groundwater.

'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.

- END -

Published on DES Disclosure Log
RTI Act 2009
DRAFT

Appendix A —General obligation for all persons

This appendix is not intended to provide a comprehensive assessment of all obligations under Queensland law. It provides some general information and persons are encouraged to familiarise themselves with all requirements related to their specific operation.

Responsibilities under the *Environmental Protection Act 1994*

All persons within the State of Queensland must also meet their obligations under the *Environmental Protection Act 1994*, and the regulations made under that Act.

General environmental duty

Section 319 of the *Environmental Protection Act 1994* states that we all have a general environmental duty. This means that we are all responsible for the actions we take that affect the environment. We must not carry out any activity that causes or is likely to cause environmental harm unless we take all reasonable and practicable measures to prevent or minimise the harm. To decide what meets your general environmental duty, you need to consider:

- the nature of the harm or potential harm
- the sensitivity of the receiving environment
- the current state of technical knowledge for the activity
- the likelihood of successful application of the different measures to prevent or minimise environmental harm that might be taken
- the financial implications of the different measures as they would relate to the type of activity.

It is not an offence not to comply with the general environmental duty. However, maintaining your general environmental duty is a defence against the following acts:

(a) an act that causes serious or material environmental harm or an environmental nuisance

(b) an act that contravenes a noise standard

(c) a deposit of a contaminant, or release of stormwater run-off, mentioned in section 440ZG.

More information is available on the Department of Environment and Science (DES) website www.des.qld.gov.au.

Some relevant offences under the *Environmental Protection Act 1994*

Causing serious or material environmental harm (sections 437–39)

Material environmental harm is when the harm is not trivial or negligible in nature. Serious environmental harm is harm that is irreversible, of a high impact or widespread, or that is caused to an area of high conservation value or special significance. Damages, or costs required to rehabilitate the environment, of over $5000 constitutes material environmental harm and damages, or costs required to rehabilitate the environment, of over $50,000 constitutes serious environmental harm.

Serious or material environmental harm excludes environmental nuisance.

Published on RTI Disclosure Log
DRAFT
RTI Act 2009

Causing environmental nuisance (section 440)

Environmental nuisance is unreasonable interference with an environmental value caused by aerosols, fumes, light, noise, odour, particles or smoke. It may also include an unhealthy, offensive or unsightly condition because of contamination.

Depositing a prescribed water contaminant in waters (section 440ZG)

Prescribed water contaminants include a wide variety of contaminants listed in Schedule 9 of the Environmental Protection Regulation 2008.

It is your responsibility to ensure that prescribed water contaminants are not left in a place where they may or do enter a waterway, the ocean or a stormwater drain. This includes making sure that stormwater falling on or running across your site does not leave the site contaminated. Where stormwater contamination occurs you must ensure that it is treated to remove contaminants. You should also consider where and how you store material used in your processes onsite to reduce the chance of water contamination.

Placing a contaminant where environmental harm or nuisance may be caused (section 443)

A person must not cause or allow a contaminant to be placed in a position where it could reasonably be expected to cause serious or material environmental harm or environmental nuisance.

Some relevant offences under the *Waste Reduction and Recycling Act 2011*

Littering (section 103)

Litter is any domestic or commercial waste and any material a person might reasonably believe is refuse, debris or rubbish. Litter can be almost any material that is disposed of incorrectly. Litter includes cigarette butts and drink bottles dropped on the ground, fast food wrappers thrown out of the car window, poorly secured material from a trailer or grass clippings swept into the gutter. However, litter does not include any gas, dust, smoke or material emitted or produced during, or because of, the normal operations of a building, manufacturing, mining or primary industry.

Illegal dumping of waste (section 104)

Illegal dumping is the dumping of large volumes of litter (200 litres or more) at a place. Illegal dumping can also include abandoned vehicles.

Failure to comply with EOW code (section 158)

A registered resource producer for an EOW code must not produce, use, sell or give away the resource unless the registered resource producer complies with the requirements of the EOW code relating to the resource.

A person, other than a registered resource producer, must not use a resource in a way, or for a purpose, that does not comply with an EOW code for the resource.

Published by DES | Disclosure Log
RTI Act 2009
DRAFT

9. Approved by

sch4 Contrary to public interest

Signature

14/9/2018

Date

Kelly Gleeson
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)

Published on DESI Disclosure Log
CONSULTATION DRAFT
RTI Act 2009

Assessment report

Waste Reduction and Recycling Act 2011

Decision on an end of waste code

Use this assessment report when considering submissions received during the public consultation period for a draft EOW code under section 165(1) of the Waste Reduction and Recycling Act 2011 *(WRR Act) to decide whether or not to make the EOW code under s165(3).*

PART A: SUMMARY

EOW code name and number	Coal Combustion Products (ENEW07359717)
Date draft EOW code approved for public consultation	14 September 2018
Consultation period for public submissions (start and end date)	02 October to 05 November 2018
Target date for decision	05 December 2018
Provide a summary of: the waste; the proposed use of the waste as a resource; and any environmental risks associated with using the waste as a resource.	

Coal combustion products (CCPs) are solid by-products produced from the combustion of coal, mostly, in a power station boiler and includes fly ash, bottom ash and inert cenospheres. Submissions were received from Ash Development Association Australia (ADAA) regarding the proposed development of a draft end of waste (EOW) code for the reuse of CCPs in the following applications:

- Bound applications
- Unbound applications
- Soil ameliorant applications

Bound applications

Bound applications include using the resource in manufacturing processes and applications which encapsulate or chemically transform and incorporate the resource into the following final products:

- cementitious mixes;
- cement products;
- concrete products;
- asphalt; ceramic products;
- insulation;
- paints, coatings and adhesives;
- plastics;
- geopolymers; and
- rubbers.

Unbound applications

Unbound applications include using the resource in the following applications:

- pipe bedding materials;
- sub-surface drainage;

Published on DES Disclosure Log RTI Act 2009

- selected backfill adjacent to structures;
- road pavement, base and sub-base structures;
- binder for road stabilisation pavements;
- composite filler in asphalt pavements structures;
- select layers which act as working platforms at the top of earthworks; and
- fill for reinforced soil structures (including geo-grid applications).

Manufacturing of soil conditioner or soil product

This includes the use of the resource in manufacturing a soil conditioner or soil product which meets the relevant Australian Standards for that product. The existing General beneficial use approval for CCPs ENBU01043609 (General Approval) also allows for the use of the resource in agricultural and horticultural uses. The direct application of the resource for agricultural and horticultural systems had been removed from the consultation draft EOW code based on the fact that the resource is highly alkaline. However, the land application use has been included in the final EOW code for CCP for following reasons:

- Direct land application of the resource is currently allowed under the General Approval for CCP where the resource quality criteria has a pH limit of 14.
- The consultation draft EOW code had direct land application removed considering the high pH of the resource. However, it is considered that the direct land application can be included as one of the resource use option by avoiding the risk through following measures/requirements:
- the pH limit in the EOW code for CCP is 12.5 as opposed to 14 in the existing General Approval;
- a condition of use is imposed to ensure that the direct land application is undertaken only in naturally acidic or low pH soils to correct the identified agronomic deficiency in land to which it is applied and where the final soil pH does not exceed 8 pH unit after the application of the resource; and
- ash produced tends to be slightly to moderately alkaline. Many heavy metals become mobilised in acidic conditions and alkaline qualities of the ash may be desired in pH correction.

It is considered that the reuse of CCPs in the above mentioned uses are also justified by its use allowed under the existing General Approval which expires on 31 December 2018. There is no evidence that the Department of Environment and Science (the department) is aware of any serious or material environmental harm caused by the use of CCPs under the existing General Approval.

Four users and one generator have notified the department to operate under the General Approval. After considering the EOW submission received, the department has decided to develop a draft EOW code for the reuse of CCPs in the above uses.

The department decided to develop an EOW code for CCPs to allow for its continued use as a resource following expiry of the existing General BUA. The draft EOW code was publicly consulted during the period stated above. After considering the submissions received during the public consultation, the department has decided to finalise the EOW code for the reuse of CCP in bound, unbound and land applications including use in manufacturing of soil ameliorant or a soil product. Refer to Part C below for a summary of submissions received.

For details of environmental risks associated with the proposed reuse of CCPs, refer to the assessment report that was developed to support the development of the draft EOW for the purpose of public consultation.

Published by DES Disclosure Log RTI Act 2009

PART B: CONSULTATION REQUIREMENTS

Was a copy of the draft EOW code published on the department's website? - s165(1)(a)	☒ Yes

Releas

	☐ No
Was a notice published on the department website that stated: - s165(b) (i) that a person may make a submission to the chief executive about the draft EOW code; (ii) the period, of at least 28 days (the consultation period), during which the submission may be made. (iii) how to make a submission.	☒ Yes ☐ No
Was the draft EOW code and notice available from the department's website throughout the consultation period? - s165(2)	☒ Yes ☐ No
If No selected for any of the questions above the consultation period may not be valid (provide details below).	
N/A	

PART C: CONSIDERATION OF SUBMISSIONS

Attach a document that provides details of all submission received during the consultation period for the draft EOW code.	Refer to Appendix A
Provide a summary below of submissions received and any required actions relating to the EOW code.	
The following submissions were received during the public consultation period : • Ash Development Association of ~~Water~~ (ADAA) on 05 November 2018; Refer to Appendix A for details on the submissions received and how the department has considered these submissions.	
NOTE: The chief executive must consider all submission made during the consultation period before deciding whether or not to make the EOW code - s165(3).	

Published on DES Disclosure Log
RTI Act 2009

PART D: FURTHER ADVICE, COMMENT OR INFORMATION

Provide details below of any further advice, comment or information sought about the EOW code.
The department's Litigation Unit provided comments on the draft EOW code on 16 November 2018. These comments were considered, and where appropriate, incorporated into the draft EOW code as per Part E below.
NOTE: The chief executive may ask any entity for advice, comment or information about the operation of the provisions relating to EOW codes - s173H.

PART E: REQUIRED AMENDMENTS TO THE DRAFT EOW CODE

Provide details below of required amendments to the draft EOW code following: public consultation (PART C); and feedback sought from any entity (PART D).

Amendments have been made based on the public submissions from ADAA and advice received from Litigation Unit within the department. The publically consulted draft EOW code has been amended as below for the finalisation. The reasons for the revisions based on public submissions have been detailed in Appendix A under the heading 'Department's considerations'.

Provisions in the public consultation draft	**Revisions made in the draft final code**
3. Period of EOW code	
This EOW code takes effect from **01 January 2019** and remains in force until it is cancelled, amended or suspended.	This EOW code takes effect from **01 January 2019** and remains in force until it is amended, cancelled or suspended by the **chief executive**. If an EOW code is to be amended, cancelled or suspended, the chief executive will provide an opportunity to make written submissions by: - providing a proposed action notice to the registered resource producers; and - publishing the proposed action notice on department's website for anyone interested.
4. Waste to which this EOW code applies	
This EOW code is limited to **coal combustion products** sourced from coal fired power stations and coal fired boilers where no other source of fuels is mixed. This waste becomes a **resource** when the requirements and conditions under this EOW code are met.	This EOW code is limited to **coal combustion products** sourced from coal fired power stations and coal fired boilers where no other source of fuels is mixed other than petroleum based gas or liquid fuel for ignition support. This waste becomes a **resource** when the requirements and conditions under this EOW code are met.
Requirement 6.1, Table 1 – Resource quality criteria	
Cr (VI) for Unbound application – 1 mg/kg	Cr (VI) for Unbound application – 1.5 mg/kg

Published on DES Disclosure Log
RTI Act 2009

Requirement 6.3	
The **registered resource producer** must conduct monitoring of the **resource** quality to determine compliance with *Table 1 - Resource quality criteria* and at a frequency of at least every six months.	The **registered resource producer** must conduct monitoring of the **resource** quality to determine compliance with *Table 1 - Resource quality criteria* and at a minimum of the following frequency : a) annually, where statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations; otherwise, b) every six months.
Requirement 6.4	
Where the composition of the **resource** has changed or is likely to change, additional monitoring must be conducted which is sufficient to detect and characterise the extent of any change, until such time that results demonstrate that the material is compliant with *Table 1 – Resource quality criteria* before it is used as a resource under this EOW code.	Where the composition of the **resource** has changed or is likely to change, additional monitoring must be conducted which is sufficient to detect and characterise the extent of any change, until such time that the composition is no longer likely to change and that results demonstrate that the material is compliant with *Table 1 – Resource quality criteria* before it is used as a resource under this EOW code.
Requirement 6.7	
The **registered resource producer** must make the following available to any **person** to whom they provide the **resource** each time the resource is provided for use: a) confirmation in writing that the resource being supplied is compliant with the requirements of this EOW code; b) a current certificate of analysis for the quality of the resource being supplied for at least the quality criteria in *Table 1 – Resource quality criteria*; and c) **Safety Data Sheet** for the resource.	The **registered resource producer** must make the following available to any **person** to whom they provide the **resource** each time the resource is provided for use: a) confirmation in writing that the resource being supplied is compliant with the requirements of this EOW code; b) a most recent certificate of analysis for the quality of the resource being supplied for at least the quality criteria in *Table 1 – Resource quality criteria*; and c) **Safety Data Sheet** for the resource.

Published on DES Disclosure Log
RTI Act 2009

Requirement 6.8	
The **registered resource producer** must keep the following **records** each time the **resource** is provided for use: a) origin of the resource; b) date of delivery of the resource; c) destination of the resource; d) contact details for the **person** receiving the resource; and e) quantity of the resource supplied measured in cubic meters.	The **registered resource producer** must keep the following **records** each time the **resource** is provided for use: a) origin of the resource; b) date of dispatch of the resource; c) ~~destination of the resource~~; d) contact details for the **person** receiving the resource; and e) quantity of the resource supplied measured in tonnes.

Condition 7.2 - Table 2 – Approved uses of the resource

New use added as detailed in the table below. For the resource to be used in direct land application, it has to meet the total maximum concentration of contaminants similar to that for soil ameliorant applications. The direct land application is to occur only on naturally acidic or low pH soils to correct the identified agronomic deficiency in land to which it is applied and where the final soil pH does not exceed 8 pH unit after application of the resource.

Purpose	Description of approved use
Land application	The resource can be used in direct land application on naturally acidic or low pH soils to correct the identified agronomic deficiency in land to which it is applied and where the final soil pH does not exceed 8 pH unit after application of the resource.

Condition 7.2	
For each **load** of the **resource** received, the **resource user** must keep the following **records** for a minimum of five (5) years and must provide to the **chief executive** upon request and in the format requested by the date requested: a) quantity of the resource; b) date of receipt; and c) name and address of the **person** who supplied the resource.	For each **load** of the **resource** received, the **resource user** must keep the following **records** for a minimum of five (5) years and must provide to the **chief executive** upon request and in the format requested by the date requested: a) quantity of the resource; b) date of receipt; c) name and address of the **person** who supplied the resource; and d) name and address of the resource user at the destination of resource.

Condition 7.5	
Resource users manufacturing the soil conditioner or soil product under this EOW code must notify the	**Resource users** undertaking the manufacturing of the soil ameliorant or soil product or applying

Published on DESI Disclosure Log
RTI Act 2009

chief executive of their name, address, contact information and details of intended resource usage, in writing using the approved form[1] 10 business days prior to using the resource.	resource directly to land under this EOW code must notify the **chief executive** of their name, address, contact information and details of intended resource usage, in writing using the approved form[2] no less than 10 business days prior to using the resource.
Condition 7.5- New condition added to ensure direct land application takes place only in naturally acidic soils and to correct identified deficiency.	
N/A	**Resource users** undertaking direct land application of the resource must only do so in naturally acidic soils: a) to correct the identified agronomic deficiency in land to which it is applied; and b) where the final soil pH does not exceed 8 pH unit after application of the resource.
New definitions added	
'AS4419' means Australian Standard 4419 Soils for landscaping and garden use (2003), or its most recent version.	
'AS4454' means Australian Standard 4454 Composts, soil conditioners and mulches (2012), or its most recent version.	

Published on DESI Disclosure Log
RTI Act 2009

[1] The approved form is available on the chief executive's website at www.des.qld.gov.au
[2] The approved form is available on the chief executive's website at www.des.qld.gov.au

PART F: DECISION

It is recommended that the chief executive:

☒ Makes the EOW code under s165 of the WRR Act

☐ Does not make the EOW code under s165 of the WRR Act.

NOTE: Under s166 of the WRR Act, if the chief executive decides to make the EOW code the chief executive must notify the making of the EOW code by gazette notice. The EOW Code takes effect the later of the following: (a) the day the gazette notice is published; (b) the day stated in the gazette notice for that purpose; (c) the day stated in the EOW code for that purpose.

PROVIDE REASONS FOR THE RECOMMENDATION BELOW:

It is recommended that an EOW code authorising reuse of foundry sand is developed to allow reuse of this material and divert it from disposal at lan[illegible] sch4 Contrary t

Isha Sharma		27/11/2018
Assessing Officer	**Signed**	**Date**

Review and endorsement
Comments:

Scott Blanchard	sch4 Contrary to public interest	28/11/2018
Manager	**Signed**	**Date**

Approval
I approve the recommendation based on the reasons stated in this report.

Kelly Gleeson	sch4 Contrary to public interest	5/12/2018
Delegate	**Signed**	**Date**

Published on TIA Disclosure Log 09

Appendix A – Submissions received

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
1.	ADAA	General	Formatting. Key terms, e.g resource etc. are inconsistent throughout the document in terms of **bold** formatting.	Minor editorial for clarity	No change. The bold formatting is not inconsistent in the document. The key terms are bolded only for first time use in one particular section/requirement/condition, and this is consistent throughout.
2.	ADAA	General	Terminology. Recommend using ***'Soil ameliorant'*** throughout document in preference to 'soil conditioner'. It has meaning within agricultural applications.	Minor editorial for clarity	Changed. The term 'soil conditioner' is replaced by 'soil ameliorant', and soil ameliorant defined as: **'soil ameliorant'** means a substance added to soil to improve the growing conditions for plant roots by providing nutritional requirements.
3.	ADAA	Section 2 – Guidance, 2.1	A waste becomes a resource when it has been determined to meet the requirements of an EOW code. It may be necessary to treat or process the waste prior to (ie. in order to) ***meet those requirements***.	Minor editorial for clarity	Changed. The suggested wording has been accepted to ensure further clarity with no change in intent.
4.	ADAA	Section 2.2	A resource ***which*** is approved under an EOW code, is also deemed to be a waste when it is disposed of at a waste disposal facility, or if it is deposited at a place in a way that would, apart from its use approved under an EOW code, constitute a contravention of the general littering provision or the illegal dumping of waste provision under the WRR Act — when the ***disposal occurs or the*** depositing starts.	Minor editorial for clarity	Changed. The wording has been changed by deleting the phrase 'when depositing starts' to make it consistent with other EOW codes. Deleting the above phrase removes confusion, if any, without changing the intent of the section.
5.	ADAA	Section 2.3	Please refer to Appendix A of this EOW code for general obligations for all persons ***operating under this EOW code***, which includes the resource users.	Minor editorial for clarity	Changed. The suggested wording has been accepted to ensure further clarity with no change in intent.
6.	ADAA	Section 3	We support the EoW Code remaining in force until it is cancelled, amended or suspended.	No details provided as to what triggers cancellation, suspension or amendment. Investment decisions to install production capacity will require more detail around this.	Changed. Details have now been provided regarding if an EOW code is to be amended, cancelled or suspended, the department will provide opportunity to make written submissions by: - providing a proposed action notice to the registered resource producers; and - publishing the proposed action notice on department's website for anyone interested This information ensures confidence in the investors that they would be consulted prior to department undertaking a proposed action.
7.	ADAA	Section 4	Some power stations use liquid fuel oil or liquid petroleum gas for ignition support. So as to avoid confusion we recommend including the word 'solid'. …no other ***solid*** source of fuels is mixed.	N/A	Changed. Considering the intent of the submission, the department has changed the wording to ensure that use of petroleum based gas or liquid fuel would not be a non-compliance as far as it is used for ignition support. The intent of not mixing coal with other sources of fuel is still retained.

Published on DESI Disclosure Log
RTI Act 2009

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
8.	ADAA	Section 6.1, Table 1	The current BUA 'Resource Monitoring Frequency' requires that statistical analysis is undertaken on 95% confidence interval ('CI') for any individual grab sample as composite samples are not used. Using a 95% CI we can address potential outliers. We suggest 'definition' sampling and resource testing results are based on a 95% CI.	N/A	Changed. The existing General Approval for use of CCPs has a monitoring frequency of 12 months where statistical analysis is undertaken on 95% confidence interval ('CI'). The consultation draft had monitoring requirement at a frequency of at least every six months as a blanket approach. However, where the statistical analysis is undertaken on 95% confidence interval ('CI') for ash produced from a power station supplied by a single-source, known coal deposit, as variability in ash is minimal given it all comes from the same deposit, the monitoring frequency of 12 months is considered reasonable.
9.	ADAA	Section 6.1, Table 1 – Chromium (VI)	The current BUA has 100 mg/kg for unbound and 1 mg/kg for soil ameliorants. We propose based on our data that Cr (VI) be amended to 1.5mg/kg	This is a 66 times reduction	Changed. The current General Approval for the use of CCP allows maximum contaminant concentration of 100 mg/kg for Cr (VI) for unbound applications based on the HIL A, Schedule B1, Table 1A(1), NEPM. The limit was changed to 1mg/kg in the consultation draft to align with the Vic EPA Guideline for clean fill. However, based on information provided by ADAA based on industry data, the ash produced from some of the power stations could have Cr(VI) up to 1.1 – 1.3 mg/kg. So increasing the maximum concentration limit from 1 to 1.5 mg/kg is considered reasonable to ensure reuse of the resource (as opposed to landfilling) while still ensuring negligible environmental harm based on HIL A, Schedule B1, Table 1A(1), NEPM which allows up to 100 mg/kg.
10.	ADAA	Section 6.2	In addition to meeting the criteria in Table 1 – Resource quality criteria, the resource must not **have any properties nor contain any other contaminants** at concentrations which may cause environmental harm when used in accordance with this EOW code.	The wording **"have any properties nor contain any other contaminants"** is very broad. Is this the trigger to 'cancel, amend or suspend'? Q. Have there been examples of this in relation to the current BUA for CCPs?	No change. Under the EOW framework, a myriad of wastes, varied in quality and properties, have the potential to be the subject of EOW codes/approvals. The purpose of this requirement in the EOW code is to manage the risks of any potential contaminants not captured by the resource quality criteria requirements of an EOW code or potential contaminants which were unknown at the time of development of the EOW code. As this EOW code is not a permit specific to any one operator, the onus is on the registered resource producer to consider any such contaminants while operating under this EOW code to ensure that reuse of waste is not posing a risk to the environment.
11.	ADAA	Section 6.3	We suggest that a monitoring frequency of 12 months is reinstated for ash produced from a power station supplied by a single-source, known coal deposit, as variability in ash is minimal given it all comes from the same deposit.	N/A	Changed. Refer department's consideration for comment#8 above.
12.	ADAA	Section 6.4	Composition of the resource has changed	Please define 'change' e.g. +/- 30% change in composition, change of source coal, change of operating conditions	No change. The intent of this requirement is to ensure any potential change in the resource quality criteria based on change of either source or operating conditions or any other changes which only the resource producer would be in position to determine.

Published on DESI Disclosure Log
RTI Act 2009

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
					By defining change in the EOW code, there is a risk of not capturing different possible changes which might impact on the resource quality criteria. By not defining the change, it would be up to the resource producer based on the information they have to determine if any additional testing required to ensure the resource still meets the specified criteria and does not contain any other contaminants not captured by Table 1 – resource quality criteria.
13.	ADAA	Section 6.8 - Records	Given the concept of EoW, we recommend the following amendments. ***The registered resource producer must keep the following records each time the resource is provided for use:*** ***a) origin of the resource;*** ***b) date of dispatch of the resource;*** ***c) the relevant person taking resource;*** ***d) contact details for the relevant person receiving the resource; and*** ***e) quantity of the resource collected in tonnes.***	Under trade practices law the requirement of a 'relevant person' to be obligated to provide customer details or 'ultimate destination' to the producer of a resource is problematic. In effect this requirement obliges the processor or reseller to provide commercial sensitive or confidential customer details to the producer. The user of resource may, process, blend, package or use trade secrets and or patents to create new value. The resource is generally supplied by weight (determined by weighbridges) and not volume. Densities vary from site to site.	Changed. Considering the concern raised by the submitter regarding what is under their control, i.e, to record the date of dispatch, and not the date of delivery, the word 'delivery' has been replaced by 'dispatch'. Based on the submission and further discussion with ADAA on 26/11/2018, the requirement for the registered resource producer to provide information on the 'destination' is onerous as the receiver of the resource consider this information as commercially sensitive and confidential. However, the information about destination is captured under this EOW code by imposing a condition on user to keep record of the name and address of the resource user at the destination of the resource. The unit of the quantity is changed from 'cubic metres to tonnes' for operation convenience for the industry.
14.	ADAA	Section 7.1, Table 2 – Soil ameliorant or direct application to land	We note the removal from Table 2 of use by direct application to land, given that selected sources may have pH up to 12.5. The Association proposes reinstating the ability to use the resource for unrestricted use and in soil ameliorant use based on an identified control (ie. max pH). For example, low pH soils or acid soils could benefit from the addition of ash with pH < 12.5.	Removal of soil ameliorant or direct application to land condition from original BUA has not been justified. The Association has spent considerable time and resources consulting with the Department to incorporate these applications into the BUA, supported with published reports – we believe this application and use should remain to encourage new market innovation.	Changed. Direct land application of the resource is currently allowed under the General Approval for CCP where the resource quality criteria has a pH limit of 14. The consultation draft EOW code had direct land application removed considering the high pH of the resource. However, it is considered that the direct land application can be included as one of the resource use option by avoiding the risk through following measures/requirements: - the pH limit in the EOW code for CCP is 12.5 as opposed to 14 in the existing General Approval; - a condition of use is imposed to ensure that the direct land application is undertaken only in naturally acidic or low pH soils to correct the identified agronomic deficiency in land to which it is applied and where the final soil pH does not exceed 8 pH unit after the application of the resource; - ash produced tends to be slightly to moderately alkaline. Many heavy metals become mobilised in acidic conditions and alkaline qualities of the ash may be desired in pH correction.
15.	ADAA	Section 7.5 -	Resource users undertaking soil conditioner or soil product use of the resource under this EOW code must notify the chief executive of their name, address, contact information and details of intended resource	Minor editorial for clarity	

Published on DES Public Use Log
RTI Act 2009

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
			usage, in writing using the approved form **no less than** 10 business days **prior to** using the resource		
16.	ADAA	Section 8 – Definitions	Amend 'coal combustion products' to include the word 'solid'. Ie. *…no other **solid** source of fuels is mixed.*	Minor editorial for clarity	Changed. Refer department's consideration for comment#7 above.
17.	ADAA	Section 8 - Definitions	Amend 'furnace bottom ash' so that internal reference to 'bottom ash' is to 'furnace bottom ash'. Ie. 'furnace bottom ash' means the agglomerated particles formed at the bottom of the furnace. ***Furnace bottom*** ash is typically grey to black in colour, is quite angular, and has a porous surface structure.	Minor editorial for clarity	Changed. The suggested wording has been accepted to ensure further clarity with no change in intent.
18.	ADAA	Section 8 - Definitions	Amend 'resources'. Suggested wording: *…, and does not **contain** contaminants at concentrations which may cause environmental harm.*	Minor editorial for clarity	Changed. The suggested wording has been accepted to ensure further clarity with no change in intent.

Published on DESI Disclosure Log
RTI Act 2009

Published on DESI Disclosure Log
RTI Act 2009

End of Waste Code

Coal Combustion Products (ENEW07359717)

Waste Reduction and Recycling Act 2011

Release

Version history

Version	Date	Description of changes
1	01 January 2019	Commencement of EOW code

Prepared by: Waste and Contaminated Land Assessment, Department of Environment and Science

© State of Queensland, 2018
The Queensland Government supports and encourages the dissemination and exchange of its information. The copyright in this publication is licensed under a Creative Commons Attribution 3.0 Australia (CC BY) licence.

Under this licence you are free, without having to seek our permission, to use this publication in accordance with the licence terms.

You must keep intact the copyright notice and attribute the State of Queensland as the source of the publication.
For more information on this licence, visit http://creativecommons.org/licenses/by/3.0/au/deed.en

If you need to access this document in a language other than English, please call the Translating and Interpreting Service (TIS National) on 131 450 and ask them to telephone Library Services on +61 7 3170 5470.

This publication can be made available in an alternative format (e.g. large print or audiotape) on request for people with vision impairment; phone +61 7 3170 5470 or email <library@des.qld.gov.au>.

November 2018

Published on DESI Disclosure Log
RTI Act 2009

Contents

1. Explanatory Statement....4
2. Guidance....4
2.1 Resource use versus Activity....4
2.2 Resource versus Waste....4
2.3 Failure to comply....4
2.4 Lawfulness of the activity....5
3. Period of this EOW code....5
4. Waste to which this EOW code applies....5
5. Person to whom this EOW code applies....5
5.1 Registered resource producers of the resource....5
5.2 Resource users....5
6. Registered resource producer requirements....6
7. Conditions of use....7
8. Definitions....9
Appendix A —General obligation for all persons....12
9. Approved by....14

Published on DESI Disclosure Log
RTI Act 2009

1. Explanatory Statement

This End of Waste (EOW) code for **coal combustion products** has been issued by the Queensland Government in accordance with section 159 of the *Waste Reduction and Recycling Act 2011* (WRR Act).

This EOW code states when a waste becomes a resource and any relevant requirements and/or conditions for its use. It supports the vision of Queensland's Waste Strategy 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 the waste is not being used in accordance with the relevant requirements and/or conditions of this EOW code, or another type of permit that allows for its use, it is considered a waste and must be disposed of appropriately at a facility that is lawfully able to receive the waste.

2. Guidance

2.1 Resource use versus Activity

An EOW code states when a waste stops being a waste following any necessary processing or treatment.

A waste becomes a **resource** when it has been determined to meet the requirements of an EOW code. It may be necessary to treat or process the waste prior to (i.e, in order to) meet those requirements. An Environmental Authority (EA) under the *Environmental Protection Act 1994* (EP Act) is required where an activity being undertaken triggers the threshold for any environmentally relevant activity (ERA). This means that treating or processing the waste to meet the resource quality criteria under the EOW code may require an EA under the EP Act if the activity meets the threshold for an ERA.

2.2 Resource versus Waste

A waste that is considered a **resource** under an EOW code is considered a resource only for the purpose of the use(s) approved in an EOW code. In the event, a resource does not meet the requirements of the EOW code and/or is not used in accordance with the EOW code, it is deemed to be a waste and must be managed in accordance with waste management requirements under the EP Act and the WRR Act, and their subordinate legislation.

A resource which is approved under an EOW code, is also deemed to be a waste when it is disposed of at a waste disposal facility, or if it is deposited at a place in a way that would, apart from its use approved under an EOW code, constitute a contravention of the general littering provision or the illegal dumping of waste provision under the WRR Act.

2.3 Failure to comply

Any **person** operating under this EOW code must comply with the relevant requirements and conditions of use of the EOW code. It is an offence to not comply with the relevant requirements and conditions, carrying a maximum penalty of 1665 penalty units for an individual and 8325 penalty units for a corporation[1].

Please refer to Appendix A of this EOW code for general obligations for all persons operating under this EOW code, which includes the **resource users**.

[1] The value of a penalty unit is stated in the Penalties and Sentences Regulation 2015 (Qld).

Published on DES Disclosure Log
RTI Act 2009

2.4 Lawfulness of the activity

The issuing of this EOW code for the use of the **resource** does not warrant or imply the lawfulness of the activity under all legislation, or that approvals necessary under other legislation have or will be approved. It is the responsibility of the **registered resource producer** and **resource user** to identify and obtain all other approvals necessary for the relevant activities.

3. Period of this EOW code

This EOW code takes effect from **01 January 2019** and remains in force until it is amended, cancelled or suspended[2] by the **chief executive**.

4. Waste to which this EOW code applies

This EOW code is limited to **coal combustion products** sourced from coal fired power stations and coal fired boilers where no other source of fuels is mixed other than petroleum based gas or liquid fuel for ignition support.

This waste becomes a **resource** when the requirements and conditions under this EOW code are met.

5. Person to whom this EOW code applies

5.1 Registered resource producers of the resource

5.1.1 Prior to operating under this EOW code, the producer of the **resource** must register with the **chief executive** by giving a notice in the approved form[3] that the **person** intends to become a **registered resource producer** for this EOW code.

5.1.2 A registered resource producer for this EOW code must comply with the stated registered resource producer requirements.

5.2 Resource users

5.2.1 The **resource user** must only use the **resource** for a purpose allowed under this EOW code.

5.2.2 The resource user must comply with the stated conditions of use.

Published on DESI Disclosure Log
RTI Act 2009

[2] If an EOW code is to be amended, cancelled or suspended, the chief executive will provide an opportunity to make written submissions by providing a proposed action notice to the registered resource producers; and publishing the proposed action notice on department's website for anyone interested.
[3] The approved form, *Registered Resource Producer for an EOW code,* is available on the **Queensland Government** website at www.des.qld.gov.au, and can be searched using the term ESR/2018/4082

6. Registered resource producer requirements

(6.1)	The **registered resource producer** must not use, sell or give away the **resource** unless it meets the criteria in *Table 1 – Resource quality criteria* for the approved use in accordance with this EOW code.

Table 1 – Resource quality criteria

Quality criteria	Limits for specific uses *		
	Bound applications	Total Maximum Concentration (mg per kg)	
		Unbound applications	Soil ameliorant and land applications
Arsenic (total)	NS	20	20
Beryllium	NS	NS	60
Boron	NS	100	10**
Cadmium	NS	1	1
Chromium (total)	NS	100	100
Chromium (III)	NS	NS	100
Chromium (VI)	NS	1.5	1
Cobalt	NS	100	100
Copper	NS	100	100
Lead	NS	50	50
Mercury	NS	1	1
Molybdenum	NS	NS	10
Nickel	NS	60	60
Selenium	NS	10	5
Zinc	NS	200	200
Electrical conductivity	NS	NS	10,000(uS/cm)
pH	NS	5 – 12.5 (pH units)	5 – 12.5 (pH units)

NS = Not specified (monitoring of each element is still required).

* measured using **reference test methods**

** measured using hot $CaCl_2$ method

(6.2)	In addition to meeting the criteria in *Table 1 – Resource quality criteria*, the resource must not have any properties nor contain any other **contaminants** at concentrations which may cause **environmental harm** when used in accordance with this EOW code.

Resource monitoring

(6.3)	The **registered resource producer** must conduct monitoring of the **resource** quality to determine compliance with *Table 1 - Resource quality criteria* and at a minimum of the following frequency :

Published on DESI Disclosure Log RTI Act 2009

	a) annually, where statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations; otherwise, b) every six months.
(6.4)	Where the composition of the **resource** has changed or is likely to change, additional monitoring must be conducted which is sufficient to detect and characterise the extent of any change, until such time that the composition is no longer likely to change and that results demonstrate that the material is compliant with *Table 1 – Resource quality criteria* before it is used as a resource under this EOW code.
(6.5)	Any determination of the suitability or characterisation of the **resource** (including ongoing sampling) must be made by an **appropriately qualified person**.
(6.6)	All analysis required under this EOW code must be carried out by a laboratory that has **NATA** certification, or an equivalent certification, for such analyses.
Information to be provided	
(6.7)	The **registered resource producer** must make the following available to any **person** to whom they provide the **resource** each time the resource is provided for use: a) confirmation in writing that the resource being supplied is compliant with the requirements of this EOW code; b) a most recent certificate of analysis for the quality of the resource being supplied for at least the quality criteria in *Table 1 – Resource quality criteria*; and c) **Safety Data Sheet** for the resource.
Records	
(6.8)	The **registered resource producer** must keep the following **records** each time the **resource** is provided for use: a) origin of the resource; b) date of dispatch of the resource; c) contact details for the **person** receiving the resource; and d) quantity of the resource supplied measured in tonnes.
(6.9)	The **registered resource producer** must keep **records** of all requirements, including monitoring requirements, under this EOW code for a period of at least five (5) years and provide the records to the **chief executive** upon request and in the format requested within 10 days.

Published on DESI Disclosure Log
RTI Act 2009

7. Conditions of use

Approved uses	
(7.1)	The approved **resource** is **coal combustion products** that comply with the quality criteria listed in *Table 1 - Resource quality criteria* and is used for the purpose stated in *Table 2 – Approved uses of the resource*.

