



Mt Piper Ash Management Strategy Update

October 2018

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1. Introduction

The Mt Piper Power Station comprises of two 700 MW coal-fired steam turbine generators, built in 1992 and 1993. The power station is located approximately 17 km northwest of Lithgow and five kilometres east of Portland. Mt Piper Power Station is fuelled using black coal sourced from the local area, with ash produced during coal combustion by the transformation of the non-combustible mineral matter present in the coal.

Ash produced at Mt Piper Power Station is managed at the Lamberts North Ash Repository, which is operated in accordance with Project Approval 09_0186. The Mt Piper Ash Management Strategy has been prepared to satisfy Condition D1 of Project Approval 09_0186 and was submitted to the Director-General on 30 July 2012.

This report satisfies the requirement to report on the status and outcomes of investigations into increasing ash re-use every two years from the commencement of the operation of the Mt Piper Ash placement Project 09_0186, in accordance with Condition D1 of the Project Approval.

2. Regulatory Requirements

2.1 Project Approval

The Mt Piper Ash Placement project (Lamberts North) was approved under Part 3A of the *Environment Planning and Assessment Act 1979* (EP&A Act) by the Minister for Planning and Infrastructure on 16 February 2012, Project Approval 09_0186. The Project Approval details conditions that need to be complied with, including those in Table 2-1.

Table 2-1 Compliance Status of relevant Project Approval conditions

Relevant Approval	Condition No.	Condition Summary	Compliance Status	Comment	Section where addressed within this report
Project Approval 09_0186	D1	Ash Management Strategy	Compliant	The Mt Piper Ash Management Strategy has been prepared to satisfy Condition D1 of Project Approval 09_0186 and was submitted to the Director-General on 30 July 2012.	1
Project Approval 09_0186	D1	Two yearly update of status & outcomes into investigations to increase ash re-use.	Compliant	This report has been developed to satisfy this requirement.	1, 3, 4
Project Approval 09_0186	D1	Goal of 40% ash re-use by 31 December 2020.	Compliant	Mt Piper Power Station has obtained 30% ash re-use since Lamberts North operations commenced.	3

2.2 Coal Ash Exemption 2014

The Protection of the Environment Operations (Waste) Regulation 2005 makes requirements relating to non-licensed landfill sites, non-licensed waste activities and non-licensed waste transporting. The EPA issues general exemptions for commonly recovered, high volume and well characterised waste materials. One such exemption is the *Coal Ash Exemption 2014*. This exemption applies for all applications of ash re-use.

The exemption sets out the requirement for utilisation of ash as outlined below.

The exemption is subject to the following conditions:

7.1. At the time the coal ash or blended coal ash is received at the premises, the material must meet all chemical and other material requirements for coal ash or blended coal ash which are required on or before the supply of coal ash or blended coal ash under 'the coal ash order 2014'.

7.2. Coal ash and blended coal ash can only be applied to land:

7.2.1. as a soil amendment for the growing of vegetation,

7.2.2. in cementitious mixes such as concrete, and

7.2.3. in non-cementitious mixes such as an engineered fill, stabiliser, filter or drainage material or as a sand substitute as follows:

(a) pipe bedding material,

(b) selected backfill adjacent to structures,

(c) road pavement, base and sub-base structures,

(d) composite filler in asphalt pavements,

(e) rigid and composite pavement structures,

(f) select layers which act as working platforms at the top of earthworks,

(g) fill for reinforced soil structures (including geo-grid applications).

7.3. In cementitious mixes, the consumer can only apply coal ash or blended coal ash to land where it complies with a relevant specification or Australian Standard or supply agreement.

7.4. In non-cementitious mixes the consumer can only apply coal ash or blended coal ash to land where it:

7.4.1. complies with the relevant specification or Australian Standard or complies with supply agreement/s, or

7.4.2. complies with a development consent that specifically considers the use of coal ash, and

7.4.3. is not applied in or beneath water including groundwater.

Ash produced from Mt Piper Power Station has an approximate pH of 5, which does not comply with the *Coal Ash Exemption 2014*. As a result, EnergyAustralia NSW (as Delta Electricity) have previously worked in conjunction with the Ash Development Association of Australia (ADAA) to revise the Coal Ash Exemption, such that prescribed uses of low pH ash in non-cementitious mixes are possible. The strategy adopted was to therefore demonstrate that the ash has a low buffering capacity and, when blended with other compliant materials, the pH of the blended product will comply with the *Coal Ash Exemption 2014*. (Delta Electricity, 2012).

