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## Submission: Eraring Power Station - Ash Dam Expansion MOD 1

### Introduction

The Hunter Community Environment Centre (HCEC) objects to the proposal by Origin Energy to expand its ash dump as set out in its Ash Dam Augmentation Project Environmental Assessment (the EIS). The assessment is seriously flawed and the proposal is poorly conceived and environmentally hazardous.

The Eraring Power Station (EPS) ash dump poses an unacceptable hazard to the health and safety of the residents and environment of Lake Macquarie and increasing the volume of coal ash stored indefinitely on the shores of Australia's largest saltwater coastal lake is irresponsible.

The EIS contains some serious omissions which need to be fully detailed in a new and more comprehensive document to adequately consider the impacts of increasing the size of the ash dump.

### The proposal

The EPS has an expected life at least up to 2030 and generation of coal ash waste exceeds current storage capacity of its 250 ha ash dump. Origin Energy's preferred option is the raise the ash dam wall by 14 meters to 140m which would increase the ash capacity by 5 million m<sup>3</sup> and extend the operational life of the ash dump to approximately 2024. No mention is made in the EIS of what is proposed for the ash generated after this time.

There are a number of issues with the proposal and the EIS that must be addressed.

#### 1. Coal ash reuse targets have not been met.

The perceived need for additional ash storage capacity is due to the failure of Origin Energy to meet the targets set by the Department of Planning for the beneficial reuse of the coal ash EPS generates.

In 2007, approval was granted for the first expansion of the EPS ash dumps with a key goal to develop and implement strategies that target reuse levels of 80% of all ash (both fly ash and bottom ash) produced by EPS by 31 December 2015. In 2015 the EPS was only achieving 55% reuse.

The target for 80% reuse has now been pushed back to 2021 with only 37% of the ash generated currently reused.

Unless Origin is forced to aggressively pursue a coal ash reuse strategy, the target of 80% reuse is unlikely to be achieved, resulting in another expansion modification being sought by Origin in 2024, if not sooner.

**2. The EIS does not set out the volume of coal ash the ash dump contains or explore the risks of catastrophic failure of the ash containment structure.**

The EPS has been generating about 1.34 million tonnes (Mt) of coal ash a year for the past 36 years.<sup>1</sup> Since being commissioned, the EPS has therefore generated almost 50 Mt of coal ash. If 30% of this has been reused (15 Mt), the EPS coal ash dam wall, which looms over Myuna Bay, holds back about 35 Mt of coal ash. A truly frightening fact given experiences of coal ash dump containment failures in the USA, such as the 2008 catastrophic coal ash dam failure in Kingston Tennessee.

**3. The EIS does not set out the elements or toxicity of the EPS coal ash.**

Coal ash contains a large number of trace elements at concentrations that have the potential to significantly impact human and environmental health. Notably, mercury, lead, arsenic, cadmium, chromium, nickel, selenium and radioactive elements such as uranium and thorium etc.

Heavy metals are significant environmental pollutants, and their toxicity is a problem of increasing significance for human health and the environment. Because of their high solubility in water, heavy metals can be absorbed by living organisms. Once they enter the food chain, concentrations of heavy metals can magnify as they accumulate in organisms and ecosystems. If the metals are ingested beyond recommended maximum concentration, they can cause serious health disorders.

However, concentrations depend on the coal burnt. A detailed chemical analysis of the coal used by the EPS and the ash generated is necessary to fully evaluate the impacts of expanding the EPS ash dump.

Nevertheless, concentrations of heavy metals including cadmium, arsenic, copper, and zinc that exceeded the ANZEC Guidelines (2000) have been found in sediments in the Lake Macquarie and near to the EPS.<sup>2</sup>

Selenium, the metal of most concern in the Lake, is regularly found in the water and sediment of Lake Macquarie and near to the EPS above 2 parts per billion (2ppb) which is above thresholds which bioaccumulates above the dietary toxic level for fish.<sup>3</sup>

Ellwood et al (2015),<sup>4</sup> found that fly ash from Vales Point and Earring Power Stations contained between 21–22 parts per million (ppm) and the input of selenium from the ash dams into Lake Macquarie from

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<sup>1</sup> In 2005/06, 595,000 tonnes of ash from EPS was reused, which represents a total of 44.5% of the ash produced. See HLA, 2007.

<sup>2</sup> Schneider L, Maher W, Potts J, Gruber B, Batley G, Taylor A, Chariton A, Krikowa F, Zawadzki A, Heijnis H., 2014. Recent history of sediment metal contamination in Lake Macquarie, Australia, and an assessment of ash handling procedure effectiveness in mitigating metal contamination from coal-fired power stations. *Sci Total Environ*.