Table 2 - Approved uses of the resource

Purpose	Description of approved use
Bound applications	The resource can 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. Final products for the purpose of this EOW code are limited to: a) cementitious mixes; b) cement products; c) concrete products; d) asphalt; e) binder for road stabilisation pavements; f) rigid and composite pavements structures; g) ceramic products; h) insulators; i) varnishes, plastics, ceramics, ultra-light concrete and metal alloys; j) paints, coatings and adhesives; k) geopolymers; and l) rubbers.
Unbound applications	The resource use is limited to the following applications on **standard areas**: a) pipe bedding materials; b) sub-surface drainage; c) selected backfill for structures; d) road pavement, base, sub-base and subgrade structures; e) structured and engineered fill; f) select layers which act as working platforms at the top of earthworks; and g) fill for reinforced soil structures (including geo-grid applications).
Manufacturing of **soil ameliorant** or soil product	The resource can be used in manufacturing a soil ameliorant or soil product which meets the relevant Australian Standards for that product.
Land application	The resource can be used in direct land application on naturally acidic or low pH soils to correct the identified agronomic deficiency in land to which it is applied and where the final soil pH does not exceed 8 pH unit after application of the resource.

Records

(7.2)	For each **load** of the **resource** received, the **resource user** must keep the following **records** for a minimum of five (5) years and must provide to the **chief executive** upon request and in the format requested by the date requested: a) quantity of the resource; b) date of receipt; c) name and address of the **person** who supplied the resource; and d) name and address of the resource user at the destination of resource.

Published on DESI Disclosure Log
RTI Act 2009

Unbound applications	
(7.3)	**Resource users** undertaking an unbound application must not use the resource: a) below the groundwater table; b) within 50m of a water supply bore; and c) in areas with pH greater than 8.
Soil ameliorant or soil product use	
(7.4)	**Resource users** manufacturing the soil ameliorant or soil product may only mix, blend, or otherwise incorporate the **resource** into a material to be used as a **soil ameliorant** where the material to be provided complies with the **AS4454 AS4419** including monitoring and keeping records of product quality to demonstrate compliance with the relevant Australian Standard.
(7.5)	**Resource users** undertaking the manufacturing of the soil ameliorant or soil product or applying resource directly to land under this EOW code must notify the **chief executive** of their name, address, contact information and details of intended resource usage, in writing using the approved form[4] no less than 10 business days prior to using the resource.
(7.6)	**Resource users** undertaking direct land application of the resource must only do so in naturally acidic soils: a) to correct the identified agronomic deficiency in land to which it is applied; and b) where the final soil pH does not exceed 8 pH unit after application of the resource.
Notification of **emergencies**, incidents and exceptions	
(7.7)	Any breach of a condition of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach. **Records,** including full details of the breach and any subsequent actions taken, must be kept and provided to the chief executive upon request.

Published on DESI Disclosure Log
RTI Act 2009

8. Definitions

Words and phrases used throughout this EOW code **in bold** are defined below. Where a definition for a term used in this EOW code is sought and the term is not defined within this EOW code, the definitions provided in the relevant legislation shall be used.

'appropriately qualified person' means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

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

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

'cenosphere(s)' means inert, hollow, essentially thin-walled glass spheres of approximately 10–350 microns having a typical density of 0.4–0.8g/cm^3, comprised largely of silica and alumina and filled with air and/or gasses which are formed from coal combustion ash when in a molten state.

'chief executive' means the Department of Environment and Science or its successor.

[4] The approved form is available on the chief executive's website at www.des.qld.gov.au

'coal combustion products' means **fly ash**, **furnace bottom ash** or **cenosphere(s)** resulting from the burning of coal within coal fired power stations and coal fired boilers where no other source of fuel is mixed other than petroleum based gas or liquid fuel for ignition support.

'contaminants' (as defined in Section 11 of the *Environmental Protection Act 1994*), unless authorised under this EOW code means —

a) a gas, liquid or solid; or
b) an odour; or
c) an organism (whether alive or dead), including a virus or parasite; or
d) energy, including noise, heat, radioactivity and electromagnetic radiation; or
e) a combination of contaminants.

'emergency(ies)' means a situation where either human health or safety is threatened, or serious or material environmental harm has been or is likely to be caused; and urgent action is necessary to protect the health or safety of persons, or prevent or minimise the harm, or rehabilitate or restore the environment because of the harm.

'environmental harm' means environmental harm as defined in Chapter 1 of the *Environmental Protection Act 1994.*

'fly ash' means solid material extracted from the flue gasses of a boiler fired with pulverised coal, consisting essentially of the oxides of silicon, aluminium, iron and some calcium of which particle sizes range from less than 1µm (micrometre) to 200µm and are irregular to spherical shape.

'furnace bottom ash' means the agglomerated particles formed at the bottom of the furnace. Furnace bottom ash is typically grey to black in colour, is quite angular, and has a porous surface structure.

'load' means the volume of **resource** put in or on something for conveyance or transportation, carried at one time. A truck and trailer carrying the resource is considered as one load as well as multiple bins travelling by rail. Where the resource is transported via conveyor systems, information should be recorded on a daily basis until the transfer ceases.

'NATA' is the National Association of Testing Authorities.

'person(s)' means an individual or a corporation.

'records' include breach notifications, analysis results, monitoring reports and monitoring programs required under a condition or requirement of this EOW code.

'reference test methods'—The reference test methods for determining the contaminant and 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].

'registered resource producer' means a **person** who has registered with the **chief executive** to use, sell or give away the **resource** to be used under this EOW code.

'resource(s)' means **fly ash**, **furnace bottom ash** or **cenosphere(s)** produced from the combustion of coal, at coal fired power stations and coal fired boilers, that meet the resource quality criteria in *Table 1 – Resource quality criteria* of this EOW code, and does not contain contaminants other than what is listed in *Table 1– Resource quality criteria* .

'resource user(s) means a **person** who uses the **resource** for the use approved under this EOW code and in such a manner which does not cause any **environmental harm**, and includes the producer who uses the resource.

'Safety Data Sheet' means a document containing data regarding the properties of the **resource** which provides information on handling or working with that substance in a safe manner; and includes information such as physical data toxicity, environmental characteristics, health effects, first aid, reactivity; and storage,

Published on DESI Disclosure Log
RTI Act 2009

disposal, protective equipment and spill handling procedures. The Safety Data Sheet must be compliant with Safe Work Australia's code of practice for production of Safety Data Sheets.

'soil ameliorant' means a substance added to soil to improve the growing conditions for plant roots by providing nutritional requirements.

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

'surface water' means waters excluding groundwater.

'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.

- END -

Published on DESI Disclosure Log
RTI Act 2009

Appendix A —General obligation for all persons

This appendix is not intended to provide a comprehensive assessment of all obligations under Queensland law. It provides some general information and persons are encouraged to familiarise themselves with all requirements related to their specific operation.

Responsibilities under the *Environmental Protection Act 1994*

All persons within the State of Queensland must also meet their obligations under the *Environmental Protection Act 1994*, and the regulations made under that Act.

General environmental duty

Section 319 of the *Environmental Protection Act 1994* states that we all have a general environmental duty. This means that we are all responsible for the actions we take that affect the environment. We must not carry out any activity that causes or is likely to cause environmental harm unless we take all reasonable and practicable measures to prevent or minimise the harm. To decide what meets your general environmental duty, you need to consider:

- the nature of the harm or potential harm
- the sensitivity of the receiving environment
- the current state of technical knowledge for the activity
- the likelihood of successful application of the different measures to prevent or minimise environmental harm that might be taken
- the financial implications of the different measures as they would relate to the type of activity.

It is not an offence not to comply with the general environmental duty. However, maintaining your general environmental duty is a defence against the following acts:

(a) an act that causes serious or material environmental harm or an environmental nuisance

(b) an act that contravenes a noise standard

(c) a deposit of a contaminant, or release of stormwater run-off, mentioned in section 440ZG.

More information is available on the Department of Environment and Science (DES) website www.des.qld.gov.au.

Some relevant offences under the *Environmental Protection Act 1994*

Causing serious or material environmental harm (sections 437–39)

Material environmental harm is when the harm is not trivial or negligible in nature. Serious environmental harm is harm that is irreversible, of a high impact or widespread, or that is caused to an area of high conservation value or special significance. Damages, or costs required to rehabilitate the environment, of over $5000 constitutes material environmental harm and damages, or costs required to rehabilitate the environment, of over $50,000 constitutes serious environmental harm.

Serious or material environmental harm excludes environmental nuisance.

Published on DESI Disclosure Log
RTI Act 2009

Causing environmental nuisance (section 440)

Environmental nuisance is unreasonable interference with an environmental value caused by aerosols, fumes, light, noise, odour, particles or smoke. It may also include an unhealthy, offensive or unsightly condition because of contamination.

Depositing a prescribed water contaminant in waters (section 440ZG)

Prescribed water contaminants include a wide variety of contaminants listed in Schedule 9 of the Environmental Protection Regulation 2008.

It is your responsibility to ensure that prescribed water contaminants are not left in a place where they may or do enter a waterway, the ocean or a stormwater drain. This includes making sure that stormwater falling on or running across your site does not leave the site contaminated. Where stormwater contamination occurs you must ensure that it is treated to remove contaminants. You should also consider where and how you store material used in your processes onsite to reduce the chance of water contamination.

Placing a contaminant where environmental harm or nuisance may be caused (section 443)

A person must not cause or allow a contaminant to be placed in a position where it could reasonably be expected to cause serious or material environmental harm or environmental nuisance.

Some relevant offences under the *Waste Reduction and Recycling Act 2011*

Littering (section 103)

Litter is any domestic or commercial waste and any material a person might reasonably believe is refuse, debris or rubbish. Litter can be almost any material that is disposed of incorrectly. Litter includes cigarette butts and drink bottles dropped on the ground, fast food wrappers thrown out of the car window, poorly secured material from a trailer or grass clippings swept into the gutter. However, litter does not include any gas, dust, smoke or material emitted or produced during, or because of, the normal operations of a building, manufacturing, mining or primary industry.

Illegal dumping of waste (section 104)

Illegal dumping is the dumping of large volumes of litter (200 litres or more) at a place. Illegal dumping can also include abandoned vehicles.

Failure to comply with EOW code (section 158)

A registered resource producer for an EOW code must not produce, use, sell or give away the resource unless the registered resource producer complies with the requirements of the EOW code relating to the resource.

A person, other than a registered resource producer, must not use a resource in a way, or for a purpose, that does not comply with an EOW code for the resource.

Published on DESI Disclosure Log
RTI Act 2009

9. Approved by

Signature

Date

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)

Published on DESI Disclosure Log
RTI Act 2009

National Technical and Education Committee

Friday, 6th March 2020

Published on DES Disclosure Log
RTI Act 2009

ADAA – EoW amendment submission (Dec 2019)

Proposed amendment(s) to the End of Waste (EoW) Code for the use of coal combustion products (CCP) WEF 1 Jan 2019

- Early December 2019, C Heidrich met with QDES to outline the proposal and justification for a minor amendment to the current definition for “coal combustion products” within the current “End of Waste Code – Coal Combustion Products
  - The purpose of these amendments are two fold.
    - To maintain ongoing legal certainty (definition of CCPs) and relevant end use applications under the EoW Code.
    - To maintain ongoing important innovation and carbon reduction opportunities for Queensland coal fired powers stations.

Published on DESI Disclosure Log
RTI Act 2009

ADAA - Evidence (provided)

- **CSIRO** - Cement and Concrete Technology Group study (2004) investigated issues related to possible impacts to current end uses from co-combustion with biomass and the resultant characteristics and properties which may need to change within AS 3582.1
  - The information about the composition of fly ashes derived from co-combustion of biomasses and coal indicates that there are no significant differences compared with the composition of fly ashes derived from coal only, if the proportion of biomass used is up to 10% (by weight)
  - A minor change to the current definition to allow for up 10% weight of biomass would be required
- **CRC Coal in Sustainable Development** – Coal – Biomass Cofiring Handbook
  - Studies confirm CSIRO findings
- **NSW CFPS** - Current biomass use demonstrates no impact on characteristics and properties

Published on DPSI Disclosure Log
RTI Act 2009

ADAA – No changes to conditions

- CCPs which are co-combusted with 'biomass' must meet the **Table 1 Quality limits** for 'unbound' applications.
- CCPs used in 'bound' e.g. concrete quality limits (none set)
- Proposed have been consulted w/ ALL Queensland operators and are unanimously supported

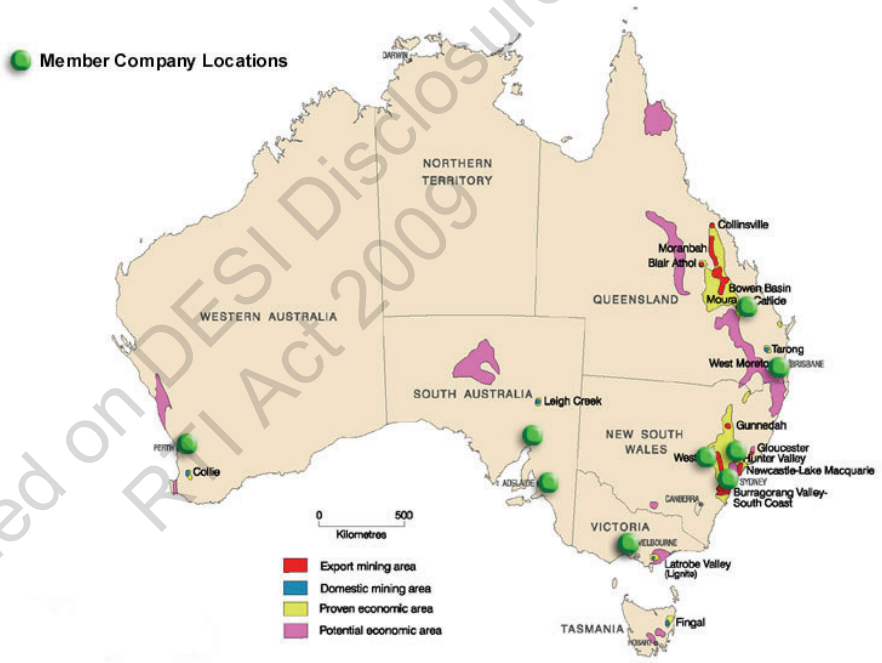
Published on DES Disclosure Log
RTI Act 2009

Queensland, DES – Response (24 Feb)

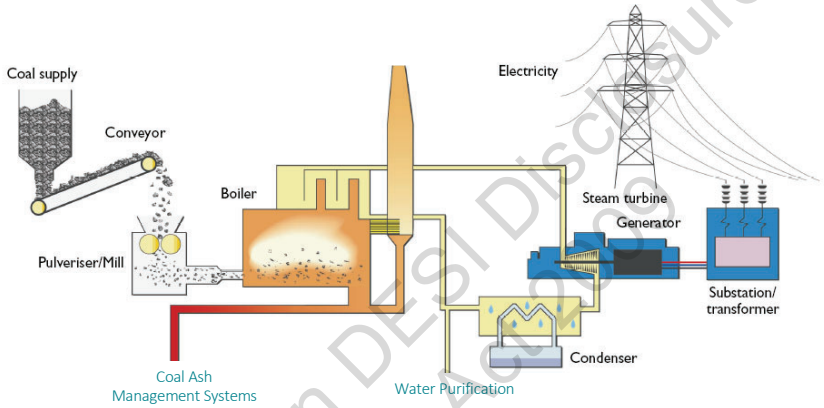
- No specific concerns about biomass (such as woodchips, sawdust, agriculture green vegetation waste) co-combusted up to 10%
  - Agreed
- Concerns about biomass (i.e. biosolids) containing PFAS and destruction capability
- PFA Team advise – PFAS require operating temperatures > 1,100 ^{o}C and residence time > 2s.
  - QDES requests general range of temperature in the coal fired power stations in Queensland, i.e. names of major power stations, their operation temperature ranges and “maximum temperature and lasting time”

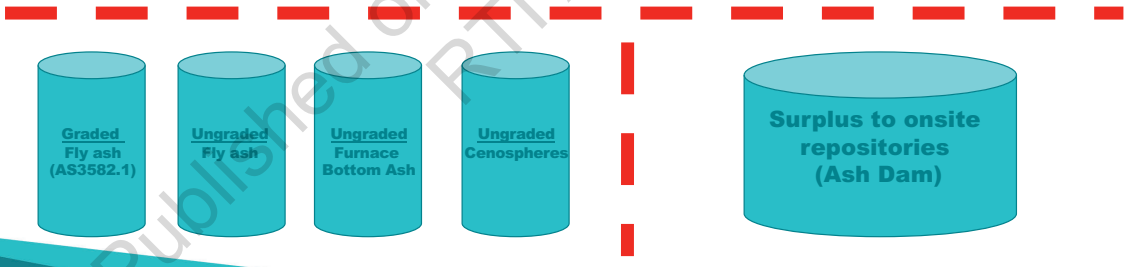
Published on DESI Disclosure Log
RTI Act 2009

Bilmar Solutions
BG&E MT
Boral Quarries & Recycling
Brickworks
Consulting & Environmental Services
Low Carbon Living (CRC)
CS Energy
Delta Electricity
Energy Australia
Golden Bay Cement (NZ)
Heeleys Consulting
Hyrock
Tremline (Hills Barker Blower)
Intergen (Millmerran)
Latrobe Magnesium
NRG Gladstone Power Station
Origin Energy Eraring
Poly Agg
QTMR (QLD)
RMS (NSW)
SmartCrete (CRC)
Sphere One (LLC)
Stanwell Corporation
Synergy (Verve Energy)
Ultimate Housing Solutions
VicRoads (VIC)
Vecor Australia



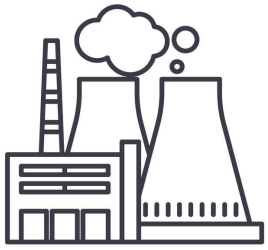
Published on DESI Disclosure Log
RTI Act 2009





Published on DES Disclosure Log
RTI Act 2009

Operating Temperature and residence time



Station	Location	Combustion zone temp °C (min)	Combustion zone temp °C (max)	Residence time sec (min)
CS Energy	Callide A & B	1300	1590	2.9
CS Energy	Kogan Creek	1250	1570	3.0
InterGen	Millmerran	1300	1600	2.9
NRG	Gladstone	1350	1650	3.2
Stanwell	Nanango	1200	1490	2.5
Stanwell	Rockhampton	1330	1550	2.8

Published on DES disclosure log
RTI Act 2009

Findings

- Queensland Coal Fired Power Stations operating temperatures are well above 1,100 ^{o}C and residence time > 2s

Published on DESI Disclosure Log
RTI Act 2009

DRAFT
Published on DESI Disclosure Log
RTI Act 2009

End of Waste Code

Coal Combustion Products (ENEW07359717)

Waste Reduction and Recycling Act 2011

Releas

Version history

Version	Date	Description of changes
1.0	01 January 2019	Commencement of EOW code
2.0	DD MM YYYY	Draft Amendment

Prepared by: Waste and End of Waste Assessment, Department of Environment and Science

© State of Queensland, 2020
The Queensland Government supports and encourages the dissemination and exchange of its information. The copyright in this publication is licensed under a Creative Commons Attribution 3.0 Australia (CC BY) licence.

Under this licence you are free, without having to seek our permission, to use this publication in accordance with the licence terms.

You must keep intact the copyright notice and attribute the State of Queensland as the source of the publication.
For more information on this licence, visit http://creativecommons.org/licenses/by/3.0/au/deed.en

If you need to access this document in a language other than English, please call the Translating and Interpreting Service (TIS National) on 131 450 and ask them to telephone Library Services on +61 7 3170 5470.

This publication can be made available in an alternative format (e.g. large print or audiotape) on request for people with vision impairment; phone +61 7 3170 5470 or email <library@des.qld.gov.au>.

June 2020

DRAFT
Published on DESI Disclosure Log
RTI Act 2009

Contents

1. Explanatory Statement....4
2. Guidance....4
2.1 Resource use versus Activity....4
2.2 Resource versus Waste....4
2.3 Failure to comply....4
2.4 Lawfulness of the activity....5
3. Period of this EOW code....5
4. Waste to which this EOW code applies....5
5. Person to whom this EOW code applies....5
5.1 Registered resource producers of the resource....5
5.2 Resource users....5
6. Registered resource producer requirements....6
7. Conditions of use....9
8. Definitions....11
Appendix A —General obligation for all persons....14
9. Approved by....15

DRAFT
Published on DESI Disclosure Log
RTI Act 2009

1. Explanatory Statement

This End of Waste (EOW) code for **coal combustion products** has been issued by the Queensland Government in accordance with section 159 of the *Waste Reduction and Recycling Act 2011* (WRR Act).

This EOW code states when a waste becomes a resource and any relevant requirements and/or conditions for its use. It supports the vision of Queensland's Waste Strategy 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 the waste is not being used in accordance with the relevant requirements and/or conditions of this EOW code, or another type of permit that allows for its use, it is considered a waste and must be disposed of appropriately at a facility that is lawfully able to receive the waste.

2. Guidance

2.1 Resource use versus Activity

Under section 155 of the WRR Act, a waste stops being a waste and becomes a **resource** when it meets the requirements and conditions of an EOW code. Under section 159 of the WRR Act, an EOW code specifies the circumstances when a waste becomes a resource; how it must be used to be considered a resource; when it is no longer considered a resource but a waste instead; and conditions that must be complied with by resources users and registered resource producers.

An Environmental Authority (EA) under the *Environmental Protection Act 1994* (EP Act) is required where an activity being undertaken triggers the threshold for any environmentally relevant activity (ERA). This means that treating or processing the waste to meet the resource quality criteria under the EOW code may require an EA under the EP Act if the activity meets the threshold for an ERA.

2.2 Resource versus Waste

A waste that is a **resource** under an EOW code is considered a **resource** only for the use(s) approved in an EOW code. To be considered a resource under the EOW code, the material used as the resource must meet the requirements of the EOW code and be used in accordance with the conditions of the EOW code, otherwise it is considered a waste and must be managed in accordance with waste management requirements under the EP Act and the WRR Act and their subordinate legislation.

A **resource** under an EOW code, is deemed to be a waste again, if it is not used in accordance with the EOW code; if it is being stored without use; if it is disposed of at a waste disposal site; or if it is deposited at a place in a way that would, apart from its use approved under an EOW code, constitute a contravention of the general littering provision (section 103) or the illegal dumping of waste provision (section 104) under the WRR Act.

2.3 Failure to comply

It is an offence under section 158(1) of the WRR Act for a **registered resource producer** to produce the **resource**, or use, sell or give away the **resource** unless they comply with the requirements under an EOW code. Further, it is an offence under section 158(2) of the WRR Act for a **person** to use the **resource** in a way, or for a purpose, that does not comply with an EOW code for the **resource**. These offences carry a maximum penalty of 1,665 penalty units for an individual and 8,325 penalty units for a corporation[1].

[1] The value of a penalty unit is stated in the *Penalties and Sentences Regulation 2015* (Qld).

DRAFT
Published on DES Disclosure Log
RTI Act 2009

Please refer to Appendix A of this EOW code for general obligations for all **persons** operating under this EOW code, which includes the **resource users**.

2.4 Lawfulness of the activity

The issuing of this EOW code for the use of the **resource** does not warrant or imply the lawfulness of the activity under all legislation, or that approvals necessary under other legislation have or will be approved. It is the responsibility of the **registered resource producer** and **resource user** to identify and obtain all other approvals necessary for the relevant activities.

3. Period of this EOW code

This EOW code takes effect from the day of gazettal of this EOW code and remains in force until it is amended, cancelled or suspended by the **chief executive**[2].

4. Waste to which this EOW code applies

This EOW code is limited to **coal combustion products** sourced from coal fired power stations and coal fired boilers where at least 90% of the fuel source is coal.

These **coal combustion products** become a **resource** when the requirements and conditions under this EOW code are met.

5. Person to whom this EOW code applies

5.1 Registered resource producers of the resource

5.1.2 A **registered resource producer** for this EOW code must comply with the stated registered resource producer requirements in Section 6 – Registered Resource Producer Requirements.

5.2 Resource users

5.2.1 The **resource user** must only use the **resource** in a way, and for a purpose allowed under this EOW code.

5.2.2 The resource user must comply with the stated conditions of use in Section 7 – Conditions of Use.

DRAFT
Published on DES Disclosure Log
RTI Act 2009

[2] If an EOW code is to be amended, cancelled or suspended, the chief executive will provide an opportunity to make written submissions by providing a proposed action notice to the registered resource producers; and publishing the proposed action notice on the chief executive's website.

6. Registered resource producer requirements

Registration under this EOW code	
(6.1)	Prior to operating under this EOW code, the producer of the **resource** must register with the **chief executive** by giving a notice in the approved form[3] to become a **registered resource producer** for this EOW code.
Approved resource	
(6.2)	The approved **resource** is **coal combustion products** which complies with *Requirement (6.3)* of this EOW code.
(6.3)	The **registered resource producer** must not use, sell or give away the **resource** under this EOW code unless the **resource** complies with all of the following criteria and quality characteristics: a) the **resource** does not exceed the quality criteria stated in *Table 1: Resource quality criteria*; and b) where biomass containing potential per and poly-fluoroalkyl substances (PFAS) contamination (e.g. biosolids) is used, the **resource** has been combusted at higher than 1100°C for at least 2 seconds.

Table 1 – Resource quality criteria

Quality characteristics	Limits for specific uses *		
	Bound applications	Total Maximum Concentration (mg/kg dry weight unless otherwise specified)	
		Unbound applications	Soil conditioner and soil products
Arsenic (total)	NS	20	20
Beryllium	NS	NS	60
Boron	NS	100	10**
Cadmium	NS	1	1
Chromium (total)	NS	100	100
Chromium (III)	NS	NS	100
Chromium (VI)	NS	1.5	1
Cobalt	NS	100	100
Copper	NS	100	100
Lead	NS	50	50
Mercury	NS	1	1
Molybdenum	NS	NS	10
Nickel	NS	60	60
Selenium	NS	10	5

[3] The approved form, *Registered Resource Producer for an EOW code,* is available on the Queensland Government website at www.qld.gov.au, using the publication number (ESR/2018/4082) as a search term.

Published on DES Disclosure Log RTI Act 2009

Zinc	NS	200	200
Electrical conductivity	NS	NS	10,000(uS/cm)
pH	NS	5 – 12.5 (pH units)	5 – 12.5 (pH units)
Sum of PFOS and PFHxS***	1	0.01	0.002
PFOA***	10	0.1	0.004

NS = Not specified (monitoring of each element is still required).

* measured using **reference test methods**

** measured using hot $CaCl_2$ method

*** analysis only required if the resource is resulting from combustion of biomass with potential PFAS contaminant (e.g, biosolids)

Resource monitoring	
(6.4)	The **registered resource producer** must sample, measure and record the composition of the **resource** for the quality characteristics in *Table 1 - Resource quality criteria* at a minimum of the following frequency: a) annually, where statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations; otherwise, b) every six months.
Monitoring for PFAS	
(6.5)	Where biomass containing potential PFAS contamination (e.g, biosolids) is used, the **registered resource producer** must sample, measure and record the quality of **resource** for PFAS for at least the following parameters: a) Total Oxidisable Precursor Assay (TOPA) with a minimum: i. C_4-C_{14} perfluoroalkyl carboxylic acids; ii. C_4-C_{10} perfluoroalkyl sulfonic acids; iii. perfluoroalkyl sulphonamides; iv. n:2 flourotelomer sulfonic acids; and b) Total Organic Fluorine Assay (TOFA).
(6.6)	When sampling, measuring and recording the quality of **resource** for PFAS in accordance with *Requirement (6.5)*: a) analysis techniques must achieve lowest practicable limits of reporting; b) analysis techniques must achieve maximum extraction of PFAS from samples following Australian Standard Leaching Procedure (ASLP) test, *Australia Standard AS4439*; c) quality assurance measures for TOPA and TOFA must be complied with *Section 19.2 of the PFAS National Environmental Management Plan Version 2.0 – January 2020*, unless superseded by a revised or new version of the document, including checks against PFAS results for corresponding non-oxidised samples; and d) any advice from the **chief executive** concerning improvements in analysis techniques

DRAFT
Published on DES Disclosure Log
RTI Act 2009

	must be implemented.
(6.7)	All sampling and monitoring required under this EOW code must be carried out by an **appropriately qualified person**.
(6.8)	All analysis required under this EOW code must be carried out by a laboratory that has **NATA** certification, or an equivalent certification, for such analyses.
Information to be provided	
(6.9)	The **registered resource producer** must provide the following to the **resource user** upon establishment of an arrangement to sell or give away the **resource**, and annually thereafter: a) a copy of the EOW code for *Coal Combustion Products (ENEW07359717)*[4]; b) the **registered resource producer's** business name, **ABN** and address; c) confirmation in writing that the **resource** being supplied is compliant with *Requirement (6.3)* of this EOW code; d) a most recent certificate of analysis for the quality characteristics listed in *Table 1: Resource quality criteria*; and e) **safety data sheet** for the **resource**.
Records	
(6.10)	The **registered resource producer** must keep the following **records** for the **resource** supplied to a **resource user**: a) origin of the **resource** (e.g. address, lot on plan and/or GPS coordinates); b) quantity (in tonnes) of the **resource** supplied; c) quality criteria of the **resource** (including but not limited to the quality characteristics listed in *Table 1: Resource quality criteria*); d) date of dispatch of the **resource**; and e) business name, **ABN** and address of the **person** receiving the **resource**.
(6.11)	All **records** required to be kept by the **registered resource producer** under this EOW code must be: a) kept by the **registered resource producer** for a period of not less than five (5) years; and b) provided to the **chief executive** upon request and in the format requested and time period specified.
Notification of **emergencies**, incidents and breaches	
(6.12)	Any breach of a requirement of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach.
(6.13)	**Records** of any breach of a requirement of this EOW code, including full details of the breach and any subsequent actions taken, must be kept and provided to the **chief executive** upon request and in the format requested and time period specified.

[4] This can be a physical copy, an electronic copy or a link to the chief executive's website where this EOW code is available.

DRAFT
Published on DES Disclosure Log
RTI Act 2009

7. Conditions of use

Approved uses	
(7.1)	The approved **resource** is **coal combustion products** that comply with *Requirement (6.3)* of this EOW code and is used for the following purposes: a) in bound applications in accordance with *Condition (7.2)*; b) in unbound applications in accordance with *Conditions (7.3)* and *(7.4)*; c) as a feedstock in the manufacture of **soil conditioner** in accordance with *Condition (7.5)*; and d) as a feedstock in the manufacture of **soil product** in accordance with *Condition (7.6).*
Resource use in bound applications	
(7.2)	The **resource** used in bound applications 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[5] for that product. Final products for the purpose of this EOW code are limited to: a) cementitious mixes; b) cement products; c) concrete products; d) asphalt; e) binder for road stabilisation pavements; f) rigid and composite pavements structures; g) ceramic products; h) insulators; i) varnishes, plastics, ceramics, ultra-light concrete and metal alloys; j) paints, coatings and adhesives; k) geopolymers; and l) rubbers.
Resource use in unbound applications	
(7.3)	Use of the **resource** in unbound applications is limited to the below applications on **standard areas**: a) pipe bedding materials; b) sub-surface drainage; c) road pavement, base, sub-base and subgrade structures;

[5] In the absence of Australian Standards for the product, it is required that the final product meets any other appropriate industry standards (e.g. Registered Professional Engineer of Queensland certified technical specifications).

DRAFT
Published on DESI Disclosure Log
RTI Act 2009

	d) select layers which act as working platforms at the top of earthworks; and e) **engineered construction works**[6].
(7.4)	**Resource users** undertaking an unbound application must not use the resource: a) below the groundwater table; b) within 50m of a water supply bore; and c) if the site of use has pH greater than 8.
Resource use as soil conditioner	
(7.5)	The **resource** must only be used to manufacture **soil conditioner** that: a) meets the requirements of **AS 4454**; and b) where biomass containing potential PFAS contamination (e.g. biosolids) is used in producing the resource, the **resource** does not exceed the quality criteria stated in *Table 2: PFAS limits*.

Table 2 – PFAS limits

Media	Contaminant	Limit
Soil	PFOS	0.001 mg/kg
	PFOS + PFHxS	0.002 mg/kg
	PFHxS	0.003 mg/kg
	PFOA	0.004 mg/kg
	PFBA, PFPeA, PFHxA	0.001 mg/kg
	Sum C_9 -C_{14} Perflouroalkyl carboxylic acids	0.01 mg/kg
	Perfluoroalkyl sulfonamides	0.001 mg/kg
	N:2 Fluorotelomer Sulfonic acids	0.004 mg/kg

Resource use as soil product	
(7.6)	The **resource** must only be used to manufacture **soil product** that: a) meets the requirements of **AS 4419**; and b) where biomass containing potential PFAS contamination (e.g. biosolids) is used in producing the resource, the **resource** does not exceed the quality criteria stated in *Table 2: PFAS limits*.
Records	
(7.7)	The **resource user** must **record** the following information for the **resource** received by the **resource user** under this EOW code: a) business name, **ABN** and address of the **registered resource producer** who supplied the **resource**; b) date the **resource user** received the **resource**;

[6] Use of the resource at a **facility** as fill material must be carried out in accordance with the requirements of an environmental authority that authorises Environmentally Relevant Activity (ERA) 60 as prescribed under Schedule 2 of the Environmental Protection Regulation 2019

DRAFT
Published under Disclosure Log
RTI Act 2009

	c) quantity (in tonnes) of the **resource** received by the **resource user**; and d) **site of use** of **resource** (e.g. street address, lot on plan and/or GPS coordinates).
(7.8)	All **records** required to be kept by the **resource user** under the conditions of this EOW code must be: a) kept by the **resource user** for a period of not less than five (5) years; and b) provided to the **chief executive** upon request and in the format requested and time period specified.
Notification of **emergencies**, incidents and exceptions	
(7.9)	Any breach of a condition of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach.
(7.10)	**Records** of any breach of a condition of this EOW code, including full details of the breach and any subsequent actions taken, must be kept and provided to the **chief executive** upon request and in the format requested and time period specified.

8. Definitions

Words and phrases used throughout this EOW code **in bold** are defined below. Where a definition for a term used in this EOW code is sought and the term is not defined within this EOW code, the definitions provided in the relevant legislation shall be used.

'ABN' means Australian Business Number which is a unique 11 digit number issued by the Australian Business Register and identifies a business in Australia.

'appropriately qualified person' means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

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

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

'cenosphere(s)' means inert, hollow, essentially thin-walled glass spheres of approximately 10–350 microns having a typical density of 0.4–0.8g/cm^3, comprised largely of silica and alumina and filled with air and/or gasses which are formed from coal combustion ash when in a molten state.

'chief executive' means the Department of Environment and Science or its successor.

'coal combustion products' means **fly ash**, **furnace bottom ash** or **cenosphere(s)** resulting from the burning of coal within coal fired power stations and coal fired boilers where at least 90% of the fuel source is coal and up to 10% of the fuel source can be biomass material (e.g. wood chip, biosolids), and where no other source of fuel is mixed other than petroleum based gas or liquid fuel for ignition support.

'emergency(ies)' means a situation where either human health or safety is threatened, or serious or material **environmental harm** has been or is likely to be caused; and urgent action is necessary to protect the health or safety of persons, or prevent or minimise the harm, or rehabilitate or restore the environment because of the harm.

'engineered construction works' means:

DRAFT
Published on DES Disclosure Log
RTI Act 2009

a) where the **resource user** uses the **resource** in accordance with an applicable prescribed engineering standard; and/or

b) engineer designed civil applications that have been certified by a Registered Professional Engineer of Queensland (RPEQ) as suitable for its intended purpose.

'environmental harm' means environmental harm as defined in Chapter 1 of the *Environmental Protection Act 1994.*

'facility' means a naturally occurring or constructed hollow, pit or void (e.g. a gully, mining shaft or quarry).

'fly ash' means solid material extracted from the flue gasses of a boiler fired primarily with pulverised coal, consisting essentially of the oxides of silicon, aluminium, iron and some calcium of which particle sizes range from less than 1µm (micrometre) to 200µm and are irregular to spherical shape.

'furnace bottom ash' means the agglomerated particles formed at the bottom of the furnace. Furnace bottom ash is typically grey to black in colour, is quite angular, and has a porous surface structure.

'load' means the volume of **resource** put in or on something for conveyance or transportation, carried at one time and to one **site of use**. For example, a truck and trailer carrying the resource is considered as one load as well as multiple bins travelling by rail. Where the resource is transported via conveyor systems, information should be recorded on a daily basis until the transfer ceases.

'NATA' means the National Association of Testing Authorities.

'NEMP' means the PFAS National Environmental Management Plan version 2.0, or its most recent version.

'person(s)' means an individual or a corporation.

'records' include breach notifications, written procedures, analysis results, monitoring reports and monitoring programs required under a requirement or condition of this EOW code.

'reference test methods' means the reference test methods for determining the contaminant and 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].