To this end, expert representations were made and scientific reports were commissioned between 2010 and 2012 to demonstrate the safe utilisation of coal ash. The last submission by

the ADAA on this matter to the NSW Office of Environment and Heritage (OEH) was on 23 May 2012.

Although discussions with the OEH have been constructive, it is noted that the *Coal Ash Exemption 2014* does not permit the limited use of low pH coal ash in non-cementitious mixes. As such, failure to achieve changes to existing regulations and exemptions severely limit EnergyAustralia NSW's ability to utilise ash, as the cementitious uses are currently close to market saturation (Delta Electricity, 2012).

3. Ash re-use 2013 – 2017

Fly ash has been used as a supplementary cementitious material due to its properties for over 30 years in NSW. In power generation, ash utilisation has traditionally been left to the markets to manage the fly ash facilities for off-site utilisation. This market has customarily favoured cement companies who can afford to install facilities to classify and load fly ash into trucks, and limits access to aggregate markets that are dependent on local road building projects which last for months rather than years. In order to combat this, EnergyAustralia has taken steps to permit the loading of run of station ash at Mt Piper power station. Notwithstanding, the ash from Mt Piper Power Station operations currently continues to be re-used through cementitious material.

In 2014, EnergyAustralia were approached by Nu-Rock with the plan to operate a pilot plant which would trial the use of ash in the production of construction products, including blocks, pavers and aggregates. Nu-Rock is currently operating a small production plant at Mt Piper to prove the use of their products and to assist them to move towards construction of a commercial scale plant, which is anticipated to use approximately 250,000 tonnes per annum of ash. A commercial plant would be subject to appropriate commercial and technical matters being agreed between EnergyAustralia and Nu-Rock, as well as agreements between Nu-Rock and third parties that would be required for a commercial scale project to proceed.

This would significantly increase the amount of ash re-used and would enable ash reclamation from the ash repository

Ash production and re-use figures for Mt Piper Power Station are provided in Table 3-1.

Table 3-1 Mt Piper Power Station Ash Production and Re-use in tonnes and percentage

Year	Ash Produced at Mt Piper (tonnes)	Ash re-use (tonnes)			Total Ash re-used	
		Fly ash Aust.	Run of Station	Reclaimed	tonnes	%
Sept –Dec 2013	268,227	60,160	0.06	5,753	65,913	25%
2014	760,867	203,456	418	25,035	228,909	30%
2015	528,272	200,550	0	0	200,550	38%
2016	789,265	204,649	2,480	0.6	207,130	26%
2017	776,690	215,518	9,275	64	224,857	29%
Total	3,123,321	884,333	12,173	30853	927,359	30%

Table 3-1 demonstrates that the percentage of ash re-used per year peaked in 2015 at 38%, then decreased sharply and has been steadily increasing since 2016. However, it is important to note that the percentage ash re-used is a function of the amount of ash produced.

During 2015, the amount of ash produced decreased as a result of Mt Piper's decreased power generation operations. This resulted in the increase in percentage ash re-use figures shown in Table 3-1 for 2015. However, increased production in 2016 and 2017 has resulted in the percentage ash re-use decreasing to between 25 and 30%. The amount of ash re-used since Lamberts North operations commenced was approximately 66,000 tonnes of ash re-used from September 2013 to December 2013 and has consistently remained between 200,000 and 230,000 tonnes in subsequent years.

4. Future ash re-use

EnergyAustralia NSW is continuing to work with third parties with the goal of supplying ash and potentially reclaiming ash from the Mt Piper and Lamberts North ash Repositories for use in their products. These parties include Nu-Rock, and others that cannot be currently named for commercial reasons.

There are other opportunistic uses of fly ash that EnergyAustralia NSW is investigating with third parties. Mt Piper is equipped to be able to supply ash for these ad hoc opportunities, but historically, there has not been a significant demand from such projects.

5. References

Delta Electricity, 2012. *Ash Management Strategy*, NSW: Delta Electricity Pty Ltd.

DMC, 2011. *Evaluation of Laboratory Results for KoAgg from Delta Power Stations - Future Strategic Positioning*, NSW: DMC Pty Ltd.

EMS, 2012. *Review of Patents Relevant to Agglomeration of Fly Ash to Produce Aggregates*, NSW: Engineered Material Solutions Pty Ltd.