<sup>3</sup> A. Dennis Lemly, 2002. *Selenium Assessment in Aquatic Ecosystems, A Guide for Hazard Evaluation and Water Quality Criteria*. Springer Series on Environmental Management. Springer Science & Business Media, 162 pages. Pp 34-36

<sup>4</sup> Ellwood, M, Schneider, L., Potts, J., Batley, G., Floyd, J., Maher, W.,. (2015). Volatile selenium fluxes from selenium-contaminated sediments in an Australian coastal lake. *Environmental Chemistry*. 13. 10.1071/EN14228. <https://www.researchgate.net/publication/281561413/download> [accessed Aug 17 2018].

the two current operational power stations was estimated to be 113kg of selenate and 1018 kg of selenite per year. Both these species of selenium are toxic to aquatic organisms, but selenite has been shown to be more so.<sup>5</sup>

However, the EIS did not refer to any of the numerous scientific studies of heavy metal contamination in Lake Macquarie, nor did it consider the contribution of the EPS ash dump to this contamination.

#### **4. The ash dump will be allowed to continue to contaminate Lake Macquarie and coastal wetlands.**

Contamination of Lake Macquarie and listed wetland with coal ash leachate from the EPS ash dump has been ongoing. Cooling water canal monitoring for the power station's EPL shows at least 2 instances when concentrations of copper were well in excess of ANZEC Guidelines trigger values for marine water quality – >3 ppb (Eraring Power Station - EPA Licence Environmental Monitoring Data 2012-2018).

The average daily discharge from the ash dump to the cooling water outflow has been almost 7 million litres (ML) a day since 2012 and average maximum daily discharges have exceeded 18ML a day (Eraring Power Station - EPA Licence Environmental Monitoring Data 2012-2018).

The proposal would allow the continued dumping of coal ash leachate containing storm water into Lake Macquarie from its cooling water outflow of up to 5 ML a day and up to 6 ML a day (240m<sup>3</sup> an hour) over prolonged periods when storage capacity of the receiving pond is exceeded. Uncontrolled release of coal ash leachate-laden storm water will continue to be allowed to flow through listed coastal wetlands to the west of the ash dump and ultimately into Lake Macquarie.

#### **5. The ash dump will be allowed to continue to pollute groundwater.**

Groundwater monitoring results reported in the EIS of a number of trace metals in groundwater beneath the ash dump at concentrations in excess of the ANZECC 2000 criteria indicate that coal ash leachate is probably already seeping into groundwater and impacting local aquifers and Lake Macquarie.

Abandoned coal mine shafts exist just 20m below the ash dump. It is extremely likely that there is cracking between the surface and the coal mine shafts which would allow coal ash leachate to migrate into the groundwater and into tributaries of Dora Creek.

There is also potential for subsidence in the form of either pillar collapse or roof failures leading to sink-hole formation impacting on the ash dam and the western saddle embankment.

Remedial approaches proposed by Origin Energy include

- Filling mine voids with stabilised fill material;
- Excavating and collapsing of shallow mine workings; and/or
- Installing an impervious barrier using clays or suitable stabilised fill materials.

However, the effectiveness of these actions are far from certain and no risk analysis has been conducted to investigate the environmental consequences of these actions.

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<sup>5</sup> See for example, Brasher, A. M. and Ogle, R. S., Comparative toxicity of selenite and selenate to the amphipod *Hyalella azteca*, Arch. Environ. Contam. Toxicol., 24, 182, 1993.

## 6. The ash dump will continue to cause air pollution.

In addition to dangerous concentrations of numerous heavy metals, many of which are carcinogens, coal ash contains a high proportion of silica, which if inhaled can cause silicosis.

The nearest residential to the ash dump include the suburbs of Eraring (approximately 1 km south), Dora Creek (approximately 4 km southwest), Wangi Wangi, Arcadia Vale and Buttaba (approximately 3 km east), Awaba (approximately 3 km north), and Toronto (approximately 4.5 km northeast).

The NSW EPA prosecuted Origin Energy in 2017 after dust from its ash dump was found to have blown offsite during strong winds.

HCEC has now lodged a formal complaint over a similar incident observed in September 2018. The ash was being blown south east from the dump and over Wangi Wangi.



The EIS failed to set out any additional mitigation of windblown ash, nor did it detail its history of EPL breaches.

### Conclusion

A containment facility for such volumes of highly toxic waste on the edge of a lake within a growing urban population would be unlikely to be approved, let alone proposed, today. However, this legacy waste dump is now being proposed to once again be enlarged to allow the continued operation of the aging EPS after the failure to meet its previous target for reuse of its coal ash.

The HCEC believes that no further coal ash should be dumped from the EPS and all coal ash generated should be responsibly reused. Furthermore, the existing coal ash should be excavated and responsibly contained to ensure windblown ash and leachate cannot escape, and the site rehabilitated to ensure contamination of Lake Macquarie cannot continue.

The Ash Dam Augmentation Project Environmental Assessment poorly details the proposal and fails to adequately set out the potential impacts and risks of the Eraring Ash Dam. At the very least a new EIS is required to remedy these deficits.

Nevertheless, the HCEC objects to the proposal.