'registered resource producer(s)' means a **person** who produces the **resource** and has registered with the **chief executive** (in accordance with *Requirement (6.1)*) to use, sell or give away the **resource** to be used under this EOW code.

'resource(s)' means **coal combustion products** that meet the criteria and quality characteristics in *Requirement (6.3)* of this EOW code.

'resource user(s) means a **person** who uses the **resource** for the use approved under this EOW code and in such a manner which does not cause any **environmental harm**, and includes the producer who uses the resource.

'safety data sheet' means a document containing data regarding the properties of the **resource** which provides information on handling or working with that substance in a safe manner; and includes information such as physical data toxicity, environmental characteristics, health effects, first aid, reactivity; and storage, disposal, protective equipment and spill handling procedures. The safety data sheet must be compliant with Safe Work Australia's *Model Code of Practice: Preparation of safety data sheets for hazardous chemicals*.

'site of use' means the relevant location(s) where the **resource user** uses the **resource** in accordance with this EOW code.

'soil conditioner' means any **composted** or **pasteurised** organic product manufactured in accordance with **AS4454**, that is suitable for adding to soil to improve the growing conditions for plant roots by providing

DRAFT
Published by DES Disclosure Log
RTI Act 2009

nutritional requirements. A soil conditioner must not have more than 20% by mass of particles with a maximum size above 16mm.

'soil product' means general purpose soils, top dressing, topsoil and landscaping mixes manufactured in accordance with **AS4419**.

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

'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.

- END -

DRAFT
Published on DESI Disclosure Log
RTI Act 2009

Appendix A —General obligation for all persons

This appendix is not intended to provide a comprehensive assessment of all obligations under Queensland law. It provides some general information and persons are encouraged to familiarise themselves with all requirements related to their specific operation.

Responsibilities under the *Environmental Protection Act 1994*

All persons within the State of Queensland must also meet their obligations under the *Environmental Protection Act 1994*, and the regulations made under that Act.

General environmental duty

Section 319 of the *Environmental Protection Act 1994* states that we all have a general environmental duty. This means that we are all responsible for the actions we take that affect the environment. We must not carry out any activity that causes or is likely to cause environmental harm unless we take all reasonable and practicable measures to prevent or minimise the harm. To decide what meets your general environmental duty, you need to consider:

- the nature of the harm or potential harm
- the sensitivity of the receiving environment
- the current state of technical knowledge for the activity
- the likelihood of successful application of the different measures to prevent or minimise environmental harm that might be taken
- the financial implications of the different measures as they would relate to the type of activity.

It is not an offence not to comply with the general environmental duty. However, maintaining your general environmental duty is a defence against the following acts:

(a) an act that causes serious or material environmental harm or an environmental nuisance

(b) an act that contravenes a noise standard

(c) a deposit of a contaminant, or release of stormwater run-off, mentioned in section 440ZG.

More information is available on the Department of Environment and Science website www.des.qld.gov.au.

Some relevant offences under the *Environmental Protection Act 1994*

Causing serious or material environmental harm (sections 437–39)

Material environmental harm is when the harm is not trivial or negligible in nature. Serious environmental harm is harm that is irreversible, of a high impact or widespread, or that is caused to an area of high conservation value or special significance. Damages, or costs required to rehabilitate the environment, of over $5000 constitutes material environmental harm and damages, or costs required to rehabilitate the environment, of over $50,000 constitutes serious environmental harm.

Serious or material environmental harm excludes environmental nuisance.

Causing environmental nuisance (section 440)

Environmental nuisance is unreasonable interference with an environmental value caused by aerosols, fumes, light, noise, odour, particles or smoke. It may also include an unhealthy, offensive or unsightly condition because of contamination.

DRAFT
Published on DES Disclosure Log
RTI Act 2009

Depositing a prescribed water contaminant in waters (section 440ZG)

Prescribed water contaminants include a wide variety of contaminants listed in Schedule 9 of the Environmental Protection Regulation 2008.

It is your responsibility to ensure that prescribed water contaminants are not left in a place where they may or do enter a waterway, the ocean or a stormwater drain. This includes making sure that stormwater falling on or running across your site does not leave the site contaminated. Where stormwater contamination occurs you must ensure that it is treated to remove contaminants. You should also consider where and how you store material used in your processes onsite to reduce the chance of water contamination.

Placing a contaminant where environmental harm or nuisance may be caused (section 443)

A person must not cause or allow a contaminant to be placed in a position where it could reasonably be expected to cause serious or material environmental harm or environmental nuisance.

Some relevant offences under the *Waste Reduction and Recycling Act 2011*

Littering (section 103)

Litter is any domestic or commercial waste and any material a person might reasonably believe is refuse, debris or rubbish. Litter can be almost any material that is disposed of incorrectly. Litter includes cigarette butts and drink bottles dropped on the ground, fast food wrappers thrown out of the car window, poorly secured material from a trailer or grass clippings swept into the gutter. However, litter does not include any gas, dust, smoke or material emitted or produced during, or because of, the normal operations of a building, manufacturing, mining or primary industry.

Illegal dumping of waste (section 104)

Illegal dumping is the dumping of large volumes of litter (200 litres or more) at a place.

Failure to comply with EOW code (section 158)

A registered resource producer for an EOW code must not produce, use, sell or give away the resource unless the registered resource producer complies with the requirements of the EOW code relating to the resource.

A person, other than a registered resource producer, must not use a resource in a way, or for a purpose, that does not comply with an EOW code for the resource.

9. Approved by

Signature	Date

Kath Sherman
Director, Waste Operations
Delegate of the Chief Executive
Waste Reduction and Recycling Act 2011

Enquiries:
Waste and End of Waste Assessment
Waste, Development & Southeast Compliance
Ph. **13 QGOV** (13 74 68)

DRAFT
Published on DESI Disclosure Log
RTI Act 2009

Ash Development Association of Australia

Isha Sharma
Team Leader - Waste Assessment
Department of Environment and Science
Level 7, 400 George Street
Brisbane QLD 4000

Monday, 10 August 2020

Dear Isha,

RE: DRAFT Amendment End of Waste Code for coal combustion products

The Ash Development Association of Australia[1] (the Association) welcomes the opportunity to make comment(s) and recommendations on the above draft. Following consultation with QLD based members, the Association offers the following commentary and proposed changes.

	Relevant Section/ Clause	Commentary	Proposed change
1	Clause 2.2	What is the transition point between being stored "with use" and being stored "without use" and what are the implications with regards to future reclamation [harvesting] activities of ash "stored" in landfill areas? The amendment appears that it is to be considered a "waste" while there is no planned use, whereas not considered a waste when it's "used". Is there a timeframe, or minimum quantity that would need to be extracted per year for it not to be considered a waste? We understand the intent that if it is extracted or produced, not used and subsequently discarded then it becomes a waste again.	Clause requires clarity about transition between waste and product status
2	Clause 4	This section has been amended to remove other sources of fuel, e.g. start-up fuels. This clause is now in conflict with the CCP definition below	ADAA to C4… other than petroleum based gas or liquid fuel for ignition support.
3	Clause 6.3	"Potential" for PFAS contamination needs to be defined. PFAS chemicals in the environment are widespread. QDES need to provide some guidance, otherwise unnecessary testing for PFAS maybe undertaken. The ADAA proposed Biomass and Biosolids be separate, but QDES have combined the two. This condition places onus	Consider defining 'potential' PFAS when associated with biosolids? If so, specifically state 'biosolids' must be tested.

[1] http://www.adaa.asn.au/membership/current-members

ADAA National Office Unit 5, 41 - 47 Five Islands Road, Port Kembla NSW 2505
T. 02 4228 1389 • **F.** 02 4258 0169 • **W.** www.adaa.asn.au • **E.** info@adaa.asn.au
Postal Address PO Box 85, Port Kembla NSW 2505

Published on DESI Disclosure Log
RTI Act 2009

Summary of Comments on 20200810_ADAA_comments

Page: 1

Number: 1 Author: mariank Subject: Comment on Text Date: 10/09/2020 2:25:47 PM

You have a stockpile of material that meets the Requirements of the code. Do you have a use for that material? If Yes, it is a resource (ie not a waste). If No, it remains a waste until such time as you have a use for it, or its disposed off. Be aware that, if you will be storing the waste on-site without a use for it, you may need approval the store that waste.

Number: 2 Author: mariank Subject: Comment on Text Date: 10/09/2020 2:29:55 PM

The words "where at least 90% of the fuel source is coal" has been removed from Clause 4 for clarity.

Number: 3 Author: mariank Subject: Comment on Text Date: 10/09/2020 2:45:03 PM

The department does not expect every type of biomass to be tested for PFAS; only those with potential PFAS contamination, such as biosolids. Nonetheless, to assuage ADAA's concerns, Requirement 6.3(b) has been amended to say "where the biomass used includes biosolids containing ..". Definitions for 'biomass' and 'biosolids' have also been added for clarity. Requirement 6.5, and Conditions 7.5 and 7.6 have been amended for consistency.

Published on DESI Disclosure Log
RTI Act 2009

	onto the proponent to prove PFAS is not present in all forms of biomass with sampling to confirm no "potential".	
1 Table 1	Quality criteria for PFAS in Bound and Unbound applications are supported. Quality criteria for PFAS in land applications and soil uses require further and more in-depth discussion. E.g. Quality criteria are set at LOD (Level Of Detection). PFAS Team members revealed conducting an ASLP assessment is a better indicator of environmental risk. This was not previously mentioned after numerous requests by the ADAA. Lastly, the heading has been changed, narrowing to include "Soil Conditioners and soil products" from "Soil ameliorants and land application" without any justification or commentary from QDES.	Quality criteria for PFAS in land applications and soil uses requires further and more in-depth discussion, but we agree to adopt these limits, with an undertaking that further testing is required using the ASLP methods. Reinstate … 'Soil ameliorants and land application' heading
2 Clause 6.4	QDES PFAS Team noted the 95% confidence interval and the mean and standard variation limits are near impossible to meet. PFAS team recognised this would be unachievable.	Previous "BUA's" used 'means' of central tendency. Consider replacing with simple statistical methods.
3 Clause 6.6	As discussed above, ASLP would be a more appropriate test in understanding the potential harm of use. Limits are not provided for ASLP methods of assessment.	Quality criteria for PFAS in land applications and soil uses requires further and more in-depth discussion, but we agree to adopt these limits, with an undertaking that further testing is required using the ASLP methods.
4 Clause 7.1	See comment about changes to heading for "Soil ameliorants and land application"	Reinstate
5 Clause 7.3	Resource use in unbound applications **e) engineering construction works**[6] has additional criteria with footnote not in previous version. This footnote, plus definition places additional onus on users, not applied to natural materials. Where CCP's meet quality criteria, then why additional certification/criteria?	Remove footnote and /or definition criteria
Definitions	'coal combustion products' - Agreed	
	'soil conditioners' - CCPs are not organic! This definition has been changed from 'soil ameliorant' to soil conditioners' without any understanding of what CCPs are…inorganic amorphous compounds, moreover the extensive published literature (research) on soil ameliorants and land use the ADAA has provided in the past.	6 Reinstate -- 'soil ameliorant' means a substance added to soil to improve the growing conditions for plant roots by providing…"

Published on DESI Disclosure Log RTI Act 2009

About the Ash Development Association of Australia

The Association was formed in 1991 by producers and marketers of power station ash, with the objectives to investigate and foster economic market opportunities for the **beneficial**

Page: 2

Number: 1 Author: mariank Subject: Comment on Text Date: 10/09/2020 2:52:46 PM
After further investigation, land application has been reinstated as a potential use. The word 'conditioner' has been kept, however, as 'ameliorant' is not a term used in any Australian Standard. In consideration to ADAA's concerns however, the definition for 'soil conditioner' has been amended to match that of the previously termed 'soil ameliorant'.

Number: 2 Author: mariank Subject: Comment on Text Date: 10/09/2020 3:00:05 PM
Isha, Lu's advice is that "I would say, for those metal measurement, the purposed value is ok. For PFAS, as most of values are near to detect limits anyway, 85% confidence interval is reasonable." Should we amend this condition to say 85%?

Number: 3 Author: mariank Subject: Comment on Text Date: 10/09/2020 3:08:13 PM
Following further investigation, the department has decided to not require ASLP testing for the following reasons:
1) The total concentration of PFAS in CCP is very low, near detection limits. ASLP would be even lower, causing errors as the detection methods would be the same order as the detected values. Such a test is not meaningful;
2) PFAS is easily bounded with organic matter, but the majority of CCP is inorganic minerals. PFAS does not bound tightly with inorganic minerals. Therefore there would not be a significant difference between the total extraction values and the ASLP extraction values. Comparing to heavy metals, total extraction values are 2 or 3 orders greater than the ASLP extractions; and
3) CCP is an alkaline material, while the majority of PFAS are acids and have a moderate solubility in water. The water extraction from CCP would be alkaline and PFAS would be easily dissolved. The extractable test results will be lower than the total digestion of CCP (digest the sample for 30 min with 1M NaOH by heating an ultrasonic agitation), but not with 2 or 3 orders difference.

Number: 4 Author: mariank Subject: Comment on Text Date: 10/09/2020 3:08:53 PM
See comments attached to 'Table 1' above.

Number: 5 Author: mariank Subject: Comment on Text Date: 10/09/2020 3:15:38 PM
This footnote was added to maintain consistency with other codes that list similar uses. The department has decided that uses, such as filling a void, are forms of disposal and therefore, need to be licensed accordingly.

Number: 6 Author: mariank Subject: Comment on Text Date: 10/09/2020 3:16:11 PM
See comments attached to 'Table 1' above.

Published on DESI Disclosure Log
RTI Act 2009

use of coal combustion products[2] (CCPs) commonly known as power station ash, fly ash or furnace bottom ash.

The combustion of pulverized coal in the furnace of a power station boiler results in the production of several solid by-products which were once regarded as waste but today are more accurately classified as coal combustion products (CCPs). This latter term, CCPs has been adopted globally and positively aligns with the concepts of a 'circular economy' – an approach which seeks to use one industry's by-products as another industry's raw material and ultimately conserving finite resources.

This submission has been approved by the Board of the Ash Development Association of Australia. Should you have any questions regarding our submission please do not hesitate to contact the undersigned.

sch4 Contrary to public interest

ra g e r c
CEO
Ash Development Association of Australia

Published on DESI Disclosure Log
RTI Act 2009

[2] Coal combustion products include fly ash, bottom ash, boiler slag, fluidized-bed combustion (FBC) ash, or flue gas desulfurization (FGD) material produced primarily from the combustion of coal or the cleaning of the stack gases. The term 'coal ash' is interchangeable.

Compare Results

Old File:

wr-eowc-approved-coal-combustion-products.pdf

13 pages (137 KB)
6/12/18, 4:59:37 pm

versus

New File:

20200729_DRAFT Amended Code - CCPs.pdf

15 pages (861 KB)
29/7/20, 4:22:48 pm

Total Changes

135

Text only comparison

Content

71 Replacements
41 Insertions
23 Deletions

Styling and Annotations

0 Styling
0 Annotations

Go to First Change (page 1)

Published on DESI Disclosure Log RTI Act 2009

DRAFT
Published on DESI Disclosure Log
RTI Act 2009

End of Waste Code

Coal Combustion Products (ENEW07359717)

Waste Reduction and Recycling Act 2011

Queensland Government

Page: 5

Number: 1 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "13 • ESR/2018/4549•"
[New]: "15 • ESR/2018/4551•"

Published on DESI Disclosure Log
RTI Act 2009

Version history

Version	Date	Description of changes
1.0	01 January 2019	Commencement of EOW code
2.0	DD MM YYYY	Draft Amendment

Prepared by: Waste and End of Waste Assessment, Department of Environment and Science

© State of Queensland, 2020
The Queensland Government supports and encourages the dissemination and exchange of its information. The copyright in this publication is licensed under a Creative Commons Attribution 3.0 Australia (CC BY) licence.

Under this licence you are free, without having to seek our permission, to use this publication in accordance with the licence terms.

You must keep intact the copyright notice and attribute the State of Queensland as the source of the publication.
For more information on this licence, visit http://creativecommons.org/licenses/by/3.0/au/deed.en

If you need to access this document in a language other than English, please call the Translating and Interpreting Service (TIS National) on 131 450 and ask them to telephone Library Services on +61 7 3170 5470.

This publication can be made available in an alternative format (e.g. large print or audiotape) on request for people with vision impairment; phone +61 7 3170 5470 or email <library@des.qld.gov.au>.

June 2020

DRAFT
Published on DES Disclosure Log
RTI Act 2009

Page: 6

Number: 1 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "1"
[New]: "1.0"

Number: 2 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "Prepared by: Waste and Contaminated Land"
[New]: "2.0 DD MM YYYY Draft Amendment Prepared by: Waste and End of Waste"

Font-size "8.03" changed to "9.96001".

Number: 3 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "2018"
[New]: "2020"

Number: 4 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "December 2018"
[New]: "June 2020"

Author: admin Subject: Sticky Note Date: 29/07/2020 4:59:26 PM
Needs updating

Number: 5 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "13"
[New]: "15"

Published on DESI Disclosure Log
RTI Act 2009

Contents

1. Explanatory Statement....4
2. Guidance....4
2.1 Resource use versus Activity....4
2.2 Resource versus Waste....4
2.3 Failure to comply....4
2.4 Lawfulness of the activity....5
3. Period of this EOW code....5
4. Waste to which this EOW code applies....5
5. Person to whom this EOW code applies....5
5.1 Registered resource producers of the resource....5
5.2 Resource users....5
6. Registered resource producer requirements....6
7. Conditions of use....11
8. Definitions....21
Appendix A —General obligation for all persons....34
9. Approved by....15

DRAFT
Published on DESI Disclosure Log
RTI Act 2009

Page: 7

Number: 1 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "7"
[New]: "9"

Number: 2 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "10"
[New]: "11"

Number: 3 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "12 Page 3 of 13"
[New]: "14 9. Approved by ..... 15 Page 3 of 15"

Published on DESI Disclosure Log
RTI Act 2009

1. Explanatory Statement

This End of Waste (EOW) code for **coal combustion products** has been issued by the Queensland Government in accordance with section 159 of the *Waste Reduction and Recycling Act 2011* (WRR Act).

This EOW code states when a waste becomes a resource and any relevant requirements and/or conditions for its use. It supports the vision of Queensland's Waste Strategy 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 the waste is not being used in accordance with the relevant requirements and/or conditions of this EOW code, or another type of permit that allows for its use, it is considered a waste and must be disposed of appropriately at a facility that is lawfully able to receive the waste.

2. Guidance

2.1 Resource use versus Activity

Under section 155 of the WRR Act, a waste stops being a waste and becomes a **resource** when it meets the requirements and conditions of an EOW code. Under section 159 of the WRR Act, an EOW code specifies the circumstances when a waste becomes a resource; how it must be used to be considered a resource; when it is no longer considered a resource but a waste instead; and conditions that must be complied with by resources users and registered resource producers.

An Environmental Authority (EA) under the *Environmental Protection Act 1994* (EP Act) is required where an activity being undertaken triggers the threshold for any environmentally relevant activity (ERA). This means that treating or processing the waste to meet the resource quality criteria under the EOW code may require an EA under the EP Act if the activity meets the threshold for an ERA.

2.2 Resource versus Waste

A waste that is a **resource** under an EOW code is considered a **resource** only for the use(s) approved in an EOW code. To be considered a resource under the EOW code, the material used as the resource must meet the requirements of the EOW code and be used in accordance with the conditions of the EOW code, otherwise it is considered a waste and must be managed in accordance with waste management requirements under the EP Act and the WRR Act and their subordinate legislation.

A **resource** under an EOW code, is deemed to be a waste again, if it is not used in accordance with the EOW code; if it is being stored without use; if it is disposed of at a waste disposal site; or if it is deposited at a place in a way that would, apart from its use approved under an EOW code, constitute a contravention of the general littering provision (section 103) or the illegal dumping of waste provision (section 104) under the WRR Act.

2.3 Failure to comply

It is an offence under section 158(1) of the WRR Act for a **registered resource producer** to produce the **resource**, or use, sell or give away the **resource** unless they comply with the requirements under an EOW code. Further, it is an offence under section 158(2) of the WRR Act for a **person** to use the **resource** in a way, or for a purpose, that does not comply with an EOW code for the **resource**. These offences carry a maximum penalty of 1,665 penalty units for an individual and 8,325 penalty units for a corporation[1].

[1] The value of a penalty unit is stated in the *Penalties and Sentences Regulation 2015* (Qld).

Page: 8

Number: 1 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "An EOW code states when a waste stops being a waste following any necessary processing or treatment. A waste becomes a resource when it has been determined to meet the requirements of an EOW code. It may be necessary to treat or process the waste prior to (i.e, in order to) meet those requirements."
[New]: "Under section 155 of the WRR Act, a waste stops being a waste and becomes a resource when it meets the requirements and conditions of an EOW code. Under section 159 of the WRR Act, an EOW code specifies the circumstances when a waste becomes a resource; how it must be used to be considered a resource; when it is no longer considered a resource but a waste instead; and conditions that must be complied with by resources users and registered resource producers."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:09:03 PM
Minor. Reg amendment.

Number: 2 Author: Text Deleted Subject: Text Date: Indeterminate
"the purpose of"

Number: 3 Author: Text Deleted Subject: Text Date: Indeterminate
"considered"

Number: 4 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "In the event, a resource does not meet the requirements of the EOW code and/or is not used in accordance with the EOW code, it is deemed to be"
[New]: "To be considered a resource under the EOW code, the material used as the resource must meet the requirements of the EOW code and be used in accordance with the conditions of the EOW code, otherwise it is considered"

Author: admin Subject: Sticky Note Date: 31/07/2020 4:09:27 PM
Minor. Reg amendment.

Number: 5 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "Act,"
[New]: "Act"

Number: 6 Author: Text Deleted Subject: Text Date: Indeterminate
"which is approved"

Number: 7 Author: Text Deleted Subject: Text Date: Indeterminate
"also"

Number: 8 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "when it is disposed of at a waste disposal facility,"
[New]: "again, if it is not used in accordance with the EOW code; if it is being stored without use; if it is disposed of at a waste disposal site;"

Number: 9 Author: Text Inserted Subject: Text Date: Indeterminate
"(section 103)"

Number: 10 Author: Text Inserted Subject: Text Date: Indeterminate
"(section 104)"

Number: 11 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "Any person operating under this EOW code must comply with the relevant requirements and conditions of use of the EOW code. It is an offence to not comply with the relevant requirements and conditions, carrying a maximum penalty of 1665 penalty units for an individual and 8325"
[New]: "It is an offence under section 158(1) of the WRR Act for a registered resource producer to produce the resource, or use, sell or give away the resource unless they comply with the requirements under an EOW code. Further, it is an offence under section 158(2) of the WRR Act for a person to use the resource in a way, or for a purpose, that does not comply with an EOW code for the resource. These offences carry a maximum penalty of 1,665 penalty units for an individual and 8,325"

Author: admin Subject: Sticky Note Date: 31/07/2020 4:09:57 PM
Minor. Reg amendment.

Number: 12 Author: Text Deleted Subject: Text Date: Indeterminate
"Please refer to Appendix A of this EOW code for general obligations for all persons operating under this EOW code, which includes the resource users."

Number: 13 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "13"
[New]: "15"

Comments from page 8 continued on next page

Published on DESI Disclosure Log
RTI Act 2009

Please refer to Appendix A of this EOW code for general obligations for all **persons** operating under this EOW code, which includes the **resource users**.

2.4 Lawfulness of the activity

The issuing of this EOW code for the use of the **resource** does not warrant or imply the lawfulness of the activity under all legislation, or that approvals necessary under other legislation have or will be approved. It is the responsibility of the **registered resource producer** and **resource user** to identify and obtain all other approvals necessary for the relevant activities.

3. Period of this EOW code

This EOW code takes effect from the day of gazettal of this EOW code and remains in force until it is amended, cancelled or suspended by the **chief executive**[2].

4. Waste to which this EOW code applies

This EOW code is limited to **coal combustion products** sourced from coal fired power stations and coal fired boilers where at least 90% of the fuel source is coal.

These **coal combustion products** become a **resource** when the requirements and conditions under this EOW code are met.

5. Person to whom this EOW code applies

5.1 Registered resource producers of the resource

5.1.2 A **registered resource producer** for this EOW code must comply with the stated registered resource producer requirements in Section 6 – Registered Resource Producer Requirements.

5.2 Resource users

5.2.1 The **resource user** must only use the **resource** in a way, and for a purpose allowed under this EOW code.

5.2.2 The resource user must comply with the stated conditions of use in Section 7 – Conditions of Use.

DRAFT
Published on DES Disclosure Log
RTI Act 2009

[2] If an EOW code is to be amended, cancelled or suspended, the chief executive will provide an opportunity to make written submissions by providing a proposed action notice to the registered resource producers; and publishing the proposed action notice on the chief executive's website.

Page: 9

Number: 1 Author: Text Inserted Subject: Text Date: Indeterminate
"Please refer to Appendix A of this EOW code for general obligations for all persons operating under this EOW code, which includes the resource users."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:10:37 PM
Existing...relocation

Number: 2 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "01 January 2019"
[New]: "the day of gazettal of this EOW code"

Font "Arial-BoldMT" changed to "ArialMT".

Author: admin Subject: Sticky Note Date: 31/07/2020 4:10:52 PM
Minor. Reg amendment.

Number: 3 Author: Text Deleted Subject: Text Date: Indeterminate
"2"

Number: 4 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "executive."
[New]: "executive 2 ."

Font "ArialMT" changed to "Arial-BoldMT".

Number: 5 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "no other source of fuels is mixed other than petroleum based gas or liquid fuel for ignition support. This waste becomes"
[New]: "at least 90% of the fuel source is coal. These coal combustion products become"

Author: admin Subject: Sticky Note Date: 31/07/2020 4:13:59 PM
re-insert ....other than petroleum based gas or liquid fuel for ignition support.

Number: 6 Author: Text Deleted Subject: Text Date: Indeterminate
"5.1.1 Prior to operating under this EOW code, the producer of the resource must register with the chief executive by giving a notice in the approved form 3 that the person intends to become a registered resource producer for this EOW code."

Number: 7 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "requirements."
[New]: "requirements in Section 6 – Registered Resource Producer Requirements."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:15:01 PM
Minor. Reg amendment.

Number: 8 Author: Text Inserted Subject: Text Date: Indeterminate
"in a way, and"

Number: 9 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "use."
[New]: "use in Section 7 – Conditions of Use."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:15:31 PM
Minor.

Number: 10 Author: Text Deleted Subject: Text Date: Indeterminate
"department's website for anyone interested. 3"

Number: 11 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "www.des.qld.gov.au, and can be searched using the term ESR/2018/4082 Page 5 of 13"
[New]: "the chief executive's website. Page 5 of 15"

Font-color changed.

Number: 12 Author: Text Deleted Subject: Text Date: Indeterminate
"The approved form, Registered Resource Producer for an EOW code, is available on the Queensland Government website at"

Published on DES Disclosure Log RTI Act 2009

6. Registered resource producer requirements

Registration under this EOW code	
(6.1)	Prior to operating under this EOW code, the producer of the **resource** must register with the **chief executive** by giving a notice in the approved form[3] to become a **registered resource producer** for this EOW code.
Approved resource	
(6.2)	The approved **resource** is **coal combustion products** which complies with *Requirement (6.3)* of this EOW code.
(6.3)	The **registered resource producer** must not use, sell or give away the **resource** under this EOW code unless the **resource** complies with all of the following criteria and quality characteristics: a) the **resource** does not exceed the quality criteria stated in *Table 1: Resource quality criteria*; and b) where biomass containing potential per and poly-fluoroalkyl substances (PFAS) contamination (e.g. biosolids) is used, the **resource** has been combusted at higher than 1100°C for at least 2 seconds.

Table 1 – Resource quality criteria

Quality characteristics	Limits for specific uses *		
	Bound applications	Total Maximum Concentration (mg/kg dry weight unless otherwise specified)	
		Unbound applications	Soil conditioner and soil products
Arsenic (total)	NS	20	20
Beryllium	NS	NS	60
Boron	NS	100	10**
Cadmium	NS	1	1
Chromium (total)	NS	100	100
Chromium (III)	NS	NS	100
Chromium (VI)	NS	1.5	1
Cobalt	NS	100	100
Copper	NS	100	100
Lead	NS	50	50
Mercury	NS	1	1
Molybdenum	NS	NS	10
Nickel	NS	60	60
Selenium	NS	10	5

[10] The approved form, *Registered Resource Producer for an EOW code,* is available on the Queensland Government website at www.qld.gov.au, using the publication number (ESR/2018/4082) as a search term.

Published on DESI Disclosure Log RTI Act 2009

Page: 10

Number: 1 Author: Text Inserted Subject: Text Date: Indeterminate
"Registration under this EOW code"

Number: 2 Author: Text Inserted Subject: Text Date: Indeterminate
"Prior to operating under this EOW code, the producer of the resource must register with the chief executive by giving a notice in the approved form 3 to become a registered resource producer for this EOW code. Approved resource"

Author: admin Subject: Sticky Note Date: 31/07/2020 4:15:50 PM
Relocated

Number: 3 Author: Text Inserted Subject: Text Date: Indeterminate
"(6.2)"

Number: 4 Author: Text Inserted Subject: Text Date: Indeterminate
"The approved resource is coal combustion products which complies with Requirement (6.3) of this EOW code."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:16:12 PM
Relocation

Number: 5 Author: Text Inserted Subject: Text Date: Indeterminate
"(6.3)"

Number: 6 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "unless it meets the criteria in Table 1 – Resource quality criteria for the approved use in accordance with this EOW code."
[New]: "under this EOW code unless the resource complies with all of the following criteria and quality characteristics: a) the resource does not exceed the quality criteria stated in Table 1: Resource quality criteria; and b) where biomass containing potential per and poly-fluoroalkyl substances (PFAS) contamination (e.g. biosolids) is used, the resource has been combusted at higher than 1100°C for at least 2 seconds."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:20:06 PM
Why the prescription about combustion temp and residence time, when there are specific limits are established. Two gates?

Number: 7 Author: Text Deleted Subject: Text Date: Indeterminate
"criteria"

Number: 8 Author: Text Inserted Subject: Text Date: Indeterminate
"characteristics"

Number: 9 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "(mg per kg) Bound applications Unbound applications Soil ameliorant and land applications"
[New]: "(mg/kg dry weight unless otherwise specified) Soil conditioner and soil Bound applications Unbound applications products"

Author: admin Subject: Sticky Note Date: 31/07/2020 4:29:39 PM
QDES has removed 'Land Use' ...again without supporting rationale or data.

Number: 10 Author: Text Inserted Subject: Text Date: Indeterminate
"3 The approved form, Registered Resource Producer for an EOW code, is available on the Queensland Government website at www.qld.gov.au, using the publication number (ESR/2018/4082) as a search term. Page 6 of 15 • ESR/2018/4549 • Version 1.00 • Effective: 01 JAN 2019 Department of Environment and Science"

Published on DES Disclosure Log
RTI Act 2009

Zinc	NS	200	200
Electrical conductivity	NS	NS	20,000(uS/cm)
pH	NS	5 – 12.5 (pH units)	5 – 12.5 (pH units)
Sum of PFOS and PFHxS***	1	0.01	0.002
PFOA***	10	0.1	0.004

NS = Not specified (monitoring of each element is still required).

* measured using **reference test methods**

** measured using hot $CaCl_2$ method

*** analysis only required if the resource is resulting from combustion of biomass with potential PFAS contaminant (e.g, biosolids)

Resource monitoring	
(6.4)	The **registered resource producer** must sample, measure and record the composition of the **resource** for the quality characteristics in *Table 1 - Resource quality criteria* at a minimum of the following frequency: annually, where statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations; otherwise, b) every six months.
Monitoring for PFAS	
(6.5)	Where biomass containing potential PFAS contamination (e.g, biosolids) is used, the **registered resource producer** must sample, measure and record the quality of **resource** for PFAS for at least the following parameters: a) Total Oxidisable Precursor Assay (TOPA) with a minimum: i. C_4-C_{14} perfluoroalkyl carboxylic acids; ii. C_4-C_{10} perfluoroalkyl sulfonic acids; iii. perfluoroalkyl sulphonamides; iv. n:2 flourotelomer sulfonic acids; and b) Total Organic Fluorine Assay (TOFA).
(6.6)	When sampling, measuring and recording the quality of **resource** for PFAS in accordance with *Requirement (6.5)*: a) analysis techniques must achieve lowest practicable limits of reporting; b) analysis techniques must achieve maximum extraction of PFAS from samples following Australian Standard Leaching Procedure (ASLP) test, *Australia Standard AS4439*; c) quality assurance measures for TOPA and TOFA must be complied with *Section 19.2 of the PFAS National Environmental Management Plan Version 2.0 – January 2020*, unless superseded by a revised or new version of the document, including checks against PFAS results for corresponding non-oxidised samples; and d) any advice from the **chief executive** concerning improvements in analysis techniques

DRAFT
Published on DES Disclosure Log
RTI Act 2009

Page: 11

Number: 1 Author: Text Inserted Subject: Text Date: Indeterminate
"End of waste code Coal Combustion Products (ENEW07359717)"

Number: 2 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "10,000(µS/cm)"
[New]: "10,000(uS/cm)"

Number: 3 Author: Text Inserted Subject: Text Date: Indeterminate
"Sum of PFOS and PFHxS*** 1 0.01 0.002 PFOA*** 10 0.1 0.004"

Author: admin Subject: Sticky Note Date: 31/07/2020 4:28:14 PM
Table 1 (Resource Quality Criteria) PFOS & PFOA why limit in Bound applications when all other are NS

Unbound limits OK

Land application limits are 5 times lower for unbound whcih typically is land applied?

NEMP 2.0 HIL Table 2 stes limit @ 0.01 Sum

Number: 4 Author: Text Deleted Subject: Text Date: Indeterminate
"(6.2)"

Number: 5 Author: Text Inserted Subject: Text Date: Indeterminate
"*** analysis only required if"

Number: 6 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "In addition to meeting the criteria in Table 1 – Resource quality criteria, the resource must not have any properties nor contain any other contaminants at concentrations which may cause environmental harm when used in accordance with this EOW code."
[New]: "the resource is resulting from combustion of biomass with potential PFAS contaminant (e.g, biosolids)"

Font-size "9.96001" changed to "8.03999".

Number: 7 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "(6.3)"
[New]: "(6.4)"

Number: 8 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "conduct monitoring of the resource quality to determine compliance with Table 1 -Resource quality criteria and"
[New]: "sample, measure and record the composition of the resource for the quality characteristics in Table 1 -Resource quality criteria"

Number: 9 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "frequency :"
[New]: "frequency:"

Number: 10 Author: Text Inserted Subject: Text Date: Indeterminate
"a) annually, where statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations; otherwise, b) every six months."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:30:04 PM
Relocation

Number: 11 Author: Text Inserted Subject: Text Date: Indeterminate
"Monitoring for PFAS"

Number: 12 Author: Text Inserted Subject: Text Date: Indeterminate
"Where biomass containing potential PFAS contamination (e.g, biosolids) is used, the registered resource producer must sample, measure and record the quality of resource for PFAS for at least the following parameters: a) Total Oxidisable Precursor Assay (TOPA) with a minimum: i. C 4 -C 14 perfluoroalkyl carboxylic acids; ii. C 4 -C 10 perfluoroalkyl sulfonic acids; iii. perfluoroalkyl sulphonamides; iv. n:2 flourotelomer sulfonic acids; and b) Total Organic Fluorine Assay (TOFA)."

Comments from page 11 continued on next page

Published on DESI Disclosure Log RTI Act 2009

Zinc	NS	200	200
Electrical conductivity	NS	NS	10,000(uS/cm)
pH	NS	5 – 12.5 (pH units)	5 – 12.5 (pH units)
Sum of PFOS and PFHxS***	1	0.01	0.002
PFOA***	10	0.1	0.004

NS = Not specified (monitoring of each element is still required).

* measured using **reference test methods**

** measured using hot $CaCl_2$ method

*** analysis only required if the resource is resulting from combustion of biomass with potential PFAS contaminant (e.g, biosolids)

Resource monitoring	
(6.4)	The **registered resource producer** must sample, measure and record the composition of the **resource** for the quality characteristics in *Table 1 - Resource quality criteria* at a minimum of the following frequency: a) annually, where statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations; otherwise, b) every six months.
Monitoring for PFAS	
13 5)	Where biomass containing potential PFAS contamination (e.g, biosolids) is used, the **registered resource producer** must sample, measure and record the quality of **resource** for PFAS for at least the following parameters: a) Total Oxidisable Precursor Assay (TOPA) with a minimum: i. C_4-C_{14} perfluoroalkyl carboxylic acids; ii. C_4-C_{10} perfluoroalkyl sulfonic acids; iii. perfluoroalkyl sulphonamides; iv. n:2 flourotelomer sulfonic acids; and b) Total Organic Fluorine Assay (TOFA).
15 6)	14hen sampling, measuring and recording the quality of **resource** for PFAS in accordance with *Requirement (6.5)*: a) analysis techniques must achieve lowest practicable limits of reporting; b) analysis techniques must achieve maximum extraction of PFAS from samples following Australian Standard Leaching Procedure (ASLP) test, *Australia Standard AS4439*; c) quality assurance measures for TOPA and TOFA must be complied with *Section 19.2 of the PFAS National Environmental Management Plan Version 2.0 – January 2020*, unless superseded by a revised or new version of the document, including checks against PFAS results for corresponding non-oxidised samples; and d) any advice from the **chief executive** concerning improvements in analysis techniques

DRAFT
Published on DES Disclosure Log
RTI Act 2009

Author: admin Subject: Sticky Note Date: 31/07/2020 4:31:37 PM

New additional testing requirements...only if biomass 'potentially' contains PFAS.

Potentially undefined.

Number: 13 Author: Text Inserted Subject: Text Date: Indeterminate

"(6.5)"

Number: 14 Author: Text Replaced Subject: Text Date: Indeterminate

[Old]: "Page 6 of 13"
[New]: "When sampling, measuring and recording the quality of resource for PFAS in accordance with Requirement (6.5): a) analysis techniques must achieve lowest practicable limits of reporting; b) analysis techniques must achieve maximum extraction of PFAS from samples following Australian Standard Leaching Procedure (ASLP) test, Australia Standard AS4439; c) quality assurance measures for TOPA and TOFA must be complied with Section 19.2 of the PFAS National Environmental Management Plan Version 2.0 – January 2020, unless superseded by a revised or new version of the document, including checks against PFAS results for corresponding non-oxidised samples; and d) any advice from the chief executive concerning improvements in analysis techniques Page 7 of 15"

Font-size "8.03" changed to "9.96001".

Author: admin Subject: Sticky Note Date: 31/07/2020 4:33:25 PM

Noted

Number: 15 Author: Text Inserted Subject: Text Date: Indeterminate

"(6.6)"

Published on DESI Disclosure Log
RTI Act 2009

	must be implemented.
(6.7)	All sampling and monitoring required under this EOW code must be carried out by an **appropriately qualified person**.
(6.8)	All analysis required under this EOW code must be carried out by a laboratory that has **NATA** certification, or an equivalent certification, for such analyses.
Information to be provided	
(6.9)	The **registered resource producer** must provide the following to the **resource user** upon establishment of an arrangement to sell or give away the **resource**, and annually thereafter: a) a copy of the EOW code for *Coal Combustion Products (ENEW07359717)*[4]; b) the **registered resource producer's** business name, **ABN** and address; c) confirmation in writing that the **resource** being supplied is compliant with *Requirement (6.3)* of this EOW code; d) a most recent certificate of analysis for the quality characteristics listed in *Table 1: Resource quality criteria*; and e) **safety data sheet** for the **resource**.
Records	
(6.10)	The **registered resource producer** must keep the following **records** of the **resource** supplied to a **resource user**: a) origin of the **resource** (e.g. address, lot on plan and/or GPS coordinates); b) quantity (in tonnes) of the **resource** supplied; c) quality criteria of the **resource** (including but not limited to the quality characteristics listed in *Table 1: Resource quality criteria*); d) date of dispatch of the **resource**; and e) business name, **ABN** and address of the **person** receiving the **resource**.
(6.11)	All **records** required to be kept by the **registered resource producer** under this EOW code must be: a) kept by the **registered resource producer** for a period of not less than five (5) years; and b) provided to the **chief executive** upon request and in the format requested and time period specified.
Notification of **emergencies**, incidents and breaches	
(6.12)	Any breach of a requirement of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach.
(6.13)	**Records** of any breach of a requirement of this EOW code, including full details of the breach and any subsequent actions taken, must be kept and provided to the **chief executive** upon request and in the format requested and time period specified.

[4] This can be a physical copy, an electronic copy or a link to the chief executive's website where this EOW code is available.

DRAFT Published on DES Disclosure Log RTI Act 2009

Page: 12

Number: 1 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "a) annually, where statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations; otherwise, b) every six months. (6.4) Where the composition of the resource has changed or is likely to change, additional monitoring must be conducted which is sufficient to detect"
[New]: "must be implemented."

Font "TimesNewRomanPSMT" changed to "ArialMT".
Font-size "12" changed to "9.96001".

Number: 2 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "and characterise the extent of any change, until such time that the composition is no longer likely to change and that results demonstrate that the material is compliant with Table 1 – Resource quality criteria before it is used as a resource under this EOW code. (6.5) Any determination of the suitability or characterisation of the resource (including ongoing sampling) must be made"
[New]: "All sampling and monitoring required under this EOW code must be carried out"

Number: 3 Author: Text Inserted Subject: Text Date: Indeterminate
"(6.7)"

Number: 4 Author: Text Deleted Subject: Text Date: Indeterminate
"(6.6)"

Number: 5 Author: Text Inserted Subject: Text Date: Indeterminate
"(6.8)"

Number: 6 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "available to any person to whom they provide the resource each time the resource is provided for use: a) confirmation in writing that the resource being supplied is compliant with the requirements of this EOW code; b) a most recent certificate of analysis for the quality of the resource being supplied for at least the quality criteria in Table 1 – Resource quality criteria; and c) Safety Data Sheet for the resource. Records"
[New]: "to the resource user upon establishment of an arrangement to sell or give away the resource, and annually thereafter: a) a copy of the EOW code for Coal Combustion Products (ENEW07359717) 4 ; b) the registered resource producer's business name, ABN and address; c) confirmation in writing that the resource being supplied is compliant with Requirement (6.3) of this EOW code; d) a most recent certificate of analysis for the quality characteristics listed in Table 1: Resource quality criteria; and e) safety data sheet for the resource. Records (6.10)"

Author: admin Subject: Sticky Note Date: 31/07/2020 4:35:56 PM
Minor....'make avalible' replaced with 'provide'.

Number: 7 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "make"
[New]: "provide"

Number: 8 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "(6.7)"
[New]: "(6.9)"

Number: 9 Author: Text Deleted Subject: Text Date: Indeterminate
"(6.8)"

Number: 10 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "each time the resource is provided for use: a) origin of the resource; b) date of dispatch of the resource; c) contact details for the person receiving the resource; and d) quantity of the resource supplied measured in tonnes."
[New]: "for the resource supplied to a resource user: a) origin of the resource (e.g. address, lot on plan and/or GPS coordinates); b) quantity (in tonnes) of the resource supplied; c) quality criteria of the resource (including but not limited to the quality characteristics listed in Table 1: Resource quality criteria); d) date of dispatch of the resource; and e) business name, ABN and address of the person receiving the resource. (6.11) All records required to be kept by the"

Author: admin Subject: Sticky Note Date: 31/07/2020 4:36:39 PM
MInor

Number: 11 Author: Text Deleted Subject: Text Date: Indeterminate
"The"

Number: 12 Author: Text Deleted Subject: Text Date: Indeterminate
"(6.9)"

Number: 13 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "must keep records of all requirements, including monitoring requirements, under this EOW code for a period of at least five (5) years and provide the records to the chief executive upon request and in the format requested within 10 days."

Comments from page 12 continued on next page

Published on DES Disclosure Log
RTI Act 2009

	must be implemented.
(6.7)	All sampling and monitoring required under this EOW code must be carried out by an **appropriately qualified person**.
(6.8)	All analysis required under this EOW code must be carried out by a laboratory that has **NATA** certification, or an equivalent certification, for such analyses.
Information to be provided	
(6.9)	The **registered resource producer** must provide the following to the **resource user** upon establishment of an arrangement to sell or give away the **resource**, and annually thereafter: a) a copy of the EOW code for *Coal Combustion Products (ENEW07359717)*[4]; b) the **registered resource producer's** business name, **ABN** and address; c) confirmation in writing that the **resource** being supplied is compliant with *Requirement (6.3)* of this EOW code; d) a most recent certificate of analysis for the quality characteristics listed in *Table 1: Resource quality criteria*; and e) **safety data sheet** for the **resource**.
Records	
(6.10)	The **registered resource producer** must keep the following **records** for the **resource** supplied to a **resource user**: a) origin of the **resource** (e.g. address, lot on plan and/or GPS coordinates); b) quantity (in tonnes) of the **resource** supplied; c) quality criteria of the **resource** (including but not limited to the quality characteristics listed in *Table 1: Resource quality criteria*); d) date of dispatch of the **resource**; and e) business name, **ABN** and address of the **person** receiving the **resource**.
(6.11)	All **records** required to be kept by the **registered resource producer** under this EOW code must be: a) kept by the **registered resource producer** for a period of not less than five (5) years; and b) provided to the **chief executive** upon request and in the format requested and time period specified.
Notification of **emergencies**, incidents and breaches	
(6.12)	Any breach of a requirement of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach.
(6.13)	**Records** of any breach of a requirement of this EOW code, including full details of the breach and any subsequent actions taken, must be kept and provided to the **chief executive** upon request and in the format requested and time period specified.

[4] This can be a physical copy, an electronic copy or a link to the chief executive's website where this EOW code is available.

DRAFT Published on DES Disclosure Log RTI Act 2009

[New]: "under this EOW code must be: a) kept by the registered resource producer for a period of not less than five (5) years; and b) provided to the chief executive upon request and in the format requested and time period specified. Notification of emergencies, incidents and breaches (6.12) Any breach of a requirement of this EOW code must be reported to the chief executive within 24 hours of becoming aware of the breach. (6.13) Records of any breach of a requirement of this EOW code, including full details of the breach and any subsequent actions taken, must be kept and provided to the chief executive upon request and in the format requested and time period specified. 4 This can be a physical copy, an electronic copy or a link to the chief executive's website where this EOW code is available. Page 8 of 15 • ESR/2018/4549 • Version 1.00 • Effective: 01 JAN 2019 Department of Environment and Science"

Author: admin Subject: Sticky Note Date: 31/07/2020 4:37:10 PM

Formatting

Published on DESI Disclosure Log
RTI Act 2009

7. Conditions of use

Approved uses	
(7.1)	The approved **resource** is **coal combustion products** that comply with 1*equirement (6.3)* of this EOW code and is used for the following purposes: a) in bound applications in accordance with *Condition (7.2)*; b) in unbound applications in accordance with *Conditions (7.3)* and *(7.4)*; c) as a feedstock in the manufacture of **soil conditioner** in accordance with *Condition (7.5)*; and d) as a feedstock in 2e manufacture of **soil product** in accordance with *Condition (7.6).*
Resource use in bound applications	
3.2)	The **resource** 4sed in bound applications 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 5for that product. Final products for the purpose of this EOW code are limited to: a) cementitious mixes; b) cement products; c) concrete products; d) asphalt; e) binder for road stabilisation pavements; f) rigid and composite pavements structures; g) ceramic products; h) insulators; i) varnishes, plastics, ceramics, ultra-light concrete and metal alloys; j) paints, coatings and adhesives; k) geopolymers; and l) rubbers.
6esource use in unbound applications	
8.3)	7se of the **resource** in unbound applications is limited to the below 9plications on **standard areas**: a) pipe bedding materials; b) sub-surface drainage; 10 road pavement, base, sub-base and subgrade structures;

11n the absence of Australian Standards for the product, it is required that the final product meets any other appropriate industry standards (e.g. Registered Professional Engineer of Queensland certified technical specifications).

DRAFT
Published on DES Disclosure Log
RTI Act 2009

Page: 13

Number: 1 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "the quality criteria listed in Table 1 -Resource quality criteria and is used for the purpose stated in Table 2 – Approved uses of the resource. Page 7 of 13 • ESR/2018/4549 • Version 1.00 • Effective: 01 JAN 2019 Department of Environment and Science"
[New]: "Requirement (6.3) of this EOW code and is used for the following purposes: a) in bound applications in accordance with Condition (7.2); b) in unbound applications in accordance with Conditions (7.3) and (7.4); c) as a feedstock in the manufacture of soil conditioner in accordance with Condition (7.5); and d) as a feedstock in"

Font "ArialMT" changed to "Arial-ItalicMT".

Author: admin Subject: Sticky Note Date: 31/07/2020 4:37:42 PM
Land use removed?

Number: 2 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "Table 2 -Approved uses of the resource Purpose Description of approved use Bound"
[New]: "the manufacture of soil product in accordance with Condition (7.6). Resource use in bound"

Font "Arial-BoldMT" changed to "ArialMT".
Font-size "9" changed to "9.96001".

Number: 3 Author: Text Inserted Subject: Text Date: Indeterminate
"(7.2)"

Number: 4 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "can"
[New]: "used in bound applications must only"

Font-size "9" changed to "9.96001".

Author: admin Subject: Sticky Note Date: 31/07/2020 4:38:23 PM
Minor insertion

Number: 5 Author: Text Inserted Subject: Text Date: Indeterminate
"5"

Number: 6 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "Unbound The"
[New]: "Resource use in unbound applications"

Font-size "9" changed to "9.96001".

Number: 7 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "resource use is limited to the following"
[New]: "Use of the resource in unbound applications is limited to the below"

Font-size "9" changed to "9.96001".

Author: admin Subject: Sticky Note Date: 31/07/2020 4:38:50 PM
Minor insertion

Number: 8 Author: Text Inserted Subject: Text Date: Indeterminate
"(7.3)"

Number: 9 Author: Text Deleted Subject: Text Date: Indeterminate
"applications"

Number: 10 Author: Text Inserted Subject: Text Date: Indeterminate
"c) road pavement, base, sub-base and subgrade structures;"

Number: 11 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "c) selected backfill for structures;"
[New]: "5 In the absence of Australian Standards for the product, it is required that the final product meets any other appropriate industry standards (e.g. Registered Professional Engineer of Queensland certified technical specifications). Page 9 of 15 • ESR/2018/4549 • Version 1.00 • Effective: 01 JAN 2019 Department of Environment and Science"

Font-size "9" changed to "6.48".

Published on DESI Disclosure Log
RTI Act 2009

	d) select layers which act as working platforms at the top of earthworks; and e) **engineered construction works**[6].
(7.4)	**Resource users** undertaking an unbound application must not use the resource: a) below the groundwater table; b) within 50m of a water supply bore; and c) the site of use has pH greater than 8.
Resource use as soil conditioner	
(7.5)	The **resource** must only be used to manufacture **soil conditioner** that: a) meets the requirements of **AS 4454**; and b) where biomass containing potential PFAS contamination (e.g. biosolids) is used in producing the resource, the **resource** does not exceed the quality criteria stated in *Table 2: PFAS limits*.

Table 2 – PFAS limits

Media	Contaminant	Limit
Soil	PFOS	0.001 mg/kg
	PFOS + PFHxS	0.002 mg/kg
	PFHxS	0.003 mg/kg
	PFOA	0.004 mg/kg
	PFBA, PFPeA, PFHxA	0.001 mg/kg
	Sum C_9 -C_{14} Perflouroalkyl carboxylic acids	0.01 mg/kg
	Perfluoroalkyl sulfonamides	0.001 mg/kg
	N:2 Fluorotelomer Sulfonic acids	0.004 mg/kg

Resource use as soil product	
(7.6)	The **resource** must only be used to manufacture **soil product** that: a) meets the requirements of **AS 4419**; and b) where biomass containing potential PFAS contamination (e.g. biosolids) is used in producing the resource, the **resource** does not exceed the quality criteria stated in *Table 2: PFAS limits*.
Records	
(7.7)	The **resource user** must **record** the following information for the **resource** received by the **resource user** under this EOW code: a) business name, **ABN** and address of the **registered resource producer** who supplied the **resource**; b) date the **resource user** received the **resource**;

[6] Use of the resource at a **facility** as fill material must be carried out in accordance with the requirements of an environmental authority that authorises Environmentally Relevant Activity (ERA) 60 as prescribed under Schedule 2 of the Environmental Protection Regulation 2019

Published on PFAS Disclosure Log
RTI Act 2009

Page: 14

Number: 1 Author: Text Inserted Subject: Text Date: Indeterminate
"End of waste code Coal Combustion Products (ENEW07359717)"

Number: 2 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "road pavement, base, sub-base and subgrade structures;"
[New]: "select layers which act as working platforms at the top of earthworks; and"

Font-size "9" changed to "9.96001".

Number: 3 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "structured and engineered fill;"
[New]: "engineered construction works 6 ."

Font "ArialMT" changed to "Arial-BoldMT".
Font-size "9" changed to "9.96001".

Author: admin Subject: Sticky Note Date: 31/07/2020 4:41:18 PM
Combined uses..why ?
- selected backfill for structures
- structured and engineered fills
- fill for reinforced soil structures (inlcuding geo-grid appliactions)

Number: 4 Author: Text Inserted Subject: Text Date: Indeterminate
"(7.4) Resource users undertaking an unbound application must not use the resource: a) below the groundwater table;"

Number: 5 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "select layers which act as working platforms at the top of earthworks; and"
[New]: "within 50m of a water supply bore; and"

Font-size "9" changed to "9.96001".

Number: 6 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "fill for reinforced soil structures (including geo-grid applications). Manufacturing of soil ameliorant or soil product"
[New]: "if the site of use has pH greater than 8. Resource use as soil conditioner"

Font-size "9" changed to "9.96001".

Number: 7 Author: Text Inserted Subject: Text Date: Indeterminate
"(7.5)"

Number: 8 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "can be used in manufacturing a soil ameliorant or soil"
[New]: "must only be used to manufacture soil conditioner that: a) meets the requirements of AS 4454; and b) where biomass containing potential PFAS contamination (e.g. biosolids) is used in producing the resource, the resource does not exceed the quality criteria stated in Table 2: PFAS limits. Table 2 – PFAS limits Media Contaminant Limit Soil PFOS 0.001 mg/kg PFOS + PFHxS 0.002 mg/kg PFHxS 0.003 mg/kg PFOA 0.004 mg/kg PFBA, PFPeA, PFHxA 0.001 mg/kg Sum C 9 -C 14 Perflouroalkyl carboxylic acids 0.01 mg/kg Perfluoroalkyl sulfonamides 0.001 mg/kg N:2 Fluorotelomer Sulfonic acids 0.004 mg/kg Resource use as soil"

Font-size "9" changed to "9.96001".

Author: admin Subject: Sticky Note Date: 31/07/2020 4:43:59 PM
Land use removed
PFAS limts are @ lab detection levels

Number: 9 Author: Text Inserted Subject: Text Date: Indeterminate
"(7.6)"

Number: 10 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "which meets the relevant Australian Standards for that product. The resource can be used in direct land application on naturally acidic or low pH soils to correct the identified agronomic deficiency in land to which it is applied and where the final soil pH does not exceed 8 pH unit after application of the resource. Land application"
[New]: "The resource must only be used to manufacture soil product that: a) meets the requirements of AS 4419; and b) where biomass containing potential PFAS contamination (e.g. biosolids) is used in producing the resource, the resource does not exceed the quality criteria stated in Table 2: PFAS limits."

Comments from page 14 continued on next page

Published on DESI Disclosure Log
RTI Act 2009

	d) select layers which act as working platforms at the top of earthworks; and e) **engineered construction works**[6].
(7.4)	**Resource users** undertaking an unbound application must not use the resource: a) below the groundwater table; b) within 50m of a water supply bore; and c) if the site of use has pH greater than 8.
Resource use as soil conditioner	
(7.5)	The **resource** must only be used to manufacture **soil conditioner** that: a) meets the requirements of **AS 4454**; and b) where biomass containing potential PFAS contamination (e.g. biosolids) is used in producing the resource, the **resource** does not exceed the quality criteria stated in *Table 2: PFAS limits*.

Table 2 – PFAS limits

Media	Contaminant	Limit
Soil	PFOS	0.001 mg/kg
	PFOS + PFHxS	0.002 mg/kg
	PFHxS	0.003 mg/kg
	PFOA	0.004 mg/kg
	PFBA, PFPeA, PFHxA	0.001 mg/kg
	Sum C_9 -C_{14} Perflouroalkyl carboxylic acids	0.01 mg/kg
	Perfluoroalkyl sulfonamides	0.001 mg/kg
	N:2 Fluorotelomer Sulfonic acids	0.004 mg/kg

Resource use as soil product	
(7.6)	The **resource** must only be used to manufacture **soil product** that: a) meets the requirements of **AS 4419**; and b) where biomass containing potential PFAS contamination (e.g. biosolids) is used in producing the resource, the **resource** does not exceed the quality criteria stated in *Table 2: PFAS limits*.
Records	
12 7)	11 e **resource user** must **record** the following information for the **resource** received by the **resource user** under this EOW code: a) business name, **ABN** and address of the **registered resource producer** who supplied the **resource**; b) date the **resource user** received the **resource**;

[6] Use of the resource at a **facility** as fill material must be carried out in accordance with the requirements of an environmental authority that authorises Environmentally Relevant Activity (ERA) 60 as prescribed under Schedule 2 of the Environmental Protection Regulation 2019

DRAFT Published on PFAS Disclosure Log RTI Act 2009

Font-size "9" changed to "9.96001".

Number: 11 Author: Text Replaced Subject: Text Date: Indeterminate

[Old]: "For each load of the resource received, the resource user must keep the following records for a minimum of five (5) years and must provide to the chief executive upon request and in the format requested by the date requested: a) quantity of the resource; b) date of receipt; c) name and address of the person who supplied the resource; and d) name and address of the resource user at the destination of resource. Page 8 of 13"

[New]: "The resource user must record the following information for the resource received by the resource user under this EOW code: a) business name, ABN and address of the registered resource producer who supplied the resource; b) date the resource user received the resource; 6 Use of the resource at a facility as fill material must be carried out in accordance with the requirements of an environmental authority that authorises Environmentally Relevant Activity (ERA) 60 as prescribed under Schedule 2 of the Environmental Protection Regulation 2019 Page 10 of 15"

Author: admin Subject: Sticky Note Date: 31/07/2020 4:44:34 PM

Reformatting

Number: 12 Author: Text Replaced Subject: Text Date: Indeterminate

[Old]: "(7.2)"

[New]: "(7.7)"

Published on DESI Disclosure Log
RTI Act 2009

	1) quantity (in tonnes) of the **resource** received by the **resource user**; and d) **site of use** of **resource** (e.g. street address, lot on plan and/or GPS coordinates).
(7.8)	All **records** required to be kept by the **resource user** under the conditions of this EOW code must be: a) kept by the **resource user** for a period of not less than five (5) years; and b) provided to the **chief executive** upon request and in the format requested and time period specified.
Notification of **emergencies**, incidents and exceptions	
2 7.9)	Any breach of a condition of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach.
3 7.10)	**Records** of any breach of a condition of this EOW code, including full details of the breach and any subsequent actions taken, must be kept and provided to the **chief executive** upon 4equest and in the format requested and time period specified.

5 6. Definitions

Words and phrases used throughout this EOW code **in bold** are defined below. Where a definition for a term used in this EOW code is sought and the term is not defined within this EOW code, the definitions provided in the relevant legislation shall be used.

6**ABN'** means Australian Business Number which is a unique 11 digit number issued by the Australian Business Register and identifies a business in Australia.

'appropriately qualified person' means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

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

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

'cenosphere(s)' means inert, hollow, essentially thin-walled glass spheres of approximately 10–350 microns having a typical density of 0.4–0.8g/cm^3, comprised largely of silica and alumina and filled with air and/or gasses which are formed from coal combustion ash when in a molten state.

'chief executive' means the Department of Environment and Science or its successor.

'coal combustion products' means **fly ash**, **furnace bottom ash** or **cenosphere(s)** resulting from the burning of coal within coal fired power stations and coal fired boilers where 9t least 90% of the fuel source is coal and up to 10% of the fuel source can be biomass material (e.g. wood chip, biosolids), and where no other source of fuel is mixed other than petroleum based gas or liquid fuel for ignition support.

10**nergency(ies)'** means a situation where either human health or safety is threatened, or serious or material **environmental harm** has been or is likely to be caused; and urgent action is necessary to protect the health or safety of persons, or prevent or minimise the harm, or rehabilitate or restore the environment because of the harm.

11**ngineered construction works'** means:

DRAFT Published for Public Disclosure Log RTI Act 2009

Page: 15

Number: 1 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "Unbound applications (7.3) Resource users undertaking an unbound application must not use the resource: a) below the groundwater table; b) within 50m of a water supply bore; and c) in areas with pH greater than 8. Soil ameliorant or soil product use (7.4) Resource users manufacturing the soil ameliorant or soil product may only mix, blend, or otherwise incorporate the resource into a material to be used as a soil ameliorant where the material to be provided complies with the AS4454 AS4419 including monitoring and keeping records of product quality to demonstrate compliance with the relevant Australian Standard. (7.5) Resource users undertaking the manufacturing of the soil ameliorant or soil product or applying resource directly to land under this EOW code must notify the chief executive of their name, address, contact information and details of intended resource usage, in writing using the approved form 4 no less than 10 business days prior to using the resource. (7.6) Resource users undertaking direct land application of the resource must only do so in naturally acidic soils: a) to correct the identified agronomic deficiency in land to which it is applied; and b) where the final soil pH does not exceed 8 pH unit after application of the resource."
[New]: "c) quantity (in tonnes) of the resource received by the resource user; and d) site of use of resource (e.g. street address, lot on plan and/or GPS coordinates). (7.8) All records required to be kept by the resource user under the conditions of this EOW code must be: a) kept by the resource user for a period of not less than five (5) years; and b) provided to the chief executive upon request and in the format requested and time period specified."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:45:08 PM
Reformatting

Number: 2 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "(7.7)"
[New]: "(7.9)"

Number: 3 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "Records,"
[New]: "(7.10) Records of any breach of a condition of this EOW code,"

Font "Arial-BoldMT" changed to "ArialMT".

Number: 4 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "request. 4 The approved form is available on the chief executive's website at www.des.qld.gov.au Page 9 of 13 • ESR/2018/4549 • Version 1.00 • Effective: 01 JAN 2019 Department of Environment and Science"
[New]: "request and in the format requested and time period specified."

Number: 5 Author: Text Deleted Subject: Text Date: Indeterminate
"End of waste code Coal Combustion Products (ENEW07359717)"

Number: 6 Author: Text Inserted Subject: Text Date: Indeterminate
"'ABN' means Australian Business Number which is a unique 11 digit number issued by the Australian Business Register and identifies a business in Australia."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:45:27 PM
Minor

Number: 7 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "'AS4419'"
[New]: "'AS4419'"

Number: 8 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "'AS4454'"
[New]: "'AS4454'"

Number: 9 Author: Text Inserted Subject: Text Date: Indeterminate
"at least 90% of the fuel source is coal and up to 10% of the fuel source can be biomass material (e.g. wood chip, biosolids), and where"

Author: admin Subject: Sticky Note Date: 31/07/2020 4:46:40 PM
Ok. Other fuels noted here ...conflict with clause 4 above

Number: 10 Author: Text Inserted Subject: Text Date: Indeterminate
"'emergency(ies)' means a situation where either human health or safety is threatened, or serious or material environmental harm has been or is likely to be caused; and urgent action is necessary to protect the health or safety of persons, or prevent or minimise the harm, or rehabilitate or restore the environment because of the harm."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:47:25 PM
Minor

Number: 11 Author: Text Replaced Subject: Text Date: Indeterminate

Comments from page 15 continued on next page

Published on DES Disclosure Log RTI Act 2009

	c) quantity (in tonnes) of the **resource** received by the **resource user**; and d) **site of use** of **resource** (e.g. street address, lot on plan and/or GPS coordinates).
(7.8)	All **records** required to be kept by the **resource user** under the conditions of this EOW code must be: a) kept by the **resource user** for a period of not less than five (5) years; and b) provided to the **chief executive** upon request and in the format requested and time period specified.
Notification of **emergencies**, incidents and exceptions	
(7.9)	Any breach of a condition of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach.
(7.10)	**Records** of any breach of a condition of this EOW code, including full details of the breach and any subsequent actions taken, must be kept and provided to the **chief executive** upon request and in the format requested and time period specified.

8. Definitions

Words and phrases used throughout this EOW code **in bold** are defined below. Where a definition for a term used in this EOW code is sought and the term is not defined within this EOW code, the definitions provided in the relevant legislation shall be used.

'ABN' means Australian Business Number which is a unique 11 digit number issued by the Australian Business Register and identifies a business in Australia.

'appropriately qualified person' means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

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

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

'cenosphere(s)' means inert, hollow, essentially thin-walled glass spheres of approximately 10–350 microns having a typical density of 0.4–0.8g/cm^3, comprised largely of silica and alumina and filled with air and/or gasses which are formed from coal combustion ash when in a molten state.

'chief executive' means the Department of Environment and Science or its successor.

'coal combustion products' means **fly ash**, **furnace bottom ash** or **cenosphere(s)** resulting from the burning of coal within coal fired power stations and coal fired boilers where at least 90% of the fuel source is coal and up to 10% of the fuel source can be biomass material (e.g. wood chip, biosolids), and where no other source of fuel is mixed other than petroleum based gas or liquid fuel for ignition support.

'emergency(ies)' means a situation where either human health or safety is threatened, or serious or material **environmental harm** has been or is likely to be caused; and urgent action is necessary to protect the health or safety of persons, or prevent or minimise the harm, or rehabilitate or restore the environment because of the harm.

'engineered construction works' means:

DRAFT Published for Public Disclosure Log RTI Act 2009

[Old]: "'contaminants' (as defined in Section 11 of"
[New]: "'engineered construction works' means: Page 11 of 15 • ESR/2018/4549 • Version 1.00 • Effective: 01 JAN 2019 Department of Environment and Science"

Published on DESI Disclosure Log
RTI Act 2009

a) where the **resource user** uses the **resource** in accordance with an applicable prescribed engineering standard; and/or

b) engineer designed civil applications that have been certified by a Registered Professional Engineer of Queensland (RPEQ) as suitable for its intended purpose.

'environmental harm' means environmental harm as defined in Chapter 1 of the *Environmental Protection Act 1994*.

'facility' means a naturally occurring or constructed hollow, pit or void (e.g. a gully, mining shaft or quarry).

'fly ash' means solid material extracted from the flue gasses of a boiler fired primarily with pulverised coal, consisting essentially of the oxides of silicon, aluminium, iron and some calcium of which particle sizes range from less than 1µm (micrometre) to 200µm and are irregular to spherical shape.

'furnace bottom ash' means the agglomerated particles formed at the bottom of the furnace. Furnace bottom ash is typically grey to black in colour, is quite angular, and has a porous surface structure.

'load' means the volume of **resource** put in or on something for conveyance or transportation, carried at one time and to one **site of use**. For example, a truck and trailer carrying the resource is considered as one load as well as multiple bins travelling by rail. Where the resource is transported via conveyor systems, information should be recorded on a daily basis until the transfer ceases.

'NATA' means the National Association of Testing Authorities.

'NEMP' means the PFAS National Environmental Management Plan version 2.0, or its most recent version.

'person(s)' means an individual or a corporation.

'records' include breach notifications, written procedures, analysis results, monitoring reports and monitoring programs required under a requirement or condition of this EOW code.

'reference test methods' means the reference test methods for determining the contaminant and 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].

'registered resource producer(s)' means a **person** who produces the **resource** and has registered with the **chief executive** (in accordance with *Requirement (6.1)*) to use, sell or give away the **resource** to be used under this EOW code.

'resource(s)' means **coal combustion products** that meet the criteria and quality characteristics in *Requirement (6.3)* of this EOW code.

'resource user(s) means a **person** who uses the **resource** for the use approved under this EOW code and in such a manner which does not cause any **environmental harm**, and includes the producer who uses the resource.

'safety data sheet' means a document containing data regarding the properties of the **resource** which provides information on handling or working with that substance in a safe manner; and includes information such as physical data toxicity, environmental characteristics, health effects, first aid, reactivity; and storage, disposal, protective equipment and spill handling procedures. The safety data sheet must be compliant with Safe Work Australia's *Model Code of Practice: Preparation of safety data sheets for hazardous chemicals*.

'site of use' means the relevant location(s) where the **resource user** uses the **resource** in accordance with this EOW code.

'soil conditioner' means any **composted** or **pasteurised** organic product manufactured in accordance with **AS4454**, that is suitable for adding to soil to improve the growing conditions for plant roots by providing

Page: 16

Number: 1 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "the Environmental Protection Act 1994), unless authorised under this EOW code"
[New]: "a) where the resource user uses the resource in accordance with an applicable prescribed engineering standard; and/or b) engineer designed civil applications that have been certified by a Registered Professional Engineer of Queensland (RPEQ) as suitable for its intended purpose."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:49:26 PM
Refer Unbound uses ....this definition greatly increases the approval burden of CCP use, that is NOT impossed on material materials. Pls justify

Number: 2 Author: Text Inserted Subject: Text Date: Indeterminate
"'environmental harm' means environmental harm as defined in Chapter 1 of the Environmental Protection Act 1994."

Number: 3 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "means — a) a gas, liquid or solid; or b) an odour; or c) an organism (whether alive or dead), including a virus or parasite; or d) energy, including noise, heat, radioactivity and electromagnetic radiation; or e) a combination of contaminants."
[New]: "'facility' means a naturally occurring or constructed hollow, pit or void (e.g. a gully, mining shaft or quarry)."

Font "ArialMT" changed to "Arial-BoldMT".

Author: admin Subject: Sticky Note Date: 31/07/2020 4:50:29 PM
Not sure of relevance?

Number: 4 Author: Text Deleted Subject: Text Date: Indeterminate
"'emergency(ies)' means a situation where either human health or safety is threatened, or serious or material environmental harm has been or is likely to be caused; and urgent action is necessary to protect the health or safety of persons, or prevent or minimise the harm, or rehabilitate or restore the environment because of the harm. 'environmental harm' means environmental harm as defined in Chapter 1 of the Environmental Protection Act 1994."

Number: 5 Author: Text Inserted Subject: Text Date: Indeterminate
"primarily"

Number: 6 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "time. A"
[New]: "time and to one site of use. For example, a"

Number: 7 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "is"
[New]: "means"

Number: 8 Author: Text Inserted Subject: Text Date: Indeterminate
"'NEMP' means the PFAS National Environmental Management Plan version 2.0, or its most recent version."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:50:51 PM
OK

Number: 9 Author: Text Inserted Subject: Text Date: Indeterminate
"written procedures,"

Number: 10 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "condition or requirement"
[New]: "requirement or condition"

Number: 11 Author: Text Deleted Subject: Text Date: Indeterminate
"Page 10 of 13 • ESR/2018/4549 • Version 1.00 • Effective: 01 JAN 2019 Department of Environment and Science"

Number: 12 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "methods'—The"
[New]: "methods' means the"

Font "ArialMT" changed to "Arial-BoldMT".

Number: 13 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "producer'"
[New]: "producer(s)'"

Comments from page 16 continued on next page

Published on DES Disclosure Log
RTI Act 2009

a) where the **resource user** uses the **resource** in accordance with an applicable prescribed engineering standard; and/or

b) engineer designed civil applications that have been certified by a Registered Professional Engineer of Queensland (RPEQ) as suitable for its intended purpose.

'environmental harm' means environmental harm as defined in Chapter 1 of the *Environmental Protection Act 1994*.

'facility' means a naturally occurring or constructed hollow, pit or void (e.g. a gully, mining shaft or quarry).

'fly ash' means solid material extracted from the flue gasses of a boiler fired primarily with pulverised coal, consisting essentially of the oxides of silicon, aluminium, iron and some calcium of which particle sizes range from less than 1µm (micrometre) to 200µm and are irregular to spherical shape.

'furnace bottom ash' means the agglomerated particles formed at the bottom of the furnace. Furnace bottom ash is typically grey to black in colour, is quite angular, and has a porous surface structure.

'load' means the volume of **resource** put in or on something for conveyance or transportation, carried at one time and to one **site of use**. For example, a truck and trailer carrying the resource is considered as one load as well as multiple bins travelling by rail. Where the resource is transported via conveyor systems, information should be recorded on a daily basis until the transfer ceases.

'NATA' means the National Association of Testing Authorities.

'NEMP' means the PFAS National Environmental Management Plan version 2.0, or its most recent version.

'person(s)' means an individual or a corporation.

'records' include breach notifications, written procedures, analysis results, monitoring reports and monitoring programs required under a requirement or condition of this EOW code.

'reference test methods' means the reference test methods for determining the contaminant and 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].

'registered resource producer(s)' means a **person** who [14]oduces the **resource** and has registered with the **chief executive** [15] accordance with *Requirement (6.1)*) to use, sell or give away the **resource** to be used under this EOW code.

'resource(s)' means [16]**al combustion products** that meet the criteria and quality characteristics in *Requirement (6.3)* of this EOW code.

'resource user(s) means a **person** who uses the **resource** for the use approved under this EOW code and in such a manner which does not cause any **environmental harm**, and includes the producer who uses the resource.

[17]**afety data sheet'** means a document containing data regarding the properties of the **resource** which provides information on handling or working with that substance in a safe manner; and includes information such as physical data toxicity, environmental characteristics, health effects, first aid, reactivity; and storage, disposal, protective equipment and spill handling procedures. The[18]afety data sheet must be compliant with Safe Work Australia's [19]*odel Code of Practice: Preparation of safety data sheets for hazardous chemicals*.

'site of use' means the relevant location(s) where the **resource user** uses the **resource** in accordance with this EOW code.

'soil conditioner' means any **composted** or **pasteurised** organic product manufactured in accordance with **AS4454**, that is suitable for adding to soil to improve the growing conditions for plant roots by providing

Number: 14 Author: Text Inserted Subject: Text Date: Indeterminate
"produces the resource and"

Number: 15 Author: Text Inserted Subject: Text Date: Indeterminate
"(in accordance with Requirement (6.1))"

Number: 16 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "fly ash, furnace bottom ash or cenosphere(s) produced from the combustion of coal, at coal fired power stations and coal fired boilers, that meet the resource quality criteria in Table 1 – Resource quality criteria of this EOW code, and does not contain contaminants other than what is listed in Table 1– Resource quality criteria ."
[New]: "coal combustion products that meet the criteria and quality characteristics in Requirement (6.3) of this EOW code."

Author: admin Subject: Sticky Note Date: 31/07/2020 4:51:33 PM
Minor

Number: 17 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "'Safety Data Sheet'"
[New]: "'safety data sheet'"

Number: 18 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "Safety Data Sheet"
[New]: "safety data sheet"

Number: 19 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "code of practice for production of Safety Data Sheets. 'soil ameliorant' means a substance added to soil to improve the growing conditions for plant roots by providing"
[New]: "Model Code of Practice: Preparation of safety data sheets for hazardous chemicals. 'site of use' means the relevant location(s) where the resource user uses the resource in accordance with this EOW code. 'soil conditioner' means any composted or pasteurised organic product manufactured in accordance with AS4454, that is suitable for adding to soil to improve the growing conditions for plant roots by providing Page 12 of 15 • ESR/2018/4549 • Version 1.00 • Effective: 01 JAN 2019 Department of Environment and Science"

Font "ArialMT" changed to "Arial-ItalicMT".

Author: admin Subject: Sticky Note Date: 31/07/2020 4:53:36 PM
CCPs are not organic! This definition has been changed without any understanding of what CCPs are, moreover the extensive published literature (research) on soil ameliorents and land use

Published on DES Disclosure Log
RTI Act 2009

nutritional requirements. Soil conditioner must not have more than 20% by mass of particles with a maximum size above 16mm.

'soil product' means general purpose soils, top dressing, topsoil and landscaping mixes manufactured in accordance with **AS4419**.

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

'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.

- END -

DRAFT
Published on DESI Disclosure Log
RTI Act 2009

Page: 17

Number: 1 Author: Text Inserted Subject: Text Date: Indeterminate
"End of waste code Coal Combustion Products (ENEW07359717)"

Number: 2 Author: Text Inserted Subject: Text Date: Indeterminate
"A soil conditioner must not have more than 20% by mass of particles with a maximum size above 16mm. ‘soil product’ means general purpose soils, top dressing, topsoil and landscaping mixes manufactured in accordance with AS4419."

Author: admin Subject: Sticky Note Date: 31/07/2020 5:07:52 PM
Likely impacts on FBA

Number: 3 Author: Text Deleted Subject: Text Date: Indeterminate
"’surface water’ means waters excluding groundwater."

Number: 4 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "11 of 13"
[New]: "13 of 15"

Published on DESI Disclosure Log
RTI Act 2009

Appendix A —General obligation for all persons

This appendix is not intended to provide a comprehensive assessment of all obligations under Queensland law. It provides some general information and persons are encouraged to familiarise themselves with all requirements related to their specific operation.

Responsibilities under the *Environmental Protection Act 1994*

All persons within the State of Queensland must also meet their obligations under the *Environmental Protection Act 1994*, and the regulations made under that Act.

General environmental duty

Section 319 of the *Environmental Protection Act 1994* states that we all have a general environmental duty. This means that we are all responsible for the actions we take that affect the environment. We must not carry out any activity that causes or is likely to cause environmental harm unless we take all reasonable and practicable measures to prevent or minimise the harm. To decide what meets your general environmental duty, you need to consider:

- the nature of the harm or potential harm
- the sensitivity of the receiving environment
- the current state of technical knowledge for the activity
- the likelihood of successful application of the different measures to prevent or minimise environmental harm that might be taken
- the financial implications of the different measures as they would relate to the type of activity.

It is not an offence not to comply with the general environmental duty. However, maintaining your general environmental duty is a defence against the following acts:

(a) an act that causes serious or material environmental harm or an environmental nuisance

(b) an act that contravenes a noise standard

(c) a deposit of a contaminant, or release of stormwater run-off, mentioned in section 440ZG.

More information is available on the Department of Environment and Science 1bsite www.des.qld.gov.au.

Some relevant offences under the *Environmental Protection Act 1994*

Causing serious or material environmental harm (sections 437–39)

Material environmental harm is when the harm is not trivial or negligible in nature. Serious environmental harm is harm that is irreversible, of a high impact or widespread, or that is caused to an area of high conservation value or special significance. Damages, or costs required to rehabilitate the environment, of over $5000 constitutes material environmental harm and damages, or costs required to rehabilitate the environment, of over $50,000 constitutes serious environmental harm.

Serious or material environmental harm excludes environmental nuisance.

2ausing environmental nuisance (section 440)

Environmental nuisance is unreasonable interference with an environmental value caused by aerosols, fumes, light, noise, odour, particles or smoke. It may also include an unhealthy, offensive or unsightly condition because of contamination.

DRAFT Published on DES Disclosure Log RTI Act 2009

Page: 18

Number: 1 Author: Text Deleted Subject: Text Date: Indeterminate
"(DES)"

Number: 2 Author: Text Inserted Subject: Text Date: Indeterminate
"Causing environmental nuisance (section 440) Environmental nuisance is unreasonable interference with an environmental value caused by aerosols, fumes, light, noise, odour, particles or smoke. It may also include an unhealthy, offensive or unsightly condition because of contamination."

Number: 3 Author: Text Replaced Subject: Text Date: Indeterminate
[Old]: "12 of 13"
[New]: "14 of 15"

Published on DESI Disclosure Log
RTI Act 2009

Depositing a prescribed water contaminant in waters (section 440ZG)

Prescribed water contaminants include a wide variety of contaminants listed in Schedule 9 of the Environmental Protection Regulation 2008.

It is your responsibility to ensure that prescribed water contaminants are not left in a place where they may or do enter a waterway, the ocean or a stormwater drain. This includes making sure that stormwater falling on or running across your site does not leave the site contaminated. Where stormwater contamination occurs you must ensure that it is treated to remove contaminants. You should also consider where and how you store material used in your processes onsite to reduce the chance of water contamination.

Placing a contaminant where environmental harm or nuisance may be caused (section 443)

A person must not cause or allow a contaminant to be placed in a position where it could reasonably be expected to cause serious or material environmental harm or environmental nuisance.

Some relevant offences under the *Waste Reduction and Recycling Act 2011*

Littering (section 103)

Litter is any domestic or commercial waste and any material a person might reasonably believe is refuse, debris or rubbish. Litter can be almost any material that is disposed of incorrectly. Litter includes cigarette butts and drink bottles dropped on the ground, fast food wrappers thrown out of the car window, poorly secured material from a trailer or grass clippings swept into the gutter. However, litter does not include any gas, dust, smoke or material emitted or produced during, or because of, the normal operations of a building, manufacturing, mining or primary industry.

Illegal dumping of waste (section 104)

Illegal dumping is the dumping of large volumes of litter (200 litres or more) at a place. 2

Failure to comply with EOW code (section 158)

A registered resource producer for an EOW code must not produce, use, sell or give away the resource unless the registered resource producer complies with the requirements of the EOW code relating to the resource.

A person, other than a registered resource producer, must not use a resource in a way, or for a purpose, that does not comply with an EOW code for the resource.

3. Approved by

Signature

Date

Kath Sherman
Director, Waste Operations
Delegate of the Chief Executive
Waste Reduction and Recycling Act 2011

Enquiries:
Waste and End of Waste Assessment
Waste, Development & Southeast Compliance
Ph. **13 QGOV** (13 74 68)

Release

DRAFT
Published by DES Disclosure Log
RTI Act 2009

Page: 19

Number: 1 Author: Text Deleted Subject: Text Date: Indeterminate

"Causing environmental nuisance (section 440) Environmental nuisance is unreasonable interference with an environmental value caused by aerosols, fumes, light, noise, odour, particles or smoke. It may also include an unhealthy, offensive or unsightly condition because of contamination."

Number: 2 Author: Text Deleted Subject: Text Date: Indeterminate

"Illegal dumping can also include abandoned vehicles."

Number: 3 Author: Text Replaced Subject: Text Date: Indeterminate

[Old]: "Approved 05 December 2018 Enquiries: Permit and Licence Management Ph: 13 QGOV (13 74 68) Email: palm@des.qld.gov.au Page 13 of 13"

[New]: "9. Approved by Signature Date Kath Sherman Director, Waste Operations Delegate of the Chief Executive Waste Reduction and Recycling Act 2011 Enquiries: Waste and End of Waste Assessment Waste, Development & Southeast Compliance Ph. 13 QGOV (13 74 68) Page 15 of 15"

Font-size "11.03" changed to "12".

Published on DESI Disclosure Log
RTI Act 2009

Notice

Waste Reduction and Recycling Act 2011

Proposed action for an end of waste code

This notice is issued by the chief executive under s172(2) of the Waste Reduction and Recycling Act 2011 *(WRR Act) to advise a registered resource producer of a proposed action for an end of waste (EOW) code.*

Your reference: ENEW07359717
Our reference: 101/0024168

Re: Proposed action to amend end of waste code ENEW07359717

This Notice is issued to advise you that the department is proposing to amend the End of Waste Code ENEW07359717 for the reuse of coal combustion products as a resource.

The reasons for the proposed action and the facts and circumstances that form the basis for the reasons are provided below.

The EOW code for Coal Combustion Products (ENEW07359717) was developed for the reuse of coal combustion products, and publicly consulted from 2 October to 5 November 2018.

In early 2020, the department received a proposal from Ash Development Association of Australia (ADAA), with supporting information, to amend the current code to allow for the reuse of CCP produced from the co-firing of coal with the biomass – for example, wood chips and/or biosolids – as a fuel source. Following review of the proposal, amendment of the current EOW code is now proposed to allow the reuse of CCP produced from coal co-fired with biomass as a fuel source.

You may make a written submission to the chief executive about the proposed action by **11 November 2020**. Written submissions are to be made to the department by email to RRS.Consultation@des.qld.gov.au.

Published on DES Disclosure Log RTI Act 2009

sch4 Contrary t	21 September 2020
Signature	Date

Kathrin Sherman
Department of Environment and Science
Delegate of the chief executive
Waste Reduction and Recycling Act 2011

Enquiries:
Waste and End of Waste Assessment
Phone: 1300 130 372
Email: palm@des.qld.gov.au

Assessment report

Waste Reduction and Recycling Act 2011

Proposed action to industry to amend, cancel or suspend an EOW code

Use this assessment report when deciding if the chief executive should propose an amendment, cancellation or suspension of an EOW code under s172 of the Waste Reduction and Recycling Act 2011 *(WRR Act). Preparation of this assessment report is evidence that the criteria for deciding if an amendment (s167), cancellation (s171) or suspension (s171) to an EOW code should be proposed to industry under the procedures prescribed in s172 or if an amendment is minor and may be made by notice under s173A.*

PART A: PROPOSED ACTION

EOW code name and number	Coal Combustion Products ENEW07359717 - (101/0024168)
Proposed action	☐ A minor amendment is made to the EOW code ☒ The amendment of the EOW code is proposed to industry ☐ The cancellation of the EOW code is proposed to industry ☐ The suspension of the EOW code is proposed to industry

Provide specific details of action to be the proposed.

The proposed action is to amend the current EOW code for Coal Combustion Products (ENEW07359717). The reasons for the proposed action and the facts and circumstances that form the basis for the reasons are provided below.

The EOW code for Coal Combustion Products (CCP) was developed for the reuse of CCP which includes fly ash, furnace bottom ash or cenosphere(s) from the burning of coal by the coal fired power stations and coal fired boilers. The current EOW code was developed following public consultation process during 2 October - 5 November 2018.

In early 2020, the department received a proposal from Ash Development Association of Australia (ADAA), with supporting information, to amend the current code to allow for the reuse of CCP produced from the co-firing of coal with the biomass – for example, wood chips and/or biosolids – as a fuel source. Following review of the proposal, amendment of the current EOW code is now proposed to allow the reuse of CCP produced from coal co-fired with biomass as a fuel source.

As the current gazetted EOW code for CCP is now two years old, the department has also decided to streamline this EOW code to make it consistent with other recent EOW codes. The proposed amendments are outlined below. Details of the reasons for this proposed action are outlined below in Part C of this assessment report.

Provisions in the current gazetted code	Revisions made in the amended code
1. Explanatory Statement	
This End of Waste (EOW) code for coal combustion products has been issued by the ~~Queensland Government~~ in accordance with section 159 of the *Waste Reduction and Recycling Act 2011* (WRR Act).	This End of Waste (EOW) code for **coal combustion products** has been issued by the **chief executive** in accordance with section 159 of the *Waste Reduction and Recycling Act 2011* (WRR Act).

Published on DES Disclosure Log RTI Act 2009

Release

This EOW code states when ~~a waste~~ become~~s~~ a resource and any relevant requirements and/or conditions for its use. ~~It supports the vision of Queensland's Waste Strategy, which is defined in the WRR Act, 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 the ~~waste~~ is not being used in accordance with the relevant requirements and/or conditions of this EOW code, or another type of permit that allows for its use, it is considered a waste and must be disposed of appropriately at a facility that is lawfully able to receive the waste.	This EOW code states when **coal combustion products** become a **resource** and any relevant requirements and/or conditions for its use. If this **resource** is not being used in accordance with relevant requirements and/or conditions of this EOW code, or another type of permit that allows for its use, it is considered a waste under section 13 of the *Environmental Protection Act 1994* (EP Act) and must be disposed of appropriately at a facility that is **lawfully** able to receive the waste.
2. Guidance	
2.1 Resource use versus Activity ~~An EOW code states when~~ a waste stops being a waste ~~following any necessary processing or treatment~~. ~~A waste~~ becomes a **resource** when it ~~has been determined to~~ meet the requirements of an EOW code. ~~It may be necessary to treat or process the waste prior to and/or in order to meeting those requirements.~~ An Environmental Authority (EA) under the ~~*Environmental Protection Act 1994* (~~EP Act~~)~~ is required where an activity being undertaken triggers the threshold for any environmentally relevant activity (ERA). This means that treating or processing the waste to meet the resource quality criteria under the EOW code may require an EA under the EP Act if the activity meets the threshold for an ERA.	Under section 155 of the WRR Act, a waste stops being a waste and becomes a **resource** when it meets the requirements and conditions of an EOW code. Under section 159 of the WRR Act, an EOW code specifies the circumstances when a waste becomes a resource; how it must be used to be considered a resource; when it is no longer considered a resource but a waste instead; and conditions that must be complied with by resources users and registered resource producers. An Environmental Authority (EA) under the EP Act is required where an activity being undertaken triggers the threshold for any environmentally relevant activity (ERA). This means that treating or processing the waste to meet the resource quality criteria under the EOW code may require an EA under the EP Act if the activity meets the threshold for an ERA
2.2 Resource versus waste A waste that is ~~considered~~ a **resource** under an EOW code is a resource only for the purpose of the uses(s) approved in an EOW code. ~~In the event a resource does not meet the requirements of the EOW code and/or is not used in accordance with the EOW code, it is deemed to be a waste and~~ must be managed in accordance with waste management requirements under the EP Act and the WRR Act, and their subordinate legislation. A resource ~~which is, approved~~ under an EOW code, is deemed to be a waste ~~when~~ it is disposed of at a waste disposal ~~facility~~, or if it is deposited at a place in a way that would, apart from its use approved under an EOW code, constitute a contravention of the general littering provision or the illegal dumping of waste provision under the WRR Act.	A waste that is a **resource** under an EOW code is considered a resource only for the use(s) approved in an EOW code. To be considered a resource under the EOW code, the material used as the resource must meet the requirements of the EOW code and be used in accordance with the conditions of the EOW code, otherwise it is considered a waste and must be managed in accordance with waste management requirements under the EP Act and the WRR Act and their subordinate legislation. A **resource** under an EOW code, is deemed to be a waste again, if it is not used in accordance with the EOW code; if it is disposed of at a waste disposal site; or if it is deposited at a place in a way that would, apart from its use approved under an EOW code, constitute a contravention of the general littering provision (section

Published on DES RTI Disclosure Log

	103) or the illegal dumping of waste provision (section 104) under the WRR Act.
2.3 Failure to comply ~~Any **person** operating under this EOW code must~~ comply with the ~~relevant~~ requirements ~~and conditions of the~~ EOW code. ~~It~~ is an offence ~~to~~ not comply with ~~the relevant requirements and conditions~~, carry~~ing~~ a maximum penalty of 1665 penalty units for an individual and 8325 penalty units for a corporation[1]. Please refer to Appendix A of this EOW code for general obligations for all persons operating under this EOW code, which includes the **resource users.** **Footnote 1:** The value of a penalty unit is stated in the *Penalties and Sentences Regulation 2015* (Qld).	It is an offence under section 158(1) of the WRR Act for a **registered resource producer** to produce the **resource**, or use, sell or give away the **resource** unless they comply with the requirements under an EOW code. Further, it is an offence under section 158(2) of the WRR Act for a **person** to use the **resource** in a way, or for a purpose, that does not comply with an EOW code for the **resource**. These offences carry a maximum penalty of 1,665 penalty units for an individual and 8,325 penalty units for a corporation[1]. Please refer to Appendix A of this EOW code for general obligations for all **persons** operating under this EOW code, which includes the **resource users.** **Footnote 1:** The value of a penalty unit is stated in the *Penalties and Sentences Regulation 2015* (Qld).
4. Waste to which this EOW code applies	
This EOW code is limited to **coal combustion products** sourced from coal fired power stations and coal fired boilers ~~where no other source of fuels is mixed other than petroleum based gas or liquid fuel for ignition support.~~ This ~~waste~~ become~~s~~ a **resource** when the requirements and conditions under this EOW code are met.	This EOW code is limited to **coal combustion products** sourced from coal fired power stations and coal fired boilers. The **coal combustion products** become a **resource** when the requirements and conditions under this EOW code are met.
5. Person to whom this EOW code applies	
5.1 Registered resource producers of the resource 5.1.1 ~~Prior to operating under this EOW code, the producer of the **resource** must register with the **chief executive** by giving a notice in the approved form[1] that the **person** intends to become a **registered resource producer** for this EOW code.~~ 5.1.2 A registered resource producer for this EOW code must comply with the stated registered resource producer requirements.	The department has since decided that 5.1.1 needed to be a specified Requirement so that it would be enforceable. As such 5.1.1 has become Requirement 6.1 below, and 5.1.2 has become the new 5.1.1. **Requirement 6.1** Prior to operating under this EOW code, the producer of the **resource** must register with the **chief executive** by giving a notice in the approved form[3] to become a **registered resource producer** for this EOW code. **Footnote 3:** The approved form, *Registered Resource Producer for an EOW code,* is available on the Queensland Government website at www.qld.gov.au, using the publication number (ESR/2018/4082) as a search term. 5.1.1 A **registered resource producer** for this EOW code must comply with the stated registered resource producer requirements in Section 6 – Registered Resource Producer Requirements.

[1] The approved form, *Registered Resource Producer for an EOW code,* is available on the **Queensland Government** website at www.des.qld.gov.au, and can be searched using the term ESR/2018/4082

Published on DES Disclosure Log RTI Act 2009

6. Registered Resource Producer Requirements	
New standard Requirement.	**Requirement 6.2** The approved **resource** is **coal combustion products** which complies with *Requirement (6.3)* of this EOW code.
Requirement 6.1 The **registered resource producer** must not use, sell or give away the **resource** ~~unless it meets the criteria in *Table 1 – Resource quality criteria* for the approved use in accordance with this EOW code~~.	**Requirement 6.3** The **registered resource producer** must not use, sell or give away the **resource** under this EOW code unless the **resource** complies with all of the following criteria and quality characteristics: a) the **resource** does not exceed the quality criteria stated in *Table 1: Resource quality criteria*; and b) where the **biomass** used as additional fuel source includes **biosolids** containing per and poly-fluoroalkyl substances (PFAS) contamination, the **resource** has been combusted at higher than 1100°C for at least 2 seconds.
Table 1 – Resource quality criteria Refer Appendix A for a copy of the original Table 1.	Refer Appendix B for a copy of the amended Table 1 with changes shown.
Requirement 6.2 In addition to meeting the criteria in *Table 1 – Resource quality criteria*, the resource must not have any properties nor contain any other **contaminants** at concentrations which may cause **environmental harm** when used in accordance with this EOW code.	Deleted. This Requirement is covered by the general environmental duty (GED) requirement under s319 of the EP Act.
Requirement 6.3 The **registered resource producer** must ~~conduct monitoring~~ of the **resource** quality ~~to determine compliance with~~ *Table 1 - Resource quality criteria* and at a minimum of the following frequency-: a) annually, where statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations; otherwise, b) every six months.	**Requirement 6.4** The **registered resource producer** must sample, measure and record the composition of the **resource** for the quality characteristics in *Table 1 - Resource quality criteria* at a minimum of the following frequency: a) annually, where statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations; otherwise, b) every six months.
Requirement 6.4 Where the composition of the **resource** has changed or is likely to change, additional monitoring must be conducted which is sufficient to detect and characterise the extent of any change, until such time that the composition is no longer likely to change and that results demonstrate that the material is compliant with *Table 1 – Resource quality*	Deleted. This Requirement is no longer used due to Compliance feedback that it is unenforceable.

Published on DESI Disclosure Log RTI Act 2009

criteria before it is used as a resource under this EOW code.	
Requirement 6.5 Any determination of the suitability or characterisation of the **resource** (including ongoing sampling) must be made by an **appropriately qualified person**.	Deleted. This Requirement is no longer used due to Compliance feedback that it is unenforceable.
New Requirement pertaining to the management of PFAS contamination.	**Requirement 6.5** Where the **biomass** used as additional fuel source includes **biosolids** containing PFAS contamination, the **registered resource producer** must sample, measure and record the quality of **resource** for PFAS for at least the following parameters: a) Total Oxidisable Precursor Assay (TOPA) with a minimum: i. C_4-C_{14} perfluoroalkyl carboxylic acids; ii. C_4-C_{10} perfluoroalkyl sulfonic acids; iii. perfluoroalkyl sulphonamides; iv. n:2 flourotelomer sulfonic acids; and b) Total Organic Fluorine Assay (TOFA).
New Requirement pertaining to the management of PFAS contamination.	**Requirement 6.6** When sampling, measuring and recording the quality of **resource** for PFAS in accordance with *Requirement (6.5)*: a) analysis techniques must achieve lowest practicable limits of reporting; b) analysis techniques must achieve maximum extraction of PFAS from samples following Australian Standard Leaching Procedure (ASLP) test, *Australia Standard AS4439*; c) quality assurance measures for TOPA and TOFA must be complied with *Section 19.2 of the PFAS National Environmental Management Plan Version 2.0 – January 2020*, unless superseded by a revised or new version of the document, including checks against PFAS results for corresponding non-oxidised samples; and d) any advice from the **chief executive** concerning improvements in analysis techniques must be implemented.
New standard Requirement	**Requirement 6.7** All sampling and monitoring required under this EOW code must be carried out by an **appropriately qualified person**.
Requirement 6.7	**Requirement 6.9**

Published on DESI Disclosure Log RTI Act 2009

The **registered resource producer** must ~~make~~ the following ~~available~~ to ~~any **person** to whom they provide the **resource** each time the resource is provided for use~~: a) confirmation in writing that the resource being supplied is compliant with ~~the requirements~~ of this EOW code; b) a most recent certificate of analysis for the quality ~~of the resource being supplied for at least the quality criteria~~ in *Table 1 – Resource quality criteria*; and c) **~~S~~afety ~~D~~ata ~~S~~heet** for the resource.	The **registered resource producer** must provide the following to the **resource user** upon establishment of an arrangement to sell or give away the **resource**, and annually thereafter: a) a copy of the EOW code for *Coal Combustion Products (ENEW07359717)*[4]; b) the **registered resource producer's** business name, **ABN** and address; c) confirmation in writing that the **resource** being supplied is compliant with *Requirement (6.3)* of this EOW code; d) a most recent certificate of analysis for the quality characteristics listed in *Table 1: Resource quality criteria*; and e) **safety data sheet** for the **resource**. **Footnote 4:** This can be a physical copy, an electronic copy or a link to the chief executive's website where this EOW code is available.
Requirement 6.8 The **registered resource producer** must keep the following **records** ~~each time~~ the **resource** ~~is provided for use~~: a) origin of the resource; b) date of dispatch of the resource; c) ~~contact details for~~ the **person** receiving the resource; and d) quantity of the resource supplied ~~measured in tonnes~~.	**Requirement 6.10** The **registered resource producer** must keep the following **records** for the **resource** supplied to a **resource user**: a) origin of the **resource** (e.g. address, lot on plan and/or GPS coordinates); b) quantity (in tonnes) of the **resource** supplied; c) quality criteria of the **resource** (including but not limited to the quality characteristics listed in *Table 1: Resource quality criteria*); d) date of dispatch of the **resource**; and e) business name, **ABN** and address of the **person** receiving the **resource**.
Requirement 6.9 ~~The~~ **registered resource producer** must ~~keep **records** of all requirements, including monitoring requirements, under this EOW code~~ for a period ~~of at least~~ five (5) years and provide ~~the records~~ to the **chief executive** upon request ~~and~~ in the format requested ~~within 10 days~~.	**Requirement 6.11** All **records** required to be kept by the **registered resource producer** under this EOW code must be: a) kept by the **registered resource producer** for a period of not less than five (5) years; and b) provided to the **chief executive** upon request, in the format requested and in the time period specified.
New standard Requirement	**Requirement 6.13** Any breach of a requirement of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach.
New standard Requirement	**Requirement 6.14**

Published on DESI Disclosure Log
RTI Act 2009

	Records of any breach of a requirement of this EOW code, including full details of the breach and any subsequent actions taken, must be kept and provided to the **chief executive** upon request, in the format requested and time period specified.
7. Conditions of use	
Condition 7.1 The approved **resource** is **coal combustion products** that comply with ~~the quality criteria listed in *Table 1 - Resource quality criteria* and is used for the purpose stated in *Table 2 – Approved uses of the resource*~~.	The conditions within Table 2 in the original EOW code have been transferred to Conditions 7.1 - 7.4 and 7.6 - 7.9 below, and Table 2 deleted in the amended code. **Condition 7.1** The approved **resource** is **coal combustion products** that comply with *Requirement (6.3)* of this EOW code and is used for the following purposes: a) in bound applications in accordance with *Condition (7.2)*; b) in unbound applications in accordance with *Conditions (7.3)* and *(7.4)*; c) as a feedstock in the manufacture of **soil conditioner** in accordance with *Conditions (7.5), (7.6)* and *(7.7)*; d) as a feedstock in the manufacture of **soil product** in accordance with *Conditions (7.5), (7.6)* and *(7.8)*; and e) in direct land application in accordance with *Conditions (7.5), (7.6)* and *(7.9)*. **Condition 7.2** The **resource** used in bound applications 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[5] for that product. Final products for the purpose of this EOW code are limited to: a) cementitious mixes; b) cement products; c) concrete products; d) asphalt; e) binder for road stabilisation pavements; f) rigid and composite pavements structures; g) ceramic products; h) insulators; i) varnishes, plastics, ceramics, ultra-light concrete and metal alloys; j) paints, coatings and adhesives; k) geopolymers; and

Published on DESI Disclosure Log
RTI Act 2009

l) rubbers.

Footnote 5: In the absence of Australian Standards for the product, it is required that the final product meets any other appropriate industry standards (e.g. Registered Professional Engineer of Queensland certified technical specifications).

Condition 7.3

Use of the **resource** in unbound applications is limited to the below applications on **standard areas**:

a) pipe bedding materials;

b) sub-surface drainage;

c) road pavement, base, sub-base and subgrade structures;

d) select layers which act as working platforms at the top of earthworks; and

e) **engineered construction works**[6].

Footnote 6: Use of the resource at a **facility** as fill material must be carried out in accordance with the requirements of an environmental authority that authorises Environmentally Relevant Activity (ERA) 60 as prescribed under Schedule 2 of the Environmental Protection Regulation 2019.

Condition 7.4

Resource users undertaking an unbound application must not use the resource:

a) below the groundwater table;

b) within 50m of a water supply bore; and

c) if the **site of use** has pH greater than 8.

Condition 7.6

Where the **resource** is generated from the use of **biosolids** containing PFAS contamination, the **resource** must not exceed the quality criteria stated in *Table 2: PFAS limits* for the use in manufacturing soil conditioner, soil product and/or in land application.

Refer Appendix C for *Table 2: PFAS limits*.

Condition 7.7

The **resource** must only be used to manufacture **soil conditioner** that meets the requirements of **AS 4454**.

Condition 7.8

The **resource** must only be used to manufacture **soil product** that meets the requirements of **AS 4419**.

Condition 7.9

Resource users undertaking direct land application of the resource must only do so in naturally acidic soils:

Published on DESI Disclosure Log
RTI Act 2009

	a) to correct the identified agronomic deficiency in land to which it is applied; and b) where the final soil pH does not exceed 8 pH unit after application of the resource.
Table 2 – Approved uses of the resource Refer Appendix D.	Deleted. This table was deleted and the contents separated out into individual conditions, Conditions 7.1 - 7.4 and 7.6 - 7.9 above. This separation improves clarity of the code, allowing for greater ease of understanding of the user obligations as well as supporting effective compliance by the department.
Condition 7.2 ~~For each **load** of~~ the **resource** received, the **resource user** ~~must keep the following **records** for a minimum of~~ five (5) years and ~~must~~ provide to the **chief executive** upon request and in the format requested ~~by the date requested~~: a) quantity of the resource; b) date ~~of receipt~~; c) name and address of the ~~**person**~~ who supplied the resource; and d) ~~name and address of the resource user at the destination of resource~~.	Condition 7.2 has been split into two separate conditions to allow for more effective compliance. **Condition 7.10** The **resource user** must **record** the following information for the **resource** received by the **resource user** under this EOW code: a) business name, **ABN** and address of the **registered resource producer** who supplied the **resource**; b) date the **resource user** received the **resource**; c) quantity (in tonnes) of the **resource** received by the **resource user**; and d) **site of use** of **resource** (e.g. street address, lot on plan and/or GPS coordinates). **Condition 7.11** All **records** required to be kept by the **resource user** under the conditions of this EOW code must be: a) kept by the **resource user** for a period of not less than five (5) years; and b) provided to the **chief executive** upon request, in the format requested and time period specified.
Condition 7.3 **Resource users** undertaking an unbound application must not use the resource: a) below the groundwater table; b) within 50m of a water supply bore; and c) in areas with pH greater than 8.	This Condition was relocated as Condition 7.4 above, allowing all use-related conditions to be together.
Condition 7.4 **Resource users** manufacturing the soil ameliorant or soil product may only mix, blend, or otherwise incorporate the **resource** into a material to be used as a **soil ameliorant** where the material to be provided complies with the **AS4454 AS4419** including monitoring and keeping records of product quality to demonstrate compliance with the relevant Australian Standard.	This Condition has been split into two separate conditions to allow for easier, more effective compliance - Conditions 7.7 and 7.8 above – and have been relocated to allow all use-related conditions to be together.

Published on DESI Disclosure Log
RTI Act 2009

Condition 7.5 ~~**Resource users** undertaking the~~ manufactur~~ing~~ of ~~the~~ soil ~~ameliorant or~~ soil product or ~~applying resource~~ direct~~ly to~~ land ~~under this EOW code~~ must notify the **chief executive** ~~of their name, address, contact information and details of intended resource usage, in writing using the~~ approved form ~~no less than~~ 10 ~~business~~ days prior to using the resource.	**Condition 7.5** A **person** who intends to use the **resource** in the manufacture of **soil conditioner**, **soil product** and/or in direct land application must notify the **chief executive** by giving a notice in the approved form[1] at least 10 days prior to the commencement of using the **resource.**
Condition 7.6 **Resource users** undertaking direct land application of the resource must only do so in naturally acidic soils: a) to correct the identified agronomic deficiency in land to which it is applied; and b) where the final soil pH does not exceed 8 pH unit after application of the resource.	This Condition was relocated as Condition 7.9 above, allowing all use-related conditions to be together. New condition 7.6 has been inserted to impose PFAS limits on the coal combustion products for use in soil conditioner, soil product and in direct land application. Refer Appendix B for a copy of the Table 2 – PFAS limits.
Condition 7.7 Any breach of a condition of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach. **Records,** including full details of the breach and any subsequent actions taken, must be kept and provided to the chief executive upon request.	Condition 7.7 has been split into two separate conditions to allow for easier, more effective compliance. **Condition 7.12** Any breach of a condition of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach. **Condition 7.13** **Records** of any breach of a condition of this EOW code, including full details of the breach and any subsequent actions taken, must be kept and provided to the **chief executive** upon request, in the format requested and time period requested.
8. Definitions	
New definition to accommodate amendments to Requirement 6.9, 6.10 and Condition 7.10.	**'ABN'** means Australian Business Number which is a unique 11 digit number issued by the Australian Business Register and identifies a business in Australia.
New definition to accommodate amendments to Requirements 6.3 and 6.5, and the definition for 'coal combustion products'.	**'biomass'** means plant or animal material, such as, wood chips and/or **biosolids**.
New definition to accommodate amendments to Requirements 6.3 and 6.5, Conditions 7.6, and the definition for 'coal combustion products'.	**'biosolids'** means treated tank sludges and residues from a **sewage treatment plant** including sedimentation tank and clarifier sludges, aerobically and anaerobically digested sludge and cake products from those sewage treatment plants.
'coal combustion products' means **fly ash**, **furnace bottom ash** or **cenosphere(s)** resulting from the burning of coal within coal fired power stations and coal fired boilers where no other source of fuel is mixed other than petroleum based gas or liquid fuel for ignition support.	**'coal combustion products'** means **fly ash**, **furnace bottom ash** or **cenosphere(s)** resulting from the burning of coal within coal fired power stations and coal fired boilers where at least 90% of the fuel source is coal and up to 10% of the fuel source can be **biomass** material (e.g. wood chip, **biosolids**), and where no other source of fuel is mixed other than petroleum based gas or liquid fuel for ignition support.

Published on DESI Disclosure Log
RTI Act 2009

New definition to accommodate amendments to Condition 7.3.	**'engineered construction works'** means: a) where the **resource user** uses the **resource** in accordance with an applicable prescribed engineering standard; and/or b) engineer designed civil applications that have been certified by a Registered Professional Engineer of Queensland (RPEQ) as suitable for its intended purpose.
New definition to accommodate amendments to Condition 7.3.	**'facility'** means a naturally occurring or constructed hollow, pit or void (e.g. a gully, mining shaft or quarry).
'resource(s)' means ~~**fly ash**, **furnace bottom ash** or **cenosphere(s)** produced from the combustion of coal, at coal fired power stations and coal fired boilers,~~ that meet ~~the resource quality criteria in *Table 1 – Resource quality criteria* of this EOW code, and does not contain contaminants other than what is listed in *Table 1 – Resource quality criteria*~~ .	**'resource(s)'** means **coal combustion products** that meet the criteria and quality characteristics in *Requirement (6.3)* of this EOW code.
'resource user(s) means a **person** who uses the **resource** for the use approved under this EOW code and in such a manner which does not cause any **environmental harm**, and includes the producer who uses the resource.	**'resource user(s)** means a **person** who uses the **resource** for the use approved under this EOW code and in such a manner which does not cause any **environmental harm**, and includes the producer who uses the resource. Where the **resource user** uses the **resource** in the manufacture of soil conditioner, soil product or in direct land application, notification must be made in the approved form in accordance with *Condition (7.5)* of this EOW code.
New definition to accommodate amendments to Condition 7.4 and 7.10.	**'site of use'** means the relevant location(s) where the **resource user** uses the **resource** in accordance with this EOW code.
'soil ~~ameliorant~~' means a substance added to soil to improve the growing conditions for plant roots by providing nutritional requirements.	**'soil conditioner'** means a substance added to soil to improve the growing conditions for plant roots by providing nutritional requirements. *Justification*: AS4454 and AS4419 do not refer to 'soil ameliorant'. As the current code requires compliance with AS4454 and AS4419, this definition has been amended to be consistent with the terminology used in these standards. This relatively minor change will allow the associated conditions to be enforceable.
New definition to accommodate amendments to Conditions 7.1, 7.5, 7.6 and 7.8.	**'soil product'** means general purpose soils, top dressing, topsoil and landscaping mixes manufactured in accordance with **AS4419**.

Published on DESI Disclosure Log RTI Act 2009

PART B: REASONS FOR PROPOSED ACTION - MINOR AMENDMENT

Is the proposed action to make a minor amendment?	☒ No - not applicable go to **PART C** ☐ Yes - provide details below

Minor Amendments (s173A of the WRR Act)

NOTE - Minor amendment means an amendment: (a) to correct a minor or formal error; or (b) to make another change that is not a change of substance and does not adversely affect the interests of a registered resource producer or a person who is likely to receive a resource from a registered resource producer. Minor amendments may be made by notice under s173A of the WRR Act.

Provide details of the minor amendment and the reason(s) why the amendment is minor.

PART C: REASONS FOR PROPOSED ACTION - AMENDMENT OTHER THAN MINOR

Is the proposed action to make an amendment other than a minor amendment?	☐ No - not applicable go to **PART D** ☒ Yes - provide details below

Amendment other than a minor amendment (s167 of the WRR Act)

NOTE: Under s167 the chief executive may amend an EOW code on the chief executive's own initiative. While there is no assessment criteria under s167, the Explanatory Notes for the Environmental Protection and Other Legislation Amendment Bill 2014 provide that s167 applies to all amendments and ensures that the chief executive when amending an EOW code can continue to address matters stated in s163 (matter to be considers in preparing an EOW code). The criteria below are from s163.

Assess the amendment against the following criteria.

WRR Act s163(1)(a) – The objects of the Act.

Polluter and user pays principle (s10 and s11 WRR Act)

The generator and user of the resource will meet any costs associated with the supply and reuse of the material under commercial arrangements. No cost is to be borne by the public.

Proximity principle (s12 WRR Act)

The resource proposed to be used under the EOW code will be made available to users throughout Queensland.

Product stewardship principle (s13 WRR Act)

The coal fired power stations and coal fired boilers generating coal combustion products have responsibility and ownership of the waste until it is sold to or provided to users for reuse under the EOW code. There is a shared responsibility between all persons who are involved in the life cycle of the resource for managing the environmental, social and economic impact of the resource.

WRR Act s163(1)(b) – The proposed use of a particular resource under the end of waste code.

Requirements for the registered resource producer and conditions of use for the resource user have been imposed in the EOW code. In addition to the original resource quality criteria, resource monitoring requirements, record keeping requirements and notification conditions, this amendment has seen the addition of further resource quality criteria, as well as sampling, monitoring and recording requirements relating to PFAS contamination. The user is also now required to undertake sampling and monitoring of PFAS in the end product if they undertake the manufacture of soil conditioners or soil products, and limits have been set in alignment with the current version of the *PFAS National Environmental Management Plan* (NEMP) *Version 2.0 – January 2020* (National Chemicals Working Group of the Heads of EPAs Australia and New Zealand).

Published on DES Disclosure Log
RTI Act 2009

Together, these new requirements and conditions ensure that any potential environmental harm caused by the reuse of the resource will be minimised to the greatest extent possible.

WRR Act s163(1)(c) – Whether the proposed use of a particular resource is likely to cause any serious environmental harm or material environmental harm.

It is not considered likely that serious or material environmental harm or environmental nuisance will be caused by the reuse of biomass as a fuel source in coal-fired power stations and boilers, provided that the requirements and conditions of the EOW code, including the resource quality criteria and PFAS limits, are complied with.

Any coal combustion products that contain potential PFAS contamination, such as biosolids, must be combusted at higher than 1100°C for at least 2 seconds, in addition to meeting the resource quality criteria, in order to be considered a resource and be suitable for reuse for the stated uses. This specification aligns with the latest best practice requirements for PFAS management outlined within the current version of NEMP.

Further, the uses allowable under the EOW code have been adjusted for the increased risk:

- unbound applications have been restricted to lower-risk uses; and
- the uses as soil additives has been changed from 'soil ameliorant' and 'land application', to 'soil conditioner' and 'soil products'

to align with best practice for PFAS management and Australian Standards for the manufacture of these products, including the addition of PFAS limits in the final product. These changes are detailed in Part A above.

Together, these new restrictions, Requirements and Conditions appropriately address the risk of environmental harm posed by the addition of biomass as additional fuel in the generation of coal combustion products.

WRR Act s163(1)(d) - The waste and resource management hierarchy.

Coal combustion products are solid by-products produced from the combustion of coal in power station boilers, and includes fly ash, bottom ash and inert cenospheres.

The EOW code for Coal Combustion Products was originally developed in 2018 on the basis that the only fuel being used within the power stations and boilers was coal (with a small amount of petroleum during start-up).

With the development and movement of technological preferences away from coal and towards renewable sources of energy, ADAA approached the department early in 2020 to have the current code amended to include the reuse of biomass as a fuel source in energy generation.

While biosolids are a renewable source of fuel, they are also a regulated waste under Schedule 9, Part 1 of the Environmental Protection Regulation 2008 (EP Reg):

- Item 56 - sewage sludge and residues, including nightsoil and septic tank sludge

In recent years, per- and poly-fluoroalkyl substances (PFAS) emerged as environmental contaminants. These substances are broken down very slowly in the environment. They can persist for a long time and can travel long distances in water and air currents. Research has also shown that biosolids contain significant amounts of PFAS and as such must be managed in accordance with NEMP and with best practice.

In accordance with the waste and resource management hierarchy disposal is the least preferred method of managing the waste. Instead, the proposed reuse of biomass as a fuel under the code will allow reuse of the material, as well as the destruction of PFAS contaminants in biosolids. The leftover ash for coal incineration co-incineration of biosolids can be used in a range of bound and unbound applications, or in soil conditioners and soil products, so long as it meets the Requirements and Conditions of the code. This reuse will not generate any waste as the resource will be used in its entirety.

WRR Act s163(1)(e) – Any other matter prescribed by regulation.

There are currently no other matters prescribed by regulation.

Published on DES Disclosure Log
RTI Act 2009

WRR Act s163(2) – Any other matter that the chief executive considers to be relevant
The department considers that the resource authorised for reuse under the EOW code is of high quality and where the resource is used according to the conditions of the draft EOW code for coal combustion products, environmental nuisance is unlikely to occur. Also, in addition to any environmental authority conditions which may be applicable to coal combustion product generators and users, the general environmental duty provision of the EP Act would also apply. The department considers that a demand exists for the development of renewable energy sources as well as the destruction of a prevalent environmental contaminant based on discussions held with industry in 2020.

PART D: REASONS FOR PROPOSED ACTION - CANCELLATION OR SUSPENSION

Is the proposed action the cancellation or suspension of the EOW code?	☒ No - not applicable go to **PART E** ☐ Yes (Cancellation)- provide details below ☐ Yes (Suspension)- provide details below

Cancellation or suspension of an EOW code (s171 of the WRR Act)

NOTE: This provision enables cancellation or suspension of an EOW code as there may be an event which occurs following the making of the EOW code that means that the EOW code is redundant or results in undesirable impacts.

Provide details of the reason(s) for the proposed action.

- ☐ There is no longer a use for a particular resource under the code.
- ☐ The end of waste code was made on the basis of a miscalculation:
  - of the characteristics of the resource; and
  - the potential of the resource to cause serious environmental harm, or material environmental harm, because of those characteristics.
- ☐ The use of particular waste or a particular resource is unlawful.
- ☐ It is necessary or desirable to do so having regard to the objects of the Act. *(See s3, s4 and s5 of the WRR Act - includes the waste and resource management hierarchy; polluter pays principle; user pays principle; proximity principle; product stewardship principle)*

Details of the facts and circumstances that form the basis for the reason(s) for the proposed action.

PART E: RECOMMENDATION

Provide details of the recommended action to be taken.
It is recommended that the department proposes to industry the action to amend the EOW code for Coal Combustion Products to allow the reuse of biomass as a fuel source.

Published on DESI Disclosure Log
RTI Act 2009

PART D: DECISION

It is recommended that the chief executive:

☒ **proposes** to industry the action to **amend** the EOW code in accordance with the procedure outlined under s172 of the WRR Act.

☐ **does not propose** to industry the action to **<PICK FROM LIST>** the EOW code. Subsequently, no changes are made to the EOW code.

☐ **makes a minor amendment** to the EOW code by publishing a notice of the amendment on the department's website in accordance with s173A of the WRR Act.

Kimberley Marian	Kim Marian	15/09/2020
Assessing Officer	**Signed**	**Date**
Review and endorsement Comments: I approve the recommendation based on the reasons stated in this report.		
Isha Sharma	Isha Sharma	15/09/2020
Team Leader	**Signed**	**Date**
Review and endorsement I endorse the recommendation based on the reasons stated in this report.		
Olga Hawas	sch4 Contrary to pub	*18 September 2020*
A/Manager	**Signed**	**Date**
Approval I approve the recommendation based on the reasons stated in this report.		
Kathrin Sherman	sch4 Contrary	21 September 2020
Delegate	**Signed**	**Date**

Published on DES Disclosure Log 09 FIA

APPENDIX A – Original table imposed in the EOW code for Coal Combustion Products gazetted in 2018

Table 1 – Resource quality criteria

Quality ~~criteria~~	Limits for specific uses *		
	Bound applications	Total Maximum Concentration ~~(mg per kg)~~	
		Unbound applications	Soil ~~ameliorant~~ and land application~~s~~
Arsenic (total)	NS	20	20
Beryllium	NS	NS	60
Boron	NS	100	10**
Cadmium	NS	1	1
Chromium (total)	NS	100	100
Chromium (III)	NS	NS	100
Chromium (VI)	NS	1.5	1
Cobalt	NS	100	100
Copper	NS	100	100
Lead	NS	50	50
Mercury	NS	1	1
Molybdenum	NS	NS	10
Nickel	NS	60	60
Selenium	NS	10	5
Zinc	NS	200	200
Electrical conductivity	NS	NS	10,000(uS/cm)
pH	NS	5 – 12.5 (pH units)	5 – 12.5 (pH units)

NS = Not specified (monitoring of each element is still required).

* measured using **reference test methods**

** measured using hot $CaCl_2$ method

Published on DESI Disclosure Log RTI Act 2009

APPENDIX B – Amended table to support current 2020 proposal for biomass derived coal combustion products

Table 1 – Resource quality criteria

Quality characteristics	Limits for specific uses *		
	Bound applications	Total Maximum Concentration (mg/kg dry weight unless otherwise specified)	
		Unbound applications	Soil conditioner, soil product and direct land application
Arsenic (total)	NS	20	20
Beryllium	NS	NS	60
Boron	NS	100	10**
Cadmium	NS	1	1
Chromium (total)	NS	100	100
Chromium (III)	NS	NS	100
Chromium (VI)	NS	1.5	1
Cobalt	NS	100	100
Copper	NS	100	100
Lead	NS	50	50
Mercury	NS	1	1
Molybdenum	NS	NS	10
Nickel	NS	60	60
Selenium	NS	10	5
Zinc	NS	200	200
Electrical conductivity	NS	NS	10,000(uS/cm)
pH	NS	5 – 12.5 (pH units)	5 – 12.5 (pH units)
Sum of PFOS and PFHxS***	1	0.01	Refer to ***Table 2 – PFAS limits***
PFOA***	10	0.1	Refer to ***Table 2 – PFAS limits***

NS = Not specified (monitoring of each element is still required).

* measured using **reference test methods**

** measured using hot $CaCl_2$ method

*** analysis only required if the resource is resulting from combustion of biomass with potential PFAS contaminant (e.g, biosolids)

Published on DESI Disclosure Log RTI Act 2009

APPENDIX C – New table imposed to manage PFAS contamination of soil conditioner, soil product and in direct land application under amended EOW code

Table 2 – PFAS limits

Media	Contaminant	Limit
Coal combustion products for use in soil conditioner, soil product and in direct land application	PFOS	0.001 mg/kg
	PFOS + PFHxS	0.002 mg/kg
	PFHxS	0.003 mg/kg
	PFOA	0.004 mg/kg
	PFBA, PFPeA, PFHxA	0.001 mg/kg
	Sum C_9 -C_{14} Perflouroalkyl carboxylic acids	0.01 mg/kg
	Perfluoroalkyl sulfonamides	0.001 mg/kg
	N:2 Fluorotelomer Sulfonic acids	0.004 mg/kg

Published on DESI Disclosure Log
RTI Act 2009

APPENDIX D - Original table imposed in the EOW code for Coal Combustion Products gazetted in 2018 with proposed amendments shown

Table 2 - Approved uses of the resource

Purpose	Description of approved use
Bound applications	The resource ~~can 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. Final products for the purpose of this EOW code are limited to: a) cementitious mixes; b) cement products; c) concrete products; d) asphalt; e) binder for road stabilisation pavements; f) rigid and composite pavements structures; g) ceramic products; h) insulators; i) varnishes, plastics, ceramics, ultra-light concrete and metal alloys; j) paints, coatings and adhesives; k) geopolymers; and l) rubbers.
Unbound applications	The resource use is limited to the following applications on **standard areas**: a) pipe bedding materials; b) sub-surface drainage; ~~c) selected backfill for structures;~~ d) road pavement, base, sub-base and subgrade structures; ~~e) structured and engineered fill;~~ f) select layers which act as working platforms at the top of earthworks; and g) ~~fill for reinforced soil structures (including geo-grid applications)~~.
Manufacturing of **soil ~~ameliorant~~** conditioner or soil product	The resource can be used in manufacturing a soil ~~ameliorant~~ conditioner or soil product which meets the relevant Australian Standards for that product.
Land application	The resource can be used in direct land application on naturally acidic or low pH soils to correct the identified agronomic deficiency in land to which it is applied and where the final soil pH does not exceed 8 pH unit after application of the resource.

Published on DESI Disclosure Log RTI Act 2009

Published on DESI Disclosure Log
RTI Act 2009

End of Waste Code

Coal Combustion Products (ENEW07359717)

Waste Reduction and Recycling Act 2011

Releas

Version history

Version	Date	Description of changes
1.0	01 January 2019	Commencement of EOW code
2.0	February 2021	Amendment of EOW code

Prepared by: Waste Assessment, Department of Environment and Science

© State of Queensland, 2021
The Queensland Government supports and encourages the dissemination and exchange of its information. The copyright in this publication is licensed under a Creative Commons Attribution 3.0 Australia (CC BY) licence.

Under this licence you are free, without having to seek our permission, to use this publication in accordance with the licence terms.

You must keep intact the copyright notice and attribute the State of Queensland as the source of the publication.
For more information on this licence, visit http://creativecommons.org/licenses/by/3.0/au/deed.en

If you need to access this document in a language other than English, please call the Translating and Interpreting Service (TIS National) on 131 450 and ask them to telephone Library Services on +61 7 3170 5470.

This publication can be made available in an alternative format (e.g. large print or audiotape) on request for people with vision impairment; phone +61 7 3170 5470 or email <library@des.qld.gov.au>.

February 2021

Published on DESI Disclosure Log
RTI Act 2009

Contents

1. Explanatory Statement....4
2. Guidance....4
2.1 Resource use versus Activity....4
2.2 Resource versus Waste....4
2.3 Failure to comply....4
2.4 Lawfulness of the activity....5
3. Period of this EOW code....5
4. Waste to which this EOW code applies....5
5. Person to whom this EOW code applies....5
5.1 Registered resource producers of the resource....5
5.2 Resource users....5
6. Registered resource producer requirements....6
7. Conditions of use....9
8. Definitions....12
Appendix A —General obligation for all persons....15
9. Approved by....16

Published on DESI Disclosure Log
RTI Act 2009

1. Explanatory Statement

This End of Waste (EOW) code for **coal combustion products** has been issued by the **chief executive** in accordance with section 159 of the *Waste Reduction and Recycling Act 2011* (WRR Act).

This EOW code states when the **coal combustion products** become a **resource** and any relevant requirements and/or conditions for its use. If the **resource** is not being used in accordance with the relevant requirements and/or conditions of this EOW code, or another type of permit that allows for its use, it is considered a waste under section 13 of the *Environmental Protection Act 1994* (EP Act) and must be disposed of appropriately at a facility that is **lawfully** able to receive the waste.

2. Guidance

2.1 Resource use versus Activity

Under section 155 of the WRR Act, a waste stops being a waste and becomes a **resource** when it meets the requirements and conditions of an EOW code. Under section 159 of the WRR Act, an EOW code specifies the circumstances when a waste becomes a resource; how it must be used to be considered a resource; when it is no longer considered a resource but a waste instead; and conditions that must be complied with by resource users and registered resource producers.

An Environmental Authority (EA) under the EP Act is required where an activity being undertaken triggers the threshold for any environmentally relevant activity (ERA). This means that treating or processing the waste to meet the resource quality criteria under the EOW code may require an EA under the EP Act if the activity meets the threshold for an ERA.

2.2 Resource versus Waste

A waste that is a **resource** under an EOW code is considered a **resource** only for the use(s) approved in an EOW code. To be considered a resource under the EOW code, the material used as the resource must meet the requirements of the EOW code and be used in accordance with the conditions of the EOW code, otherwise it is considered a waste and must be managed in accordance with waste management requirements under the EP Act and the WRR Act and their subordinate legislation.

A **resource** under an EOW code, is deemed to be a waste again, if it is not used in accordance with the EOW code; if it is disposed of at a waste disposal site; or if it is deposited at a place in a way that would, apart from its use approved under an EOW code, constitute a contravention of the general littering provision (section 103) or the illegal dumping of waste provision (section 104) under the WRR Act.

2.3 Failure to comply

It is an offence under section 158(1) of the WRR Act for a **registered resource producer** to produce the **resource**, or use, sell or give away the **resource** unless they comply with the requirements under an EOW code. Further, it is an offence under section 158(2) of the WRR Act for a **person** to use the **resource** in a way, or for a purpose, that does not comply with an EOW code for the **resource**. These offences carry a maximum penalty of 1,665 penalty units for an individual and 8,325 penalty units for a corporation[1].

Please refer to Appendix A of this EOW code for general obligations for all **persons** operating under this EOW code, which includes the **resource users**.

[1] The value of a penalty unit is stated in the *Penalties and Sentences Regulation 2015* (Qld).

Published on DES Disclosure Log
RTI Act 2009

2.4 Lawfulness of the activity

The issuing of this EOW code for the use of the **resource** does not warrant or imply the lawfulness of the activity under all legislation, or that approvals necessary under other legislation have or will be approved. It is the responsibility of the **registered resource producer** and **resource user** to identify and obtain all other approvals necessary for the relevant activities.

3. Period of this EOW code

This EOW code takes effect from the day of gazettal of this EOW code and remains in force until it is amended, cancelled or suspended by the **chief executive**[2].

4. Waste to which this EOW code applies

This EOW code is limited to **coal combustion products** sourced from coal fired power stations and coal fired boilers where at least 90% of the fuel source is coal and up to 10% of the fuel source can be **biomass** material (e.g. wood chip, **biosolids**), and where no other source of fuel is mixed other than petroleum based gas or liquid fuel for ignition support. These **coal combustion products** become a **resource** when the requirements and conditions under this EOW code are met.

5. Person to whom this EOW code applies

5.1 Registered resource producers of the resource

5.1.1 A **registered resource producer** for this EOW code must comply with the stated registered resource producer requirements in Section 6 – Registered Resource Producer Requirements.

5.2 Resource users

5.2.1 The **resource user** must only use the **resource** in a way, and for a purpose allowed under this EOW code.

5.2.2 The **resource user** must comply with the stated conditions of use in Section 7 – Conditions of Use.

Published on DES Disclosure Log
RTI Act 2009

[2] If an EOW code is to be amended, cancelled or suspended, the chief executive will provide an opportunity to make written submissions by providing a proposed action notice to the registered resource producers; and publishing the proposed action notice on the chief executive's website.

6. Registered resource producer requirements

Registration under this EOW code	
(6.1)	Prior to operating under this EOW code, the producer of the **resource** must register with the **chief executive** by giving a notice in the approved form[3] to become a **registered resource producer** for this EOW code.
Approved resource	
(6.2)	The approved **resource** is **coal combustion products** which complies with *Requirement (6.3)* of this EOW code.
(6.3)	The **registered resource producer** must not use, sell or give away the **resource** under this EOW code unless the **resource** complies with all of the following criteria and quality characteristics: a) the **resource** does not exceed the quality criteria stated in *Table 1: Resource quality criteria*; and b) where **biomass** used as additional fuel source includes **biosolids** containing per- and poly-fluoroalkyl substances (PFAS) contamination, the **resource** has been combusted at higher than 1100°C for at least 2 seconds.

Table 1 – Resource quality criteria

Quality characteristics	Limits for specific uses *		
	Bound applications	Total Maximum Concentration (mg/kg dry weight unless otherwise specified)	
		Unbound applications	Soil conditioner, soil product and direct land application
Arsenic (total)	NS	20	20
Beryllium	NS	NS	60
Boron	NS	100	10**
Cadmium	NS	1	1
Chromium (total)	NS	100	100
Chromium (III)	NS	NS	100
Chromium (VI)	NS	1.5	1
Cobalt	NS	100	100
Copper	NS	100	100
Lead	NS	50	50
Mercury	NS	1	1
Molybdenum	NS	NS	10
Nickel	NS	60	60
Selenium	NS	10	5

Published on DESI Disclosure Log
RTI Act 2009

[3] The approved form, *Registered Resource Producer for an EOW code,* is available on the chief executive's website.

Zinc	NS	200	200
Electrical conductivity	NS	NS	10(dS/m)
pH	NS	5 – 12.5 (pH units)	5 – 12.5 (pH units)
Sum of PFOS and PFHxS***	0.01	Refer to ***Table 2 – PFAS limits***	0.0002****
PFOA***	0.02	Refer to ***Table 2 – PFAS limits***	0.0002****
Sum of PFAS***	0.1	Refer to ***Table 2 – PFAS limits***	0.0002****

NS = Not specified (monitoring of each element is still required).

* measured using **reference test methods**

** measured using hot $CaCl_2$ method

*** analysis only required if the resource is resulting from combustion of biomass with potential PFAS contaminant (e.g, biosolids)

****or the **limit of reporting** (LOR), whichever is smaller

Resource monitoring	
(6.4)	The **registered resource producer** must sample, measure and record the composition of the **resource** for the quality characteristics in *Table 1 - Resource quality criteria* at a minimum of the following frequency: a) if biomass is used that contains or is reasonably likely to contain PFAS, every six months; b) otherwise, every six months, until statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations over three years, then annually thereafter.
(6.5)	All sampling and monitoring required under this EOW code must be carried out by an **appropriately qualified person**.
(6.6)	All analysis required under this EOW code must be carried out by a laboratory that has **NATA** certification, or an equivalent certification, for such analyses.
Monitoring for PFAS	
(6.7)	Where **biomass** used as additional fuel source includes **biosolids** containing PFAS contamination, the **registered resource producer** must sample, measure and record the quality of **resource** for PFAS for at least Total Oxidisable Precursor Assay (TOPA) with a minimum: a) C_4-C_{14} perfluoroalkyl carboxylic acids; b) C_4-C_{10} perfluoroalkyl sulfonic acids; c) perfluoroalkyl sulphonamides; and d) n:2 flourotelomer sulfonic acids.
(6.8)	When sampling, measuring and recording the quality of **resource** for PFAS in accordance with *Requirement (6.5)*: a) analysis techniques must achieve lowest practicable limits of reporting; b) analysis techniques must achieve maximum extraction of PFAS from samples following

Published on DESI Disclosure Log
RTI Act 2009

	Australian Standard Leaching Procedure (ASLP) test, *Australia Standard AS4439*; c) quality assurance measures for every TOPA measurement must be complied with *Section 19.2 of the PFAS National Environmental Management Plan Version 2.0 – January 2020*, unless superseded by a revised or new version of the document, including checks against PFAS results for corresponding non-oxidised samples; and d) any advice from the **chief executive** concerning improvements in analysis techniques must be implemented.
Information to be provided	
(6.9)	The registered resource producer must make the following available to any **person** to whom they provide the resource each time the resource is provided for use: a) a copy of the EOW code for *Coal Combustion Products (ENEW07359717)*[4]; b) the **registered resource producer's** business name, **ABN** and address; c) confirmation in writing that the **resource** being supplied is compliant with *Requirement (6.3)* of this EOW code; d) a most recent certificate of analysis for the quality characteristics listed in *Table 1: Resource quality criteria*; and e) **safety data sheet** for the **resource**. f) where **biomass** used as additional fuel source includes **biosolids** containing per- and poly-fluoroalkyl substances (PFAS) contamination, a notification indicating the same.
Records	
(6.10)	The registered resource producer must keep the following records each time the resource is provided for use: a) origin of the **resource** (e.g. address, lot on plan and/or GPS coordinates); b) quantity (in tonnes or cubic metres) of the **resource** supplied; c) quality criteria of the **resource**; d) date of dispatch of the **resource**; e) business name, **ABN** and address of the **person** receiving the **resource**; and f) if the **biomass** contains or may contain PFAS, the description of **biomass**, percentage by dry weight in total fuel mass and PFAS analysis results.
(6.11)	All **records** required to be kept by the **registered resource producer** under this EOW code must be: a) kept by the **registered resource producer** for a period of not less than five (5) years; and b) provided to the **chief executive** upon request, in the format requested and time period specified.
Notification of **emergencies**, incidents and breaches	

[4] This can be a physical copy, an electronic copy or a link to the chief executive's website where this EOW code is available.

Published on DES Disclosure Log
RTI Act 2009

(6.12)	Any breach of a requirement of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach[5].
(6.13)	**Records** of any breach of a requirement of this EOW code, including full details of the breach and any subsequent actions taken, must be kept and provided to the **chief executive** upon request, in the format requested and in the time period specified.

7. Conditions of use

Approved uses	
(7.1)	The approved **resource** is **coal combustion products** that comply with *Requirement (6.3)* of this EOW code and is used for the following purposes: a) in bound applications in accordance with *Condition (7.2)*; b) in unbound applications in accordance with *Conditions (7.3)* and *(7.4)*; c) as a feedstock in the manufacture of **soil conditioner** in accordance with *Conditions (7.5), (7.6)* and *(7.7)*; d) as a feedstock in the manufacture of **soil product** in accordance with *Conditions (7.5), (7.6)* and *(7.8)*; and/or e) in direct land application in accordance with *Conditions (7.5), (7.6)* and *(7.9)*.
Resource use in bound applications	
(7.2)	The **resource** used in bound applications 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[6] for that product. Final products for the purpose of this EOW code are limited to: a) asphalt; b) binder for road stabilisation pavements; c) cement products; d) cementitious mixes; e) ceramic products; f) concrete products; g) geopolymers; h) insulators; i) paints, coatings and adhesives; j) rigid and composite pavements structures; k) rubbers; and

Published on DESI Disclosure Log
RTI Act 2009

[5] Reporting can be via the **chief executive's** Pollution Hotline (1300 130 372 – option 2) or via online reporting through the **chief executive's** website.
[6] In the absence of Australian Standards for the product, it is required that the final product meets any other appropriate industry standards (e.g. Registered Professional Engineer of Queensland certified technical specifications).

	l) varnishes, plastics, ceramics, ultra-light concrete and metal alloys.
Resource use in unbound applications	
(7.3)	Use of the **resource** in unbound applications is limited to the below applications on **standard areas**: a) pipe bedding materials; b) sub-surface drainage; c) road pavement, base, sub-base and subgrade structures; d) select layers which act as working platforms at the top of earthworks; and e) **engineered construction works**[7].
(7.4)	**Resource users** undertaking an unbound application must not use the **resource**: a) below the groundwater table; b) within 50m of a water supply bore; c) if the site of use has pH greater than 8; and d) if any resource produced using biomass that contains or is reasonably likely to contain PFAS must not be used in any circumstance that: • involve fill, burial or use less than 2.0 metres above the seasonal maximum groundwater level; • is within 200 metres of any surface water body or wetland area; • is in (or in the vicinity of and able to be transported to): i) areas which can be identified with any of the nine matters of national environmental significance protected under the Environmental Protection Biodiversity Conservation Act 1999 (Commonwealth); and ii) areas of environmental significance as identified in State or local government legislation. • fill, burial or use in any location potentially affected by reasonably foreseeable future rises in groundwater or sea level, or near stormwater drains; and • within 250 metres of any bore used for drinking water, edible crop or fodder irrigation, domestic supply or stock watering.
Resource use in the manufacturing of soil conditioner, soil product and/or in direct land application	
(7.5)	A **person** who intends to use the **resource** in the manufacture of **soil conditioner**, **soil product** and/or in direct land application must notify the **chief executive** by giving a notice in the approved form[8] at least 10 days prior to the commencement of using the **resource**.

Published on DESI Disclosure Log
RTI Act 2009

[7] Use of the coal combustion products at a **facility** as fill material must be carried out in accordance with the requirements of an environmental authority that authorises Environmentally Relevant Activity (ERA) 60 as prescribed under Schedule 2 of the Environmental Protection Regulation 2019. For the purpose of filling a void, the coal combustion product is not considered as a resource.
[8] The approved form, *Resource user for an EOW code notification form* is available on the chief executive's website.

(7.6) Where the **resource** is generated from the use of **biosolids** containing PFAS contamination, the **resource** must not exceed the quality criteria stated in *Table 2: PFAS limits* for the use in manufacturing soil conditioner, soil product and/or in direct land application.

Table 2 – PFAS limits

Media	Contaminant	Limit
Coal combustion products for use in soil conditioner, soil product and in direct land application	PFOS (PFHxS not detected)	0.001 mg/kg
	PFOS + PFHxS	0.002 mg/kg
	PFHxS (PFOS not detected)	0.003 mg/kg
	PFOA	0.004 mg/kg
	PFBA, PFPeA, PFHxA	0.001 mg/kg
	Sum C_9 -C_{14} Perflouroalkyl carboxylic acids	0.01 mg/kg
	Perfluoroalkyl sulfonamides	0.001 mg/kg
	N:2 Fluorotelomer Sulfonic acids	0.004 mg/kg
	Sum of PFAS	0.010 mg/kg

(7.7) The **resource** must only be used to manufacture **soil conditioner** that meets the requirements of **AS 4454**.

(7.8) The **resource** must only be used to manufacture **soil product** that meets the requirements of **AS 4419**.

(7.9) **Resource users** undertaking direct land application of the **resource** must only do so in naturally acidic soils:

a) to correct the identified agronomic deficiency in land to which it is applied; and

b) where the final soil pH does not exceed 8 pH unit after application of the **resource**.

Records

(7.10) The **resource user** must **record** the following information for the **resource** received by the **resource user** under this EOW code:

a) business name, **ABN** and address of the **person** who supplied the **resource**;

b) date of receipt of the **resource**;

c) quantity (in tonnes or cubic metres) of the **resource** received; and

d) business name, **ABN** and address of the **resource user** at the destination of the **resource**.

(7.11) All **records** required to be kept by the **resource user** under the conditions of this EOW code must be:

a) kept by the **resource user** for a period of not less than five (5) years; and

b) provided to the **chief executive** upon request, in the format requested and time period specified.

Notification of **emergencies**, incidents and exceptions

Published on DESI Disclosure Log RTI Act 2009

(7.12)	Any breach of a condition of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach[9].
(7.13)	**Records** of any breach of a condition of this EOW code, including full details of the breach and any subsequent actions taken, must be kept and provided to the **chief executive** upon request, in the format requested and time period specified.

8. Definitions

Words and phrases used throughout this EOW code **in bold** are defined below. Where a definition for a term used in this EOW code is sought and the term is not defined within this EOW code, the definitions provided in the relevant legislation shall be used.

'ABN' means Australian Business Number which is a unique 11-digit number issued by the Australian Business Register and identifies a business in Australia.

'appropriately qualified person' means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

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

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

'biomass' means organic matter used as a source of energy in the combustion process, including dewatered or dehydrated residue from farming, forestry and municipal sewage treatment, such as dried leaves, branches and roots, woodchips, hay, sugarcane bagasse, non-chemical treated timber waste and **biosolids**.

'biosolids' means treated tank sludges and residues from a **sewage treatment plant** including sedimentation tank and clarifier sludges, aerobically and anaerobically digested sludge and cake products from those sewage treatment plants.

'cenosphere(s)' means inert, hollow, essentially thin-walled glass spheres of approximately 10–350 microns having a typical density of 0.4–0.8g/cm^3, comprised largely of silica and alumina and filled with air and/or gasses which are formed from coal combustion ash when in a molten state.

'chief executive' means the Department of Environment and Science or its successor.

'coal combustion products' means **fly ash**, **furnace bottom ash** or **cenosphere(s)** resulting from the burning of coal within coal fired power stations and coal fired boilers where at least 90% of the fuel source is coal and up to 10% of the fuel source can be **biomass** material (e.g. wood chip, **biosolids**), and where no other source of fuel is mixed other than petroleum based gas or liquid fuel for ignition support.

'emergency(ies)' means a situation where either human health or safety is threatened, or serious or material **environmental harm** has been or is likely to be caused; and urgent action is necessary to protect the health or safety of persons, or prevent or minimise the harm, or rehabilitate or restore the environment because of the harm.

'engineered construction works' means:

[9] Reporting can be via the **chief executive's** Pollution Hotline (1300 130 372 – option 2) or via online reporting through the **chief executive's** website.

Published on DESI Disclosure Log RTI Act 2009

a) where the **resource user** uses the **resource** in accordance with an applicable prescribed engineering standard; and/or

b) engineer designed civil applications that have been certified by a Registered Professional Engineer of Queensland (RPEQ) as suitable for its intended purpose.

'environmental harm' means environmental harm as defined in Chapter 1 of the *Environmental Protection Act 1994.*

'facility' means a naturally occurring or constructed hollow, pit or void (e.g. a gully, mining shaft or quarry).

'fly ash' means solid material extracted from the flue gasses of a boiler fired primarily with pulverised coal, consisting essentially of the oxides of silicon, aluminium, iron and some calcium of which particle sizes range from less than 1µm (micrometre) to 200µm and are irregular to spherical shape.

'furnace bottom ash' means the agglomerated particles formed at the bottom of the furnace. Furnace bottom ash is typically grey to black in colour, is quite angular, and has a porous surface structure.

'limit of report' means the record of the minimum concentration of a substance in a sample that can be reliably detected by a laboratory that has NATA certification, or an equivalent certification.

'load' means the volume of **resource** put in or on something for conveyance or transportation, carried at one time and to one **site of use**. For example, a truck and trailer carrying the resource is considered as one load as well as multiple bins travelling by rail. Where the resource is transported via conveyor systems, information should be recorded on a daily basis until the transfer ceases.

'NATA' means the National Association of Testing Authorities.

'person(s)' means an individual or a corporation.

'records' include breach notifications, written procedures, analysis results, monitoring reports and monitoring programs required under a requirement or condition of this EOW code.

'reference test methods' means the reference test methods for determining the contaminant and 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].

'registered resource producer(s)' means a **person** who produces the **resource** and has registered with the **chief executive** (in accordance with *Requirement (6.1)*) to use, sell or give away the **resource** to be used under this EOW code.

'resource(s)' means **coal combustion products** that meet the criteria and quality characteristics in *Requirement (6.3)* of this EOW code.

'resource user(s) means a **person** who uses the **resource** for the use approved under this EOW code and in such a manner which does not cause any **environmental harm**, and includes the producer who uses the resource. Where the **resource user** uses the **resource** in the manufacture of soil conditioner, soil product or in direct land application, notification must be made in the approved form in accordance with *Condition (7.5)* of this EOW code.

'safety data sheet' means a document containing data regarding the properties of the **resource** which provides information on handling or working with that substance in a safe manner; and includes information such as physical data toxicity, environmental characteristics, health effects, first aid, reactivity; and storage, disposal, protective equipment and spill handling procedures. The safety data sheet must be compliant with Safe Work Australia's *Model Code of Practice: Preparation of safety data sheets for hazardous chemicals*.

Published on DES Disclosure Log
RTI Act 2009

'site of use' means the relevant location(s) where the **resource user** uses the **resource** in accordance with this EOW code.

'soil conditioner' means a substance added to soil to improve the growing conditions for plant roots by providing nutritional requirements.

'soil product' means general purpose soils, top dressing, topsoil and landscaping mixes manufactured in accordance with **AS 4419**.

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

'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.

- END -

Published on DESI Disclosure Log
RTI Act 2009

Appendix A —General obligation for all persons

This appendix is not intended to provide a comprehensive assessment of all obligations under Queensland law. It provides some general information and persons are encouraged to familiarise themselves with all requirements related to their specific operation.

Responsibilities under the *Environmental Protection Act 1994*

All persons within the State of Queensland must also meet their obligations under the *Environmental Protection Act 1994*, and the regulations made under that Act.

General environmental duty

Section 319 of the *Environmental Protection Act 1994* states that we all have a general environmental duty. This means that we are all responsible for the actions we take that affect the environment. We must not carry out any activity that causes or is likely to cause environmental harm unless we take all reasonable and practicable measures to prevent or minimise the harm. To decide what meets your general environmental duty, you need to consider:

- the nature of the harm or potential harm
- the sensitivity of the receiving environment
- the current state of technical knowledge for the activity
- the likelihood of successful application of the different measures to prevent or minimise environmental harm that might be taken
- the financial implications of the different measures as they would relate to the type of activity.

It is not an offence not to comply with the general environmental duty. However, maintaining your general environmental duty is a defence against the following acts:

(a) an act that causes serious or material environmental harm or an environmental nuisance

(b) an act that contravenes a noise standard

(c) a deposit of a contaminant, or release of stormwater run-off, mentioned in section 440ZG.

More information is available on the Department of Environment and Science website www.des.qld.gov.au.

Some relevant offences under the *Environmental Protection Act 1994*

Causing serious or material environmental harm (sections 437–39)

Material environmental harm is when the harm is not trivial or negligible in nature. Serious environmental harm is harm that is irreversible, of a high impact or widespread, or that is caused to an area of high conservation value or special significance. Damages, or costs required to rehabilitate the environment, of over $5000 constitutes material environmental harm and damages, or costs required to rehabilitate the environment, of over $50,000 constitutes serious environmental harm.

Serious or material environmental harm excludes environmental nuisance.

Causing environmental nuisance (section 440)

Environmental nuisance is unreasonable interference with an environmental value caused by aerosols, fumes, light, noise, odour, particles or smoke. It may also include an unhealthy, offensive or unsightly condition because of contamination.

Published on DESI Disclosure Log
RTI Act 2009

Depositing a prescribed water contaminant in waters (section 440ZG)

Prescribed water contaminants include a wide variety of contaminants listed in Schedule 10 of the Environmental Protection Regulation 2019.

It is your responsibility to ensure that prescribed water contaminants are not left in a place where they may or do enter a waterway, the ocean or a stormwater drain. This includes making sure that stormwater falling on or running across your site does not leave the site contaminated. Where stormwater contamination occurs you must ensure that it is treated to remove contaminants. You should also consider where and how you store material used in your processes onsite to reduce the chance of water contamination.

Placing a contaminant where environmental harm or nuisance may be caused (section 443)

A person must not cause or allow a contaminant to be placed in a position where it could reasonably be expected to cause serious or material environmental harm or environmental nuisance.

Some relevant offences under the *Waste Reduction and Recycling Act 2011*

Littering (section 103)

Litter is any domestic or commercial waste and any material a person might reasonably believe is refuse, debris or rubbish. Litter can be almost any material that is disposed of incorrectly. Litter includes cigarette butts and drink bottles dropped on the ground, fast food wrappers thrown out of the car window, poorly secured material from a trailer or grass clippings swept into the gutter. However, litter does not include any gas, dust, smoke or material emitted or produced during, or because of, the normal operations of a building, manufacturing, mining or primary industry.

Illegal dumping of waste (section 104)

Illegal dumping is the dumping of large volumes of litter (200 litres or more) at a place.

Failure to comply with EOW code (section 158)

A registered resource producer for an EOW code must not produce, use, sell or give away the resource unless the registered resource producer complies with the requirements of the EOW code relating to the resource.

A person, other than a registered resource producer, must not use a resource in a way, or for a purpose, that does not comply with an EOW code for the resource.

Published on DESI Disclosure Log
RTI Act 2009

9. Approved by

Signature	Date

Director, Waste Operations
Delegate of the Chief Executive
Waste Reduction and Recycling Act 2011

Enquiries:
Waste and End of Waste Assessment
Waste, Development & Southeast Compliance
Ph. **13 QGOV** (13 74 68)

Assessment report

Waste Reduction and Recycling Act 2011

Decision on proposed action to amend, cancel or suspend an EOW code

Use this assessment report when deciding whether or not to take the proposed action to amend, cancel or suspend an EOW code under s172 of the Waste Reduction and Recycling Act 2011 *(WRR Act). Preparation of this assessment report is evidence that the criteria for deciding whether or not to take the proposed action under s172(5) has been considered.*

Published on DES Disclosure Log
RTI Act 2009

PART A: SUMMARY

EOW code name and number	Coal Combustion Products (ENEW07359717)
Action proposed to industry	☒ The amendment of the EOW code ☐ The cancellation of the EOW code ☐ The suspension of the EOW code
Date *Notice of proposed action* provided to each registered resource producer - s172(2)(a)	30 Sept 2020
Date *Notice of proposed action* published on the departments website - s172(2)(b)	30 Sept 2020
Date the submission period ended for the *Notice of proposed action* - s172(4) Note: The submission period must not end before 28 days after the later of the notice under s172(2)(a) or s172(2)(b)	19 Nov 2020

Provide details of action proposed.

The proposed action is to amend the current EOW code for Coal Combustion Products (ENEW07359717). The reasons for the proposed action and the facts and circumstances that form the basis for the reasons are provided below.

The EOW code for Coal Combustion Products (ENEW07359717) was developed in 2018 for the reuse of fly ash, furnace bottom ash and cenospheres, and publicly consulted from 2 October to 5 November 2018.

In early 2020, the department received a proposal from Ash Development Association of Australia (ADAA) to amend the current code to allow for the reuse of coal combustion products (CCP) produced from the co-firing of coal with biomass – for example, wood chips and/or biosolids – as a fuel source. Following review of the proposal, amendment of the current EOW code is now proposed to allow the reuse of CCP produced from coal co-fired with biomass within coal fired power stations and coal fired boilers where at least 90% of the fuel source is coal and up to 10% of the fuel source can be biomass material.

The Notice of Proposed Action (NOPA) and the draft amended EOW code were released for public consultation from 30 September to 19 November 2020. The NOPA, the draft amended EOW code, and the Assessment Report supporting the NOPA are available on eDOCS file number (101/0024168).

PART B: CONSIDERATION OF SUBMISSIONS

Attach a document that provides details of all submission received, during the stated period, for the proposed action. The document is to include how the department considered the submissions and any subsequent actions taken.	Appendix A

NOTE: The chief executive must consider all submission made during the stated period for the proposed action - s172(5)(a)

PART C: REQUIRED AMENDMENTS TO THE DRAFT EOW CODE

Provide details below of required amendments to the draft EOW code following: public consultation (PART B).

The publicly consulted draft Amended EOW code for Coal Combustion Products has been amended as below for the finalisation.

Provisions in the public consultation draft	Revisions made in the draft final code
3. Period of this EOW code	
This EOW code takes effect from the day of gazettal of this EOW code and remains in force until it is amended, cancelled or suspended by the **chief executive**[2]. **Footnote 2** If an EOW code is to be amended, cancelled or suspended, the chief executive will provide an opportunity to make written submissions by providing a proposed action notice to the registered resource producers; and publishing the proposed action notice on the chief executive's website.	This EOW code takes effect from the day of gazettal of this EOW code and remains in force until it is amended, cancelled or suspended by the **chief executive**[2]. **Footnote 2** If an EOW code is to be amended, cancelled or suspended, the chief executive will provide an opportunity to make written submissions by providing a proposed action notice to the registered resource producers; and publishing the proposed action notice on the chief executive's website (www.des.qld.gov.au). Justification Website address added to footnote assist people using a hardcopy version of the code.
4. Waste to which this EOW code applies	
This EOW code is limited to **coal combustion products** sourced from coal fired power stations and coal fired boilers. These **coal combustion products** become a **resource** when the requirements and conditions under this EOW code are met.	This EOW code is limited to **coal combustion products** sourced from coal fired power stations and coal fired boilers where at least 90% of the fuel source is coal and up to 10% of the fuel source can be **biomass** material (e.g. wood chip, **biosolids**), and where no other source of fuel is mixed other than petroleum based gas or liquid fuel for ignition support. These **coal combustion products** become a **resource** when the requirements and conditions under this EOW code are met. Justification Amended following feedback that the full explanation was only found in the definitions section and that adding it in Section 4 would clarify about the resource upfront.

Published on DESI Disclosure Log
RTI Act 2009

6.0 Registered Resource Producer Requirements	
Requirement 6.1 Prior to operating under this EOW code, the producer of the **resource** must register with the **chief executive** by giving a notice in the approved form[3] to become a **registered resource producer** for this EOW code. **Footnote 3** The approved form, *Registered Resource Producer for an EOW code,* is available on the chief executive's website.	**Requirement 6.1** Prior to operating under this EOW code, the producer of the **resource** must register with the **chief executive** by giving a notice in the approved form[3] to become a **registered resource producer** for this EOW code. **Footnote 3** The approved form, *Registered Resource Producer for an EOW code,* is available on the chief executive's website (www.des.qld.gov.au). Justification Website address added to footnote assist people using a hardcopy version of the code.
Table 1 – Resource quality criteria	
Refer Appendix B for Table 1 including amendments made.	Refer Appendix B for Table 1 including amendments made. Justification Amended following feedback from Technical Support and industry. Refer also Justification section regarding Condition 7.6 below.
Requirement 6.4 The **registered resource producer** must sample, measure and record the composition of the **resource** for the quality characteristics in *Table 1 - Resource quality criteria* at a minimum of the following frequency: a) annually, where statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations; otherwise, b) every six months.	**Requirement 6.4** The **registered resource producer** must sample, measure and record the composition of the **resource** for the quality characteristics in *Table 1 - Resource quality criteria* at a minimum of the following frequency: a) if **biomass** is used that contains or is reasonably likely to contain PFAS, every six months; b) otherwise, every six months, until statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations over three years, then annually thereafter. Justification

Published on DESI Disclosure Log
RTI Act 2009

	Following feedback from a submitter, points a) and b) were swapped and reworded for clarity.
Requirement 6.5 Where **biomass** used as additional fuel source includes **biosolids** containing PFAS contamination, the **registered resource producer** must sample, measure and record the quality of **resource** for PFAS for at least ~~the following parameters:~~ a) Total Oxidisable Precursor Assay (TOPA) with a minimum: i. C_4-C_{14} perfluoroalkyl carboxylic acids; ii. C_4-C_{10} perfluoroalkyl sulfonic acids; iii. perfluoroalkyl sulphonamides; iv. n:2 flourotelomer sulfonic acids; ~~and~~ ~~b) Total Organic Fluorine Assay (TOFA).~~	**Requirement 6.7** Where **biomass** used as additional fuel source includes **biosolids** containing PFAS contamination, the **registered resource producer** must sample, measure and record the quality of **resource** for PFAS for at least Total Oxidisable Precursor Assay (TOPA) with a minimum: a) C_4-C_{14} perfluoroalkyl carboxylic acids; b) C_4-C_{10} perfluoroalkyl sulfonic acids; c) perfluoroalkyl sulphonamides; and d) n:2 flourotelomer sulfonic acids. Justification Amended following feedback from Technical Support.
Requirement 6.7 All sampling and monitoring required under this EOW code must be carried out by an **appropriately qualified person**. **Requirement 6.8** All analysis required under this EOW code must be carried out by a laboratory that has **NATA** certification, or an equivalent certification, for such analyses.	**Requirement 6.5** All sampling and monitoring required under this EOW code must be carried out by an **appropriately qualified person**. **Requirement 6.6** All analysis required under this EOW code must be carried out by a laboratory that has **NATA** certification, or an equivalent certification, for such analyses. Justification Feedback from submitters suggested that Requirements 6.7 and 6.8 should apply to all sampling and monitoring, not just PFAS sampling and monitoring. Accordingly, Requirements 6.7 and 6.8 were moved from the PFAS sampling and monitoring section to the general sampling and monitoring section, and renumbered accordingly. The Requirements themselves were not altered.
Requirement 6.9 The **registered resource producer** must ~~provide the following to the **resource user** upon establishment of an arrangement to sell or give away the **resource**, and annually thereafter~~:	**Requirement 6.9** The **registered resource producer** must make the following available to any **person** to whom they provide the resource each time the resource is provided for use:

Published on DESI Disclosure Log
RTI Act 2009

a) a copy of the EOW code for *Coal Combustion Products (ENEW07359717)*[4]; b) the **registered resource producer's** business name, **ABN** and address; c) confirmation in writing that the **resource** being supplied is compliant with *Requirement (6.3)* of this EOW code; d) a most recent certificate of analysis for the quality characteristics listed in *Table 1: Resource quality criteria*; ~~and~~ e) **safety data sheet** for the **resource**~~.~~ **Footnote 4** This can be a physical copy, an electronic copy or a link to the chief executive's website where this EOW code is available.	a) a copy of the EOW code for *Coal Combustion Products (ENEW07359717)*[4]; b) the **registered resource producer's** business name, **ABN** and address; c) confirmation in writing that the **resource** being supplied is compliant with *Requirement (6.3)* of this EOW code; d) a most recent certificate of analysis for the quality characteristics listed in *Table 1: Resource quality criteria*; e) **safety data sheet** for the **resource**; and f) where **biomass** used as additional fuel source includes **biosolids** containing per- and poly-fluoroalkyl substances (PFAS) contamination, a notification indicating the same. **Footnote 4** This can be a physical copy, an electronic copy or a link to the chief executive's website (www.des.qld.gov.au) where this EOW code is available. Justification Wording of this requirement was reverted to what is currently in the gazetted code following feedback from industry. f) was added following feedback from Technical Support. Website address added to footnote assist people using a hardcopy version of the code.
Requirement 6.10 The **registered resource producer** must keep the following **records** ~~for the **resource** supplied to a **resource user**~~: a) origin of the **resource** (e.g. address, lot on plan and/or GPS coordinates); b) quantity (in tonnes) of the **resource** supplied; c) quality criteria of the **resource** ~~(including but not limited to the quality characteristics listed in *Table 1: Resource quality criteria*)~~;	**Requirement 6.10** The **registered resource producer** must keep the following **records** each time the resource is provided for use: a) origin of the **resource** (e.g. address, lot on plan and/or GPS coordinates); b) quantity (in tonnes or cubic metres) of the **resource** supplied; c) quality criteria of the **resource**; d) date of dispatch of the **resource**;

Published on DESI Disclosure Log RTI Act 2009

d) date of dispatch of the **resource**; ~~and~~ e) business name, **ABN** and address of the **person** receiving the **resource**.	e) business name, **ABN** and address of the **person** receiving the **resource**; and f) if the **biomass** contains or may contain PFAS, the description of **biomass**, percentage by dry weight in total fuel mass and PFAS analysis results. Justification Wording of this requirement was reverted to what is currently in the gazetted code following feedback from industry. 'or cubic metres' was added following feedback from a submitter. f) was added following feedback from Technical Support.
Requirement 6.11 All **records** required to be kept by the **registered resource producer** under this EOW code must be: a) kept by the **registered resource producer** for a period of not less than five (5) years; and b) provided to the **chief executive** upon request, in the format requested and time period specified.	**Requirement 6.11** All **records** required to be kept by the **registered resource producer** under this EOW code must be: c) kept by the **registered resource producer** for a period of not less than five (5) years; and d) provided to the **chief executive** upon request, in the format requested and in the time period specified. Justification Amended for consistency with Requirement 6.13.
Requirement 6.12 Any breach of a requirement of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach.	**Requirement 6.12** Any breach of a requirement of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach[5]. **Footnote 5** Reporting can be via the **chief executive's** Pollution Hotline (1300 130 372 – option 2) or via online reporting through the **chief executive's** website (www.des.qld.gov.au). Justification Footnote 5 added for clarity.

Published on DESI Disclosure Log RTI Act 2009

7. Conditions of use	
Condition 7.1 The approved **resource** is **coal combustion products** that comply with *Requirement (6.3)* of this EOW code and is used for the following purposes: a) in bound applications in accordance with *Condition (7.2)*; b) in unbound applications in accordance with *Conditions (7.3)* and *(7.4)*; c) as a feedstock in the manufacture of **soil conditioner** in accordance with *Conditions (7.5)~~,~~ ~~(7.6)~~* and *(7.~~7~~)*; d) as a feedstock in the manufacture of **soil product** in accordance with *Conditions (7.5)~~,~~ ~~(7.6)~~* and *(7.~~8~~)*; and e) in direct land application in accordance with *Conditions (7.5)~~, (7.6)~~* and *(7.~~9~~)*.	**Condition 7.1** The approved **resource** is **coal combustion products** that comply with *Requirement (6.3)* of this EOW code and is used for the following purposes: a) in bound applications in accordance with *Condition (7.2)*; b) in unbound applications in accordance with *Conditions (7.3)* and *(7.4)*; c) as a feedstock in the manufacture of **soil conditioner** in accordance with *Conditions (7.5)* and *(7.6)*; d) as a feedstock in the manufacture of **soil product** in accordance with *Conditions (7.5)* and *(7.7)*; and/or e) in direct land application in accordance with *Conditions (7.5)* and *(7.8)*. Justification Omission corrected and condition numbers updated to reflect amendments made.
Condition 7.2 The **resource** used in bound applications 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[1] for that product. Final products for the purpose of this EOW code are limited to: a) cementitious mixes; b) cement products; c) concrete products; d) asphalt;	**Condition 7.2** The **resource** used in bound applications 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[2] for that product. Final products for the purpose of this EOW code are limited to: a) asphalt; b) binder for road stabilisation pavements; c) cement products; d) cementitious mixes;

Published on DESI Disclosure Log
RTI Act 2009

[1] In the absence of Australian Standards for the product, it is required that the final product meets any other appropriate industry standards (e.g. Registered Professional Engineer of Queensland certified technical specifications).
[2] In the absence of Australian Standards for the product, it is required that the final product meets any other appropriate industry standards (e.g. Registered Professional Engineer of Queensland certified technical specifications).

e) binder for road stabilisation pavements; f) rigid and composite pavements structures; g) ceramic products; h) insulators; i) varnishes, plastics, ceramics, ultra-light concrete and metal alloys; j) paints, coatings and adhesives; k) geopolymers; and l) rubbers.	e) ceramic products; f) concrete products; g) geopolymers; h) insulators; i) paints, coatings and adhesives; j) rigid and composite pavements structures; k) rubbers; and l) varnishes, plastics, ceramics, ultra-light concrete and metal alloys. Justification The use options were rearranged into alphabetical order for ease of reference.
Condition 7.3 Use of the **resource** in unbound applications is limited to the below applications on **standard areas**: a) pipe bedding materials; b) sub-surface drainage; c) road pavement, base, sub-base and subgrade structures; d) select layers which act as working platforms at the top of earthworks; and e) **engineered construction works**[6]. **Footnote 6** Use of the ~~resource~~ at a **facility** as fill material must be carried out in accordance with the requirements of an environmental authority that authorises Environmentally Relevant Activity (ERA) 60 as prescribed under Schedule 2 of the Environmental Protection Regulation 2019.	**Condition 7.3** Use of the **resource** in unbound applications is limited to the below applications on **standard areas**: a) pipe bedding materials; b) sub-surface drainage; c) road pavement, base, sub-base and subgrade structures; d) select layers which act as working platforms at the top of earthworks; and e) **engineered construction works**[7]. **Footnote 7** Use of the coal combustion products at a **facility** as fill material must be carried out in accordance with the requirements of an environmental authority that authorises Environmentally Relevant Activity (ERA) 60 as prescribed under Schedule 2 of the Environmental Protection Regulation 2019. For the purpose of filling a void, the coal combustion product is not considered as a resource. Justification

Published on DESI Disclosure Log
RTI Act 2009

	Clarifying that the footnote is relevant to Condition 7.3e following feedback from a submitter.
Condition 7.4 **Resource users** undertaking an unbound application must not use the **resource**: a) below the groundwater table; b) within 50m of a water supply bore; ~~and~~ c) if the **site of use** has pH greater than 8~~.~~	**Condition 7.4** **Resource users** undertaking an unbound application must not use the **resource**: a) below the groundwater table; b) within 50m of a water supply bore; c) if the site of use has pH greater than 8; and d) if the resource is produced using biomass that contains, or is reasonably likely to contain, PFAS, it must not be used in any of the following circumstances: • as fill, burial or use less than 2.0 metres above the seasonal maximum groundwater level; • within 200 metres of any surface water body or wetland area; • in (or in the vicinity of and able to be transported to): i) areas which can be identified with any of the nine matters of national environmental significance protected under the Environmental Protection Biodiversity Conservation Act 1999 (Commonwealth); and ii) areas of environmental significance as identified in State or local government legislation. • as fill, burial or use in any location potentially affected by reasonably foreseeable future rises in groundwater or sea level, or near stormwater drains; and • within 250 metres of any bore used for drinking water, edible crop or fodder irrigation, domestic supply or stock watering. Justification Amended following feedback from Technical Support.

Published on DESI Disclosure Log RTI Act 2009

Condition 7.5 A **person** who intends to use the **resource** in the manufacture of **soil conditioner**, **soil product** and/or in direct land application must notify the **chief executive** by giving a notice in the approved form[8] at least 10 days prior to the commencement of using the **resource**. **Footnote 8** The approved form, *Resource user for an EOW code notification form* is available on the chief executive's website.	**Condition 7.5** A **person** who intends to use the **resource** in the manufacture of **soil conditioner**, **soil product** and/or in direct land application must notify the **chief executive** by giving a notice in the approved form[8] at least 10 days prior to the commencement of using the **resource**. **Footnote 8** The approved form, *Resource user for an EOW code notification form* is available on the chief executive's website (www.des.qld.gov.au). Justification Website address added to footnote assist people using a hardcopy version of the code.
Condition 7.6 Where the **resource** is generated from the use of **biosolids** containing PFAS contamination, the **resource** must not exceed the quality criteria stated in *Table 2: PFAS limits* for the use in manufacturing soil conditioner, soil product and/or in direct land application. **Table 2 – PFAS limits** [refer Appendix C for Table 2]	This Condition and the limits specified in Table 2 have been incorporated into Table 1. Justification Feedback from industry indicated that such limits should be included in the quality criteria specified in the Producer section. Minor amendments were also made to criteria headings following feedback from Technical Support and to maintain consistency with other Requirements and Conditions of the code. The units for EC was also amended to 'dS/m' to align with the relevant Asutralian Standards and maintain consistency with other EOW codes.
Condition 7.10 The **resource user** must **record** the following information for the **resource** received by the **resource user** under this EOW code: a) business name, **ABN** and address of the ~~**registered resource producer**~~ who supplied the **resource**; b) date ~~the **resource user** received~~ the **resource**;	**Condition 7.9** The **resource user** must **record** the following information for the **resource** received by the **resource user** under this EOW code: a) business name, **ABN** and address of the **person** who supplied the **resource**; b) date of receipt of the **resource**; c) quantity (in tonnes or cubic metres) of the **resource** received; and

Published on DESI Disclosure Log
RTI Act 2009

c) quantity (in tonnes) of the **resource** received ~~by the **resource user**~~; and ~~d) **site of use** of **resource** (e.g. street address, lot on plan and/or GPS coordinates).~~	d) business name, **ABN** and address of the **resource user** at the destination of the **resource**. Justification Reference to the various parties involved was amended following feedback from industry. The terms used have been reverted to what is currently in the gazetted code. 'or cubic metres' was added following feedback from a submitter and to maintain consistency with Requirement 6.10. d) was amended following feedback/concern regarding the term 'site of use'. As such, this subsection was reverted to the wording used in the current code.
Requirement 7.12 Any breach of a condition of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach.	**Requirement 7.11** Any breach of a requirement of this EOW code must be reported to the **chief executive** within 24 hours of becoming aware of the breach[9]. **Footnote 9** Reporting can be via the **chief executive's** Pollution Hotline (1300 130 372 – option 2) or via online reporting through the **chief executive's** website (www.des.qld.gov.au). Justification Footnote 9 added for clarity and consistency.
Definitions	
'biomass' means ~~plant or animal material, such as,~~ wood chips ~~and/or~~ **biosolids**.	**'biomass'** means organic matter used as a source of energy in the combustion process, including dewatered or dehydrated residue from farming, forestry and municipal sewage treatment, such as dried leaves, branches and roots, woodchips, hay, sugarcane bagasse, non-chemical treated timber waste and **biosolids**. Justification Amended to provide more clarity following feedback from submitters.

Published on DESI Disclosure Log
RTI Act 2009

PART D: CONSIDERATIONS FOR PROPOSED ACTION TO AMEND

Is the proposed action to amend an EOW code?	☐ No - not applicable go to **PART E** ☒ Yes - provide details below
Assess the amendment against the following criteria.	
The effects of the amendment on the use of the resource - s172(5)(b)(i).	
The amendment is expected to have a positive impact as it will allow for a reduction in the amount of coal burnt during power-generation, while allowing the reuse of a waste (woodchips, biosolids, etc), and also not compromising the quality of the resultant fly ash. In turn, this allows this ash to be reused in a range of uses, assisting in the diversion of this potential resource from landfill. There have been concerns raised by submitters about the quality of the flyash compromising the stability of the resulting concrete etc. However, the ADAA have provided information stating that they have "funded studies into biomass, coupled with numerous industry and University reports which demonstrate up to 20% by volume has no negative effects on the resulting fly ash. This is also supported by the international literature. Currently two (2) Coal Fired Power Stations (CFPS) have been burning biomass 'intermittently' for 15+ years in NSW without negative impacts to Users of these fly ashes." ADAA also state that they are in the process of having the Australian Standard updated to allow for co-firing of coal with biomass. These amendments are therefore not expected to have any detrimental effect on current and ongoing use of the resource as the amendments were made based on a submission received from a stakeholder and further consultation was undertaken with other stakeholders within the industry.	
Whether the effects of the amendment on the use of a particular resource is likely to cause any serious environmental harm or material environmental harm - s172(5)(b)(ii).	
It is not considered likely that the amendment of the EOW code for Coal Combustion Products will cause serious or material environmental harm. The risks involved in the processing and use of coal combustion products are known and familiar to the industry that has been reusing coal combustion products for the same uses for a number of years. The only additional risk is the potential PFAS contamination caused by co-firing biomass with coal. Nonetheless, information supplied by the applicant and our internal Technical Support team finds this risk to be manageable. The requirements and conditions, including additional resource quality criteria, sampling, monitoring and reporting requirements, of the amended EOW code appropriately address this additional risk of environmental harm.	
The waste and resource management hierarchy - s172(5)(b)(iii).	
The waste and resource management hierarchy was considered during the assessment of this amendment application. This amendment will allow for a reduction in the amount of virgin coal burnt during power-generation, while allowing for the reuse of a waste (woodchips, biosolids, etc), while also not compromising the quality of the resultant fly ash. In turn, this ash will be reused in a range of uses, assisting in the diversion of this potential resource from landfill. The department is therefore satisfied that the co-firing of biomass with coal meets the highest possible rank of the waste and resource management hierarchy.	
Any advice, information or comment provided by any technical advisory panel - s172(5)(b)(iv).	
A technical advisory panel was not engaged for this application.	

PART D: CONSIDERATIONS OF OTHER MATTERS

Published on DESI Disclosure Log
RTI Act 2009

Any other matter prescribed by regulation - s172(5)(c).
There are currently no other matters prescribed by regulation.
Any advice, comment or information about the proposed action sort from any other entity - s173H.
Technical advice was sought from the Waste and End of Waste Assessment team's Technical Expert during the assessment of this application, and also from the department's Technical Support team's PFAS expert. Feedback was also sought from industry during the finalisation of the amended code.

PART E: RECOMMENDATION

Provide details of the recommended action to be taken.
It is recommended that the chief executive makes the decision to approve this amendment.

PART F: HUMAN RIGHTS IMPACT ASSESSMENT

Proper consideration is required to determine the compatibility of any act, decision or statutory provision with human rights under the *Human Rights Act 2019* (HR Act). An act, decision or statutory provision will be compatible with human rights if it does not limit the human right, or if it limits the human right only to the extent that is reasonable and demonstrably justifiable. This involves a weighing up of a range of factors which are set out in section 13 of the HR Act. Please refer to *Human Rights Act assessment guidance information sheet* (Policy Register #ESR/2019/4970), and Human rights in decision making, *a guide for Queensland Government staff* for guidance.

Consider the action or decision you are proposing and ask:

1. Which rights are relevant to the decision or act proposed to be taken?
   Write here what human rights have been identified as relevant.
2. Will your action or decision limit or restrict any of the rights you've identified? No. There are no implications for human rights under the Human Rights Act 2019.

If you answered NO to Q.2, please insert the statement '*There are no implications for human rights under the Human Rights Act 2019*'.

If you answered YES to Q.2, provide further details;

INSERT REASONS FOR ASSESSMENT DECISION: What is the the nature of the human right/s affected by the decision? Are the limitation of rights reasonable and justifiable?: Is it necessary? Explain the relationship between the limitation and the purpose (whether the limitation on the right/s helps achieve the purpose). Consider whether there are any less restrictive and reasonably available alternatives

Published on DES Disclosure Log
RTI Act 2009

PART G: DECISION

It is recommended that the chief executive:

☒ Takes the proposed action to amend the EOW code under s172(5) of the WRR Act.
Effective date: <<Date>>

☐ Does not take the proposed action to <PICK FROM LIST> the EOW code under s172(5) of the WRR Act

Kimberley Marian	Kimberley Marian	18/02/2021
Assessing Officer	**Signed**	**Date**
Review and endorsement Comments: I approve the recommendation based on the reasons stated in this report.		
Isha Sharma	Isha Sharma	24/02/2021
Team Leader	**Signed**	**Date**
Approval I approve the recommendation based on the reasons stated in this report.		
Scott Blanchard	sch4 Contrary to public interest	1 March 2021
Manager	**Signed**	**Date**
Approval I approve the recommendation based on the reasons stated in this report.		
Kathrin Sherman	sch4 Contrary to	**8 March 2021**
Delegate	**Signed**	**Date**

Published DE Act 2019 Isclosure Log

Appendix A

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
1.	Dept Transport and Main Roads		Quality of fly ash	• Specifically, the proposed amendment to the End of Waste Code for Coal Combustion Products could result in changes to both the chemical composition and physical properties of fly ash generated from coal fired power stations or coal fired furnaces. While fly ash may be considered by some as a waste or by-product from coal combustion, it has been (for around 30 years) and continues to be a critical component required for the production of cement and concrete throughout Queensland, and is valued both nationally and internationally as a key constituent of concrete. • Use of fly ash in concrete also significantly improves concrete durability with respect to carbonation and chloride ingress. It should also be noted that due to the nature of the coal burnt in Queensland that the quality of the fly ash currently available in Queensland is ranked very high on the International stage. • Without fly ash that meets existing technical specifications, concrete production in Queensland and the other Eastern States of Australia, that all extensively utilise the fly ash from Queensland, will be difficult, significantly more expensive and, in some locations, potentially impossible. • Fly ash is also used extensively by TMR in pavement stabilisation. Up to 70% of the cement used in pavement stabilisation can be replaced with fly ash, leading to significant construction, economic and sustainability benefits. Without the availability of suitable fly ash, many stabilised pavements would not be viable which would lead to an increase in the reliance on thick asphalt and foamed bitumen pavements, which will ultimately cost more to construct. • It should also be noted that with the proposed amendment, concrete grade fly ash would not comply with the requirements of *AS3582.1 Supplementary Cementitious Materials Part 1 Fly Ash* which would lead to further concrete industry issues and disruption. • TMR cannot support the current EoW code for Coal Combustion Products without significant further research and investigation to ensure the use of fly ash in concrete is not adversely affected.	The department considers that the concerns raised by construction/cement industry in regards to the impact of biomass use on the quality of fly ash is an issue which needs to be discussed separately between the flyash and cement industries. In developing an EOW code, the department assesses whether or not the proposed resource causes environmental harm and whether it can be used sustainably. It is up to the relevant industry to determine the suitability of the material from an engineering/technical view point for specified uses. Nevertheless, the department does consider 'market demand' during the assessment process. Based on discussions with the Ash Development Association of Australia (ADAA), they are progressing an amendment of the relevant Australian Standard with the Australian Standard Committee that will help address the concerns raised by the construction industry. The ADAA has also provided information stating that they have "funded studies into biomass, coupled with numerous industry and University reports which demonstrate up to 20% by volume has no negative effects on the resulting fly ash. This is also supported by the international literature. Currently two coal-fired power stations (CFPS) have been burning biomass 'intermittently' for 15+ years in NSW without negative impacts to Users of these fly ashes. Ultimately, the decision to co-combust biomass and downstream users rejection is a commercial decision taken by the parties – and beyond the scope of the EoW Code."
2.				General Potential for the combustion of biomass to result in changes to the chemical composition and physical properties of the fly ash so the fly ash is not useable in or inappropriate for use in concrete, noting that we rely on specific properties of the fly ash for it to be suitable and beneficial for use in concrete and pavements.	Refer response #1. The ADAA has provided information stating that they have "funded studies into biomass, coupled with numerous industry and University reports which demonstrate up to 20% by volume has no negative effects on the resulting fly ash. This is also supported by the international literature. Currently two CFPS have been burning biomass 'intermittently' for 15+ years in NSW without negative impacts to Users of these fly ashes.

Published on RTI Disclosure Log 2020

Appendix A

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
				Comments • While fly ash is an unwanted by-product of coal combustion, it is a very valuable input to the construction industry. • Enabling coal fired power stations to use biomass as a fuel substitute is of potential benefit to the power industry and is understandable from a resource recovery. • However, the change in process could adversely impact the resource recovery of the fly ash waste. • Is there enough "supplier – customer" incentive for power stations to not contaminant fly ash in order to ensure that it is suitable for use in concrete or pavement stabilisation?	Ultimately, the decision to co-combust biomass and downstream users rejection is a commercial decision taken by the parties – and beyond the scope of the EoW Code."
3.				General If fly ash becomes unsuitable for use in concrete or pavement stabilisation, there will be a significant impact on the circular economy of fly ash. It may be that massive stockpiles will need to further be managed at power stations due to eliminating the beneficial re-use. Comments • Detrimental impacts to the ability to re-use fly ash in concrete or pavement stabilisation would potentially result in large stockpiling of this waste which would be counter-productive to the End of Waste (EoW) Code. • It would be good to understand if research has been done to investigate the potential impact to the current beneficial re-uses of fly ash. • If fly ash was rendered unsuitable for use in concrete, there would be significant extra costs associated with concrete production in QLD and other eastern states of Australia which could lead to concrete not being an economic or suitable construction material.	Refer response #1. The ADAA has provided information stating that they have "funded studies into biomass, coupled with numerous industry and University reports which demonstrate up to 20% by volume has no negative effects on the resulting fly ash. This is also supported by the international literature. Currently two CFPS have been burning 'intermittently' biomass for 15+ years in NSW without negative impacts to Users of these fly ashes."
4.				6.3 Table The identification of quality criteria by application type is reasonable and pragmatic. It would be beneficial and ensure clarity, to identify where the criteria for each is referenced from. Comments • Provide cross-reference to the criteria used for each application. • Under the EoW code, the criteria in table 1 applies to coal combustion products standalone as tested by the resource producer. Recognising that the material will then	No change. Resource criteria are developed based on review and consideration of multiple documents like relevant standards, guidelines, limits allowed in other jurisdictions, industry monitoring data etc for the given use, Depending on the uses and the associated risk, the limits are then set under the EOW code. The references of how the limits are derived are detailed in internal assessment report, but not in the EOW code. If the waste meets the Requirement 6.3, including the resource criteria listed in Table 1, the waste is

Published on DES Disclosure Log
RTI Act 2009

Appendix A

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
				likely be mixed with other constituents in the final product/application, does the criteria account for the compositions of other constituents in these applications as well?	considered to be a resource and suitable for reuse for the uses stated in section 7 of the code. Under the current amendment, the only proposed changes to the limits listed in Table 6.3 are those pertaining to PFAS contamination. The Conditions listed in section 7 of the code specify what is needed for reuse of the resource. For example, for the manufacturing of soil conditioner using the resource, the User is required to manufacture the soil conditioner in a manner that meets the requirements of AS 4454.
5.				6.3 Table Consistent format of resource quality criteria Comments • Application specific resource criteria are not applied to a number of other EoW Codes. It would be useful from an industry and resource user perspective, to have consistency and transparency of EoW codes. There is likely to be touch-points between multiple EoW codes due to resources being combined to make an overall product (i.e. fly ash often combined with slag, concrete and stabilised pavements then used to make recycled aggregate). Thus, the need for them to "fit together" is crucially important. • Ensure EoW codes can be integrated and applied holistically for industry as much as feasible.	The department assesses each application, and its proposed resource, on a case-by-case basis, based on the risk it poses to the environment. As not all wastes/resources pose the same level of risk, not all EOW codes contain same resource quality criteria. If DTMR are concerned about various EOW codes conflicting in their requirements, DTMR is welcome to submit a proposal to amend any of these codes with appropriate justification.
6.				7.3 Footnote 6 - engineered construction works does not appear to correlate to the footnote. Comment • Check footnote detail. The cross-reference does not appear to be correct.	Acknowledged. Footnote 6 (now Footnote 7) has been amended to clarify the issue.
7.				6.3 Table 1 Conflict between EoW code criteria for PFAS/PFOS and regulated waste criteria. Comments • Consider the suitability of the PFAS and PFOS limits to recycled aggregates and other EoW Codes. The recycled aggregate EoW Code does not reflect similar allowances. However, if coal combustion products containing these levels are utilised for pavements that are themselves	If the Resource Producer is compliant with the Requirements of the code (specifically Requirement 6.3), the level of PFAS/PFOS in the resultant ash, and the potential risk caused by such, is considered to be negligible. Following end of life, and prior to any further new reuse, the waste material should be reassessed for contaminant levels to ensure no environmental harm occurs. However, that further reuse of the end of life waste product is beyond the scope of this EOW code as the final waste material would be a completely different material to what the approved resource is.

Published on RTI Disclosure Log

Appendix A

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
				recycled at end of life for recycled aggregate, this needs to be accounted for in other EoW Codes. • Furthermore, if this limit is acceptable for these applications, this limit should be reflected in regulated waste criteria so that use of these EoW resources does not trigger regulated waste obligations at end of life. • Setting of PFAS and PFOS limits for bound and unbound applications may set a precedent for applications applicable to TMR. TMR has been having ongoing conversations with the DES regarding PFAS/PFOS in landscaping products.	Advice on PFAS/PFOS limits in DES is received from the same internal team to ensure consistency in advice. Relevant teams within the department are currently in the process of reviewing regulated waste criteria regarding PFAS.
8.				6.4 Testing requirements are very broad. No clarity on the method of sampling number, methodology or sizes. Comments • What sampling and testing methodology applies? • What is the minimum amount of sampling? • Composite sampling or grab sample?	Requirement 6.5 (previously 6.7) requires that "All sampling and monitoring required under this EOW code must be carried out by an **appropriately qualified person**." If the person conducting the sampling and monitoring does not know how to do so in the appropriate manner, then there would be doubt as to whether they fit the definition of 'appropriately qualified'.
9.				6.6 PFAS National Environmental Management Plan Version 2.0 – January 2020 does not appear to have detail of the sampling frequency. No minimum set by the EoW code Comments • Consider setting a minimum sampling rate / regime for both CCP in 6.4 and 6.6	Requirement 6.4 states the minimum frequency for sampling and monitoring of both co-fired and non-co-fired CCP: The **registered resource producer** must sample, measure and record the composition of the **resource** for the quality characteristics in *Table 1 - Resource quality criteria* at a minimum of the following frequency: a) if biomass used that contains or is reasonably likely to contain PFAS, every six months; b) otherwise, every six months, until statistical analysis has been undertaken that demonstrates no significant (at minimum 95% Confidence Interval) difference in the mean and standard variation of contaminant concentrations over three years, then annually thereafter.
10.				6.10 Section 6.10 requires the registered resource producer to record the quality criteria of the resource however the user application of the material may not be known to the resource producer. For instance, a cement facility may order fly ash and then on sell it either within cement or as a cementitious material for pavement. Comments • Consider whether the resource producer will know the quality requirements at the time of dispatch or if there is a complexity to the supply chain that this may differ.	Refer Response #1. In developing an EOW code, the department assesses whether or not the proposed resource causes environmental harm and whether it can be used sustainably. It is up to the relevant industry to determine the suitability of the material from engineering/technical view point. As such, developing 'application-specific criteria' is beyond the scope of EOW.

Published on DES Disclosure Log
RTI Act 2009

Appendix A

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
				• Application-specific criteria may not be able to be tested and verified by the resource producer.	
11.				7.5 Consider end of life of the recycled product if it contains those levels of PFAS/PFOS. Comment • TMR has been involved in negotiations over the past 18 months in relation to PFAS and PFOS limits for landscaping products. Issues identified are the "absolute zero" criteria for PFAS/PFOS in non-regulated waste. This has meant that any landscaping products used containing detectable PFAS/PFOS would be regulated waste if removed and disposed from site. This needs to be accounted for in other EoW codes to avoid inheriting operational liabilities in future.	Refer Response #7. If the Resource Producer is compliant with the Requirements of the code (specifically Requirement 6.3), the level of PFAS/PFOS in the resultant ash, and the potential risk caused by such, is considered to be negligible and therefore should not impact future reuse of the end-of-life product.
12.				7.10 User Records - Fly ash has been utilised across the state as supplementary cementitious material for decades. As such there are large volumes contained through-out infrastructure (buildings and transport). Considering the long history of use of this product, what purpose can be achieved from commencing a record at this point? Comment • TMR requests that DES reconsider the resource user record requirement. Furthermore, the resource user on the ground is unlikely to source the material direct from the producer. There is a distributing entity that may blend, or mix resources as required operationally. The intent of tracking use of the product is unlikely to be successful and will be an unnecessary burden on users.	Fly ash is a regulated waste under the Schedule 9 of the Environmental Protection Regulation 2019 (refer item 24). As such, tracking should already be undertaken for this material. Conditions, such as Condition 7.9 (previously 7.10 in the draft version released for public consultation), are part of the standard suite of requirements and conditions included in EOW codes to maintain consistency across the legislative documents. This condition can be seen as a previous version in the current code for coal combustion products (refer Condition 7.2 in the current code). For ease of compliance, this condition has since been updated and split into two (refer 7.10 and 7.11 in the draft, or 7.9 and 7.10 in the final version of the amended code). In concession to this feedback, however, the terminology used in the condition has been reverted to what can be seen in the current code.
13.	Envirospheres Pty Ltd			Section 6. Registered resource producer requirements We note that Section 6 of the draft amended code requires the approved resource to comply with additional requirement in 6.3 of the EOW code and includes the use of biomass and biosolids with the additional analysis of total PFAS contamination. The suggested EOW change to include biomass as a fuel source is not likely to impact on cenospheres as a resource as they are used primarily in bound applications and are not typically used in direct land application.	

Published on DES Disclosure Log
RTI Act 2009

Appendix A

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
14.				Section 7. Conditions of use, and the new amendment to Records section 7.10 As the resource user, raw cenospheres received by Envirospheres from the resource producers are processed and classified into inert mineral additives for bound industrial applications. Envirospheres presently maintain records for each load of the resource received (measured in cubic metres) as per section 7.2 of the current EOW code (Version 1.00, Effective 01 Jan 2019) and suggests that the current requirements for record keeping remain unchanged.	Acknowledged. Following feedback from submitters, both Requirement 6.10 and Condition 7.10 have been amended to allow either tonnes or cubic metres to be recorded.
15.	CCAA			Section 4 CCAA suggests that this clause be more exclusive in regards to fuels that are allowed to be used by powerstations to produce CCPs compliant to the EOW. For example, considering returning details on ignition support fuels and add biomass as an alternative fuel to coal. Wording in Section 8. Definitions for Coal Combustion By-Products should be added to this clause for clarity. Proposed amendment to first line of clause is: This EoW code is limited to coal combusion products sourced from coal fired power stations and coal fired boilers where at least 90% of the fuel source is coal and up to 10% of the fuel source can be biomass material (e.g. wood chip, biosolids), and where no other source of fuel is mixed other than petroleum based gas or liquid fuel for ignition support. Currently this clarification is only provided in the definitions.	Acknowledged and amended. Section 4 now reads: "This EOW code is limited to **coal combustion products** sourced from coal fired power stations and coal fired boilers where at least 90% of the fuel source is coal and up to 10% of the fuel source can be **biomass** material (e.g. wood chip, **biosolids**), and where no other source of fuel is mixed other than petroleum based gas or liquid fuel for ignition support. These **coal combustion products** become a **resource** when the requirements and conditions under this EOW code are met."
16.				6.3 Proposed amendment: replace 'all of the following criteria and quality characteristics:' with 'either one or both of the following criteria and quality characteristics.' Currently by saying it must comply with "all" it indicates that b) must be part of creation of the 'resource'. Alternatively, include "or" after "and" between a) and b). Suggested amendments: Either delete "and", or change to - "and / or". Suggest that b) should be a new condition - to allow for biomass, including biosolids containing PFAS, as fuel source.	Requirement 6.3b states that "where **biomass** used as additional fuel source includes **biosolids** containing per- and poly-fluoroalkyl substances (PFAS) contamination, …". If the biomass used in co-firing doesn't contain biosolids, this section is not applicable to that operation. As such, the department does not consider amendment of this Requirement to be necessary.

Published on RTI Act 2009 DES Disclosure Log

Appendix A

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
				Note that currently the condition reads that the resource must contain this. It should be amended to reflect that it may. note - this new line item is an issue of contention with resource users, e.g. TMR. and impact to quality of fly-ash for use in concrete.	
17.				6.4 Current clause 6.4 on notification on change to resource should be added to the draft as clause 6.5. This clause should also be extended, or an additional clause provided, to notify when biomass is used to replace coal and at what proportion. Proposed clause 6.5 for draft EoW is: 6.5.1 Where the composition of the resource has changed or is likely to change, additional monitoring must be conducted which is sufficient to detect and characterise the extent of any change, until such time that the composition is no longer likely to change and that results demonstrate that the material is compliant with Table 1 – Resource quality criteria before it is used as a resource under this EOW code. 6.5.2 Where biomass is proposed to be used as a fuel replacement for coal the registered resource producer should notify the resource user. Clause 6.7 in draft EoW is in PFAS section but should be included as clause 6.6 in Resource Monitoring section to clarify requirement applies to all monitoring activities. Clause 6.8 in draft is in PFAS section but should be included as clause 6.7 in Resource Monitoring section to clarify requirement applies to all monitoring activities.	Acknowledged and revised. The department considers the current Condition 6.4 to be unnecessarily ambiguous. As such, the department has decided to include specific minimum requirements for sampling and monitoring in the amended code. Refer Requirements 6.4-6.8. Requirements 6.7 and 6.8 in the draft amended code have now been moved from the PFAS sampling and monitoring section, to the general resource monitoring section, and have been renumbered as Conditions 6.5 and 6.6. Requirement 6.9 is revised to include the requirement to inform the user if the biomass used additional fuel source includes **biosolids** containing per- and poly-fluoroalkyl substances (PFAS) contamination.
18.				6.7 Clause 6.7 in draft EoW is in PFAS section but should be included as clause 6.6 in Resource Monitoring section to clarify requirement applies to all monitoring activities.	Revised. Refer Response #17. Conditions 6.7 and 6.8 in the draft amended code have now been moved from the PFAS sampling and monitoring section, to the general resource monitoring section, and have been renumbered as Conditions 6.5 and 6.6.
19.				6.8	Revised.

Published on RTI / FSI Disclosure Log 2023

Appendix A

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
				Clause 6.8 in draft is in PFAS section but should be included as clause 6.7 in Resource Monitoring section to clarify requirement applies to all monitoring activities.	Refer Response #17. Conditions 6.7 and 6.8 in the draft amended code have now been moved from the PFAS sampling and monitoring section, to the general resource monitoring section, and have been renumbered as Conditions 6.5 and 6.6.
20.				7.2 Suggest that this may be amended to say: "...with relevant Australian Standards *and industry specifications*"). Note that ash that contains biomass will not meet requirements of the Australian ash standard AS3582.1, therefore will be unable to be used as a resource regardless.	No amendment considered necessary. Footnote 5 (now Footnote 6) states that "In the absence of Australian Standards for the product, it is required that the final product meets any other appropriate industry standards (e.g. Registered Professional Engineer of Queensland certified technical specifications)."
21.				7.3 Clarification required as to when ERA 60 is required to be followed for "engineered construction works". Is this only for waste disposal facilities or all engineered fill applications?	The footnote applicable to 7.3.d (Footnote 7) has been amended to clarify this issue. It now reads: Use of the coal combustion products at a **facility** as fill material must be carried out in accordance with the requirements of an environmental authority that authorises Environmentally Relevant Activity (ERA) 60 as prescribed under Schedule 2 of the Environmental Protection Regulation 2019. For the purpose of filling a void, the coal combustion product is not considered as a resource.
22.				7.10 and 7.11 New Records conditions for resource users. These will become onerous and in relation to 7.10 d) will be very difficult / impossible to comply with. Unclear as to the value this new requirement is. Note - this is similar to the Industry argument to the same condition that was included in the aggregates EoW code. Recommend that this condition be taken out or significantly amended. If amended propose that 7.10 d) be removed.	Refer Response #12. Fly ash is a regulated waste under the Schedule 9 of the Environmental Protection Regulation 2019 (refer item 24). As such, tracking should already be undertaken for this material. Conditions, such as Conditions 7.10 and 7.11, have be added to the standard suite of requirements and conditions found on an EOW code to maintain consistency across the legislative documents.
23.				7.12 and 7.13 Is this a replication of clause 6.12 or does one apply to Producers and the other to Users?	Yes, both Producers and Users are required to notify and record breaches of the code. Therefore, these Requirements/Conditions need to be listed under both sections.
24.				Definition for 'coal combustion products'	Acknowledged and amendment made. Refer Response #15.

Published on DES Disclosure Log
RTI Act 2009

Appendix A

Comment Ref	Submitter	Section/ Page Reference	Summary of Issues	Submitter comments	Department's consideration
				A modified version of this definition should be considered for Section 4.	
25.				Definition for 'resource user(s)' Proposed amendment - to include 'distribution' of the resource as part of the 'resource user' definition. 'resource user(s) means a person who uses the resources for the use approved under this EOW code, ***including distribution of the resource***, and in such a manner that does not cause environmental harm..... This would also better cover applicability to activities relating to procurement of fly ash ('resource') from a resource producer, for the purposes of on-selling to a customer. For example, Cement Australia does not use the fly-ash to mix into a bound application (i.e. as per 7.2), our customers do this.	Distributors are not considered to be Users of the resource, as they will not be utilising the resource in any 'use'; they are simply part of the transport and distribution pathways. The EOW framework has no provisions for transports and distributors. As such, the department will not be amending this definition as the flow-on effect will adversely affect other operators transporting and distributing CCP. Nontheless, for clarity, Requirements 6.9 and 6.10, and Condition 7.9 (previously 7.10) have been reworded to use the term 'person' rather than 'resource user', as seen in the current code.
26.	ORR (internal)			Footnote 6 Thanks for clarifying the intent. That is what we thought the footnote intended to state, but found it potentially ambiguous. As currently drafted, the footnote could be read as suggesting that CCP are a resource (and therefore not a waste) when used at a facility as fill material, as long as the ERA60 authorises the use of 'the resource' as fill (meaning that it is not waste disposal). Engineered construction works, footnote (6), P10: *Use of the resource at a facility as fill material must be carried out in accordance with the requirements of an environmental authority that authorises Environmentally Relevant Activity (ERA) 60 as prescribed under Schedule 2 of the Environmental Protection Regulation 2019* For your consideration, we suggest replacing 'resource' with 'coal combustion products' and explicitly stating, as per your response in the email below, that *use of CCPs in filling mine voids and any other voids either indefinitely or temporarily is not allowed under the EOW code*.	Acknowledged and amended. Footnote 6 (now Footnote 7) now reads: Use of the coal combustion products at a **facility** as fill material must be carried out in accordance with the requirements of an environmental authority that authorises Environmentally Relevant Activity (ERA) 60 as prescribed under Schedule 2 of the Environmental Protection Regulation 2019. For the purpose of filling a void, the coal combustion product is not considered as a resource.

Published on DES Disclosure Log August 2023

Appendix B – Updated resource criteria (Table 1) in the final amendment code

Quality characteristics	Limits for specific uses *		
	Bound applications	Total Maximum Concentration (mg/kg dry weight unless otherwise specified)	
		Unbound applications	Soil conditioner, soil product and direct land application
Arsenic (total)	NS	20	20
Beryllium	NS	NS	60
Boron	NS	100**	10**
Cadmium	NS	1	1
Chromium (total)	NS	100	100
Chromium (III)	NS	NS	100
Chromium (VI)	NS	1.5	1
Cobalt	NS	100	100
Copper	NS	100	100
Lead	NS	50	50
Mercury	NS	1	1
Molybdenum	NS	NS	10
Nickel	NS	60	60
Selenium	NS	10	5
Zinc	NS	200	200
Electrical conductivity	NS	NS	~~10,000(uS/cm)~~10(dS/m)
pH	NS	5 – 12.5 (pH units)	5 – 12.5 (pH units)
	Analysis of the compounds below is only required if the resource is generated from the use of biosolids containing PFAS contamination		
Sum of PFOS and PFHxS***	~~1~~0.01	~~0.01~~ 0.002	~~Refer to ***Table 2 – PFAS limits***~~ 0.0002***
PFOA***	~~10~~0.02	~~0.1~~ 0.004	~~Refer to ***Table 2 – PFAS limits***~~ 0.0002***
PFOS (PFHxS not detected)	NS	0.001	0.0002***
PFHxS (PFOS not detected)	NS	0.003	0.0002***
PFBA, PFPeA, PFHxA	NS	0.001	0.0002***

Published on DESI Disclosure Log
RTI Act 2009

Sum C_9 -C_{14} Perflouroalkyl carboxylic acids	NS	0.01	0.0002***
Perfluoroalkyl sulfonamides	NS	0.001	0.0002***
N:2 Fluorotelomer Sulfonic acids	NS	0.004	0.0005***
Sum of PFAS***	0.1	0.01	0.0002***

NS = Not specified (monitoring of each element is still required).

* measured using **reference test methods**

** measured using hot $CaCl_2$ method

*** ~~analysis only required if the resource is resulting from combustion of biomass with potential PFAS contaminant (e.g. biosolids)~~

***or the **limit of reporting** (LOR), whichever is smaller

Published on DESI Disclosure Log
RTI Act 2009

Appendix C – Table 2 in consultation draft which is now merged with Table 1 in final amendment

~~Media~~	~~Contaminant~~	~~Limit~~
~~Coal combustion products for use in soil conditioner, soil product and in direct land application~~	~~PFOS~~	~~0.001 mg/kg~~
	~~PFOS + PFHxS~~	~~0.002 mg/kg~~
	~~PFHxS~~	~~0.003 mg/kg~~
	~~PFOA~~	~~0.004 mg/kg~~
	~~PFBA, PFPeA, PFHxA~~	~~0.001 mg/kg~~
	~~Sum C_4-C_{11} Perflouroalkyl carboxylic acids~~	~~0.01 mg/kg~~
	~~Perfluoroalkyl sulfonamides~~	~~0.001 mg/kg~~
	~~N:2 Fluorotelomer Sulfonic acids~~	~~0.004 mg/kg~~

Published on DESI Disclosure Log
RTI Act 2009

SHARMA Isha

From: VENTURA Simone
Sent: Friday, 3 June 2016 3:35 PM
To: SHARMA Isha
Subject: FW: ADAA: Coal Combustion Products General approval

Queensland Government

Simone Ventura
Team Leader
Waste and Contaminated Land Assessment | Industry and Development
Department of Environment and Heritage Protection

P 07 3330 5729
Level 8, 400 George Street, Brisbane Qld 4000
GPO Box 2454, Brisbane Qld 4001

Published on DESI Disclosure Log RTI Act 2009

From: Craig Heidrich - ADAA [mailto:cheidrich@adaa.asn.au]
Sent: Tuesday, 8 April 2014 11:03 AM
To: VENTURA Simone
Cc: sch4 Contrary to public interest
Subject: ADAA: Coal Combustion Products General approval

Dear Simone,

Further to our conversation this morning, thank you for the update on progress with the general beneficial use approval. I understood from our conversation that there are no major concerns/submission arising for QEPH public release of the draft document on the EPH website on the 6 Feb 2014.

In regards to the ADAA proposed inclusions/changes which did not make the public release version, ie.

- Binder for road stabilization pavements;
- Rigid and composite pavements structures;
- Inert mineral fillers;
- Structural and Engineered fill;
- Mine site remediation;

As requested please find as follow a brief definition and description for each new inclusion into Table 1 as requested. I have provided reference where avaliable for further reading.

- Binder for road stabilization pavements; CCPs have been used in Australian roads for many years, but only in small volumes (~ 200-250k/year) relative to the total market potential. These applications include blending with Portland cement or lime with fly ash as a stabilisation agent with in-situ granular materials. Stabilisation of naturally occurring gravels is a common process to achieve greater strength of the base course during the construction of a road. The binder and gravel together can deliver a substantial strength gain compared to the unmodified original material. http://www.adaa.asn.au/documents/Ref_Data_Sheet_7.pdf and http://www.adaa.asn.au/documents/Ref_Data_Sheet_13.pdf

- Rigid and composite pavements structures; Rigid concrete pavements are widely used on the east coast of Australia in highly trafficked capital cities and major motorways joining those cities. Lean-mix concrete

(LMC) pavement, in which fly ash comprises 60–70% of the cementitious content, are widely used in the construction of highways in Australia (Ayton 1993), including both rigid and flexible pavements. http://www.adaa.asn.au/documents/Ref_Data_Sheet_3.pdf and http://www.adaa.asn.au/documents/Technical_Notes_5.pdf

- Inert mineral fillers; One major application for cenospheres and fine fly ash is as **inert filler** in products such as paints, varnish, plastics, ceramics, ultra-light concrete and metal alloys. CCPs are good insulators as they are poor conductors of electricity. For plastics and metal alloys CCP elemental make-up makes them suitable for use to subsitute virgin raw materials. Examples include; composite plastics as insulation around electrical wires, in PVC components such as water pipe etc.

- Structural and Engineered fill; Embankments are a common feature in civil engineering construction. Whether an elevated section of roadway across a low-lying, flood-prone area, or the wall of an earth-fill dam, a wide variety of structures can be constructed out of earth or rock fills. Construction of embankments can be in order to raise the foundation level for a building, or to form an abutment on the approach to a bridge. In each case, the function of the completed embankment will require the fill to be compacted. Experience with the use of CCPs as an embankment material has demonstrated that it is a satisfactory engineering fill material (Marsh & Hausmann 1996), with its performance being comparable, if not superior, to that of natural materials. http://www.adaa.asn.au/documents/Technical_Notes_6.pdf

- Mine site remediation; The use of CCPs as structural fill in mine site remediation can provide two different but related environmental and social benefits: reclaiming the mined land for other productive uses in an economically and environmentally sound manner, and eliminating the need for converting otherwise useable lands near power stations for landfills and ash impoundments.

For **open cut mines** one example of mine rehabilitation commenced in 1996 has used CCPs from the 2,000 Mw Bayswater Power Station to fill the final voids at the nearby Ravensworth open-cut mine. The mine voids were progressively filled with ash covered with topsoil and revegetated, and the project has been followed through to the point where the land can now be returned to grazing.

For **under ground mines** the practice of remediation is common in underground metalliferous mines, mainly for ground control in conjunction with stoping operations (Potvin et al. 2005). Sivakugan et al. (2006) identify two basic types of backfill materials in Australian mines: uncemented backfill, which does not make use of cementing agents and can be evaluated using the principles of soil mechanics, and cemented backfill, which incorporates a small percentage of Portland cement, either alone or with another pozzolan such as fly ash, gypsum or blast furnace slag. Some 100,000 tones of CCPs were used in the Ipswich region for the filling of abandoned coal mines under the Ipswich Motorway. http://www.adaa.asn.au/documents/ADAA-CoalAsh-April2011.pdf and Innovative Solution for The Hunter Expressway Project http://www.adaa.asn.au/documents/ADAA-CoalAsh-November2011.pdf As an example of the second type, ash from the Flinders Power Station at Port Augusta in South Australia is used as a component of consolidated aggregate fill in the mined-out underground stopes at the Olympic Dam gold/uranium mine (Bowman 2006).

Regards

Craig Heidrich
Chief Executive Officer
Ash Development Association of Australia Inc
website http://www.adaa.asn.au
e-mail: cheidrich@adaa.asn.au
p-mail: PO BOX 1194, Wollongong NSW 2500
Map location
Ph: 02-42281389

Released on DESI Disclosure Log
FOI Act 2009

Mb: sch4 Contrary to public i
Fx: 02-42281777
"CCPs - A valuable Resource"
==========
NOTICE - This message contains information intended only for the use of the addressee named above. It may also be confidential and/or privileged. If you are not the intended recipient of this message you are hereby notified that you must not disseminate, copy or take any action in reliance on it. If you have received this message in error please notify the Ash Development Association of Australia immediately via mailto:info@adaa.asn.au.

On 05/02/2014, at 5:44 PM, Craig Heidrich - ADAA <cheidrich@adaa.asn.au> wrote:

Dear Simone,

Further to our meeting on 30 Jan 2014 and your subsequent email invitation to the Ash Development Association of Australia (ADAA) to consult with QLD based generator members on the proposed **general beneficial use approval**.

Whilst sch4 and I had limited time to review the draft during the meeting, we did provide some initial feedback which EPH incorporated into the draft general approval. We appreciate EPH providing a further opportunity to consult its key members in QLD to raise any major issues it foresees with the proposed conditions prior to the release of the draft document on the EPH website on the 6 Feb 2014.

To these ends, please find attached a tracked changes version for your consideration. In short there were no major issues or concerns with the proposed **general beneficial use approval.**

Please feel free to call my office to clarify any points.

Regards

Craig Heidrich
Chief Executive Officer
Ash Development Association of Australia Inc
website http://www.adaa.asn.au
e-mail: cheidrich@adaa.asn.au
p-mail: PO BOX 1194, Wollongong NSW 2500
Map location
Ph: 02-42281389
Mb: sch4 Contrary to public i
Fx: 02-42281777
"CCPs - A valuable Resource"
==========
NOTICE - This message contains information intended only for the use of the addressee named above. It may also be confidential and/or privileged. If you are not the intended recipient of this message you are hereby notified that you must not disseminate, copy or take any action in

Published on DEEDI Disclosure Log
RTI Act 2009

reliance on it. If you have received this message in error please notify the Ash Development Association of Australia immediately via mailto:info@adaa.asn.au.

<CCP DRAFT notice_20140130_ADAAedits.docx>

On 30/01/2014, at 6:54 PM, "Ventura, Simone" <simone.ventura@ehp.qld.gov.au> wrote:

Hi Craig and sch4 (

Thank you for being able to meet with us today to discuss the draft amended general beneficial use approval for coal combustion products. As agreed to in the meeting, please find attached a copy of the draft general approval as well as a Word version of the conditions. Conditions 8 and 22 have been updated as discussed. The draft general approval document will be uploaded on the departments website and stakeholders given the opportunity to submit comments. ADAA will be contacted when the documents have been uploaded and notified of the date by which comments are to be submitted.

The department however would like to give ADAA an opportunity to raise any major issues it foresees with the proposed conditions prior to the release of the draft document on the website. So that the department can continue progressing the approval, could any comments on major issues please be provided to myself by **6 January 2014**.

Please also find attached a copy of our departments Regulatory Strategy which outlines the long-term vision for the departments regulatory, compliance and enforcement activities. The Regulatory Strategy is also available on the departments website at http://www.ehp.qld.gov.au/management/planning-guidelines/policies/regulatory-strategy.html. Also attached is copy of ADAA's specific approval for the use of CCPs in unbound applications as discussed today. The original notice has been posted.

If you have any questions or wish to discuss anything further please feel free to contact me.

Regards

Simone Ventura
Principal Project Officer, Waste and Land Contamination Assessment
Statewide Environmental Assessments
Telephone: 07 3330 5729 **Facsimile:** 07 3330 5875
www.ehp.qld.gov.au
Department of Environment and Heritage Protection
Level 9, 400 George Street, Brisbane Qld 4000
GPO Box 2454, Brisbane Qld 4001

<image001.png>

Published on DES Disclosure Log
s31 RTI Act 2009

The information in this email together with any attachments is intended only for the person or entity to which it is addressed and may contain confidential and/or privileged material. There is no waiver of any confidentiality/privilege by your inadvertent receipt of this material.

Any form of review, disclosure, modification, distribution and/or publication of this email message is prohibited, unless as a necessary part of Departmental business.

If you have received this message in error, you are asked to inform the sender as quickly as possible and delete this message and any copies of this message from your computer and/or your computer system network.

<regulatory-strategy.pdf><20140130143137.pdf><CCP DRAFT notice_20140130.pdf><CCP DRAFT notice_20140130.docx>

Published on DESI Disclosure Log
RTI Act 2009

Report: *Kogan Creek IPAC Topsoil/ash analysis and recommendations*

Author: Landloch – T.Nash reviewed by R.Loch

Proposal: add the word sodic to EOW code: 'Sodic soils' is very broad and not all sodic soils are the same. For example sodicity occurs in self-mulching clays, non-self-mulching clays, red brown earths, transitional red brown earths and sandhill soils.

The Australian Soil Classification defines Sodasols as soils with strong texture contrast between A horizons and *sodicB horizons* which are not *strongly acid*. Australia is noteworthy for the extent and diversity of *sodic* soils and the use of sodicity in Australian soil classification systems has recently been reviewed (Isbell, 1995).

Researched and calculated by F Cordery: Sodic soils have a ESP (exchangeable sodium percentage) greater than 6% and highly sodic soils have a ESP greater 15%. The addition of 20% ash to the soil resulted in a reduction of 4.83%, from 24.71% to19.88 % however the soil remains sodic:

- For the 80/20 ratio the ESP is 3.61/16.6 =0.198795 = 19.88%
- For the 100% soil the ESP is 3.83/15.5 = 0.247096 = 24.71%

Report states purpose is to: *investigate the potential for use of bottom ash to augment available soil resources*

Question: What is meant in the report by augment available soil resources?

Definitions of augment

- to make larger; enlarge in size or extent; increase.
- to augment something means to make it larger, stronger, or more effective by adding something to it.
- augment something (*formal*) to increase the amount, value, size, etc. of something

Analysis and interpretation of report (including queries and questions)

Report determined optimal ratio is 50/50 however it is not achievable as there is not enough ash so instead the report recommends using ratio of 70/30(ash)

Report determined proposed product lacks essential nutrient and requires amelioration therefore recommended achieving the required values by applications of gypsum, diammonium nitrate, urea and compost or aged feedlot manure.

The report does not provide referenced values in Table 1 to allow for comparison, and the literature the values are taken from are not readily accessible. The report does not provide analysis of ash for containments as per the values in the EoW code *Table 1 - Resource quality criteria*. The report identifies deficiencies in Cu, Zn, and B exist however it would be useful to compare the trial results to values in the literature referenced at end of the report. The addition of ash affects Cu the most (increases deficiency). The report demonstrates a change to pH by making the pH more alkaline but does not demonstrate much more in regard to reduction of soil sodicity or soil improvement and provides no discussion in regard to sodicity. The report states gypsum, di-ammonium nitrate, urea and compost or aged feedlot manure will need to be add as there are deficiencies in the soil and ash mix. The closest sample ratio to the proposed ratio has almost the same requirement for gypsum addition. The closest sample ratio to the proposed ratio resulted in a reduction of organic carbon as a percentage from 0.87 to 0.29 and Cowell P reduced from 11mg/kg to 8mg/kg. The report demonstrates a reduction of 55% in the Exchange of Sodium as a percentage from 24.7 (100% soil and 0% ash) to 11.1(50% Soil and 50% ash). The report

Published on DESI Disclosure Log RTI Act 2009

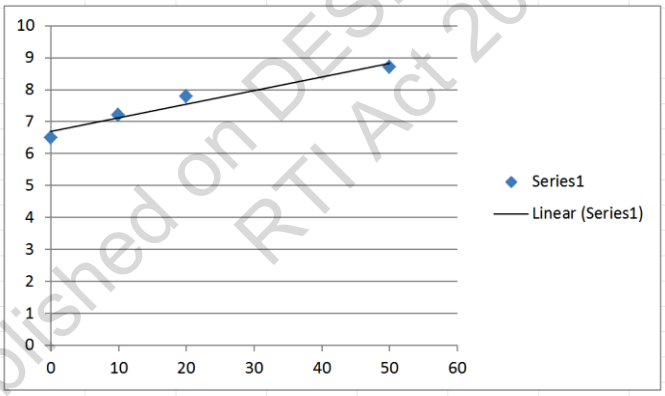
also demonstrates changes in the Ca:Mg ratio of 0.93 (100% soil) to 4.59 in the preferred ratio of 50% soil and 50% ash. The closest sample ratio of 80% soil and 20% ash to the proposed ratio of 70% soil and 30% ash resulted in a Ca:Mg ratio of 1.45.

Section 4 (Results) of the report states '*The soils are all deficient in organic carbon and phosphorus. The materials are moderately saline, and are all sodic to varying degrees. The levels of sodicity measured indicate that the materials can be expected to be prone to dispersion and hard setting, and vulnerable to tunnel erosion if placed in positions where water pathways create tunnel erosion risk. The 50% ash mix is the least sodic and least saline but also has the lowest nutrient levels. The Ca: Mg ratios of the materials indicate the ash has a high calcium content, so higher ash content will lower sodicity*'. Given that no reference to literature is provided for this statement nor is there clear reference to the results the statement does not appear to be well supported and may not be completely representative of the potential outcomes. There is also no reference to literature or methodology or calculations for section 5.1 (Amelioration) of the report therefore it cannot be determined how the values in the recommendations were derived.

The trailed Soil/Ash mix of 50% soil and 50% Ash resulted in a pH greater than 8 which is above the maximum allowable limit under the EOW code for coal combustion products, and the trailed mixture Soil/Ash mix of 80% soil and 20% Ash resulted in a pH of 7.8 therefore it is likely the proposed mix of 70% soil and 30% ash will result in a **pH greater than 8**.

Results from the report for pH of different soil/ash ratios has been used to produce a graphical representation of pH versus percentage of soil added. The value on the horizontal axis is the amount of ash added as a percentage. The pH value is on the vertical axis. By interpolation it can be seen that at 30% ash the pH is approximately 8.

Soil/Ash as percentage (ratio)	Percentage of Ash	pH
100	50	8.7
90/10	20	7.8
80/20	10	7.2
50/50	0	6.5



Published on DESI Disclosure Log
RTI Act 2009

The EOW code already provides for coal combustion products to be added to soil that is naturally acidic or low pH soils to correct the agronomic deficiency in land to which it is applied and where the final soil pH does not exceed a pH of 8 after application of the resource: Therefore the report <u>does not</u> really demonstrate the need to add the word **sodic**.

Land application	The resource can be used in direct land application on naturally acidic or low pH soils to correct the identified agronomic deficiency in land to which it is applied and where the final soil pH does not exceed 8 pH unit after application of the resource.

Question: Is the proposed activity and use of waste more relevant to manufacturing soil ameliorant or soil product:

Manufacturing of **soil ameliorant** or soil product	The resource can be used in manufacturing a soil ameliorant or soil product which meets the relevant Australian Standards for that product.

– given the proposal is to add ash to existing soil stockpiles and use the mixture as capping soil to receive vegetation as part of the site remediation.

Proposal: Bottom Ash added to soil in ratio of 70% soil and 30% ash

Questions – (including in regard to the agronomic benefits of adding bottom ash to the soil such as improving the soil quality and/or soil structure and/or reducing soil sodicity)

1. What type of soil was used in the trials for the report?
2. How were the values recommended in section 5.1 of the report derived?
   Note: no supporting references to literature or methodology or calculations were included in section 5.1
3. How will the levels of contaminants present in the bottom ash be determined?
   Note: Analysis of the trial ratio mixes of bottom ash and soil for contaminants listed in *Table 1 - Resource quality criteria* for the approved use in accordance with the EOW code for Coal Combustion Products were not included in the report.
4. The report does not provide discussion of the results in regard to changes in various parameters including Ca:Mg ratio, Exchangeable Calcium, Magnesium, Potassium and Sodium, and the exchangeable Sodium percentage, organic carbon percentage and Cowell P as being beneficial or not beneficial, and if the changes are beneficial why the changes are beneficial. **Note:** the two books referenced in the report are not readily accessible therefore how well the results in the report compare to the referenced values in the literature could not be compared.
5. Demonstrate how the addition of bottom as is suitable for all sodic soils?
6. Will the addition of Bottom Ash:
   a) reduce crusting of the soil?
   b) reduce water logging (including perching) of the soil?
   c) improve/increase water infiltration of the soil?
   d) increase water storage of the soil?
   e) increase internal drainage of the soil?
   f) increase aeration of the soil?
   g) improve the structure of the soil?
   h) increase the permeability of the soil?
   i) increase porosity of the soil?
7. How will it be determined if the Bottom Ash is alkaline or acidic, and how will the final pH value of the mixed ash and soil be determined prior to mixing (given that the pH after application must not exceed 8)?
8. Can a projection of expected outcome(s) for pH be provided in the format of a graph or table? Are results for the proposed ratio available? **Note:** The report does not contain any trial or analysis for the proposed ratio mixes of bottom ash (30%) and soil (70%)
9. Demonstrate considerations regarding identifying and mitigating or preventing potential impacts or effects on receiving environment e.g. contaminants and pathways to environment etc.?

Published on DES Disclosure Log
RTI Act 2009