

Dear Minister,

Re: Submission regarding Eraring Power Station - Ash Dam Expansion MOD 1

The Nature Conservation Council (NCC) is the peak environment organisation for NSW, representing over 150 member societies, and thousands of supporters, across the state. Together we are committed to protecting and conserving the wildlife, landscapes and natural resources of NSW

NCC opposes the expansion of the Eraring coal ash dam.

Origin Energy proposes to expand the ash dam, including clearing 9 Ha of native vegetation, and to store the ash in "terraces" to enable storage of an additional five million cubic metres of toxic coal ash.

The environmental assessment does not detail the composition of heavy metals and other toxins which leach from the ash, but National Pollution Inventory reports and annual EPA returns from Eraring suggest the ash comprises lead, cadmium, copper, zinc, selenium, arsenic and mercury.

Expanding the dam to store even more toxic coal ash in this sensitive natural environment poses an unacceptable risk of further environmental harm and alternatives are available.

Alarming, the environmental assessment notes:

1/ "Water appears to be flowing from the ash dam into the mine workings" and from there "artesian flow of mine water would be expected into several tributaries of Dora Creek"

2/ "...trace metals in groundwater beneath the Ash Dam which have, on occasion, been recorded in concentrations in excess of the ANZECC 2000 criteria."

Both of these revelations suggest that the current management of the dam is failing to prevent the accumulation of heavy metals into the Lake Macquarie environment, via several pathways. These must be investigated and resolved before expansion of the facility is contemplated.

NCC's recommended alternative to this project is for Origin Energy to invest in clean energy generation to reduce the need for coal generation, rather than continuing to grow this toxic legacy on the shores of Lake Macquarie.

For more details of how NSW can transition to 100% clean energy over the next 13 years, generating \$24 billion of investment, tens of thousands of jobs, and help to avoid dangerous

global warming, please see our report *Repowering the Regions* and the accompanying technical report, which we have attached to this submission¹.

Ash dams are notoriously underregulated globally, with disastrous consequences for the environment. The enormous quantities of coal ash produced by coal-fired power stations, combine with the toxicity of the ash to create a high-risk waste stream.

In Australia, 5.8 million tonnes of coal ash was disposed of in 2014-15, 22% of all waste disposed in Australia and the third largest waste stream behind construction and demolition waste (7.1 Mt) and municipal waste (6.5 Mt)².

Elevated and increasing levels of Lead, Cadmium, Copper, Zinc and Selenium have been found in sediments in Lake Macquarie's Bonnell Bay, adjacent to Eraring Power Station, including levels of Cadmium in excess of guidelines³.

Globally, the consequences of storing millions of cubic metres of toxic ash in aging, unlined dams have been varied. They can be in the form of catastrophic spills, such as the biggest toxic waste spill in United States history, the 2008 Kingston spill in Tennessee. Four million cubic metres of toxic coal ash was released when a dam wall collapsed, smothering a valley including homes, the Emory River and the surrounding environment.

The environmental harm is more often far less visible, but even harder to remediate, due to the tendency of heavy metals to leach from the coal ash into groundwater and surface water. For example, Physicians for Social Responsibility document tens of cases of toxic pollution from coal ash dams⁴.

Need for the project

Retirement of Eraring coal power station and closure of the coal ash dam is approaching. The power station is scheduled to retire in 2033, however this closure date is incompatible with the agreed Paris goal of limiting warming to well below 2 degrees and making efforts to limit warming to 1.5 degrees. In order to meet the Paris goal would require all coal power stations in OECD countries like Australia to close by 2030 at the latest.

A Paris compliant phase-out timeline for NSW is shown in the figure below, with Eraring closing in 2026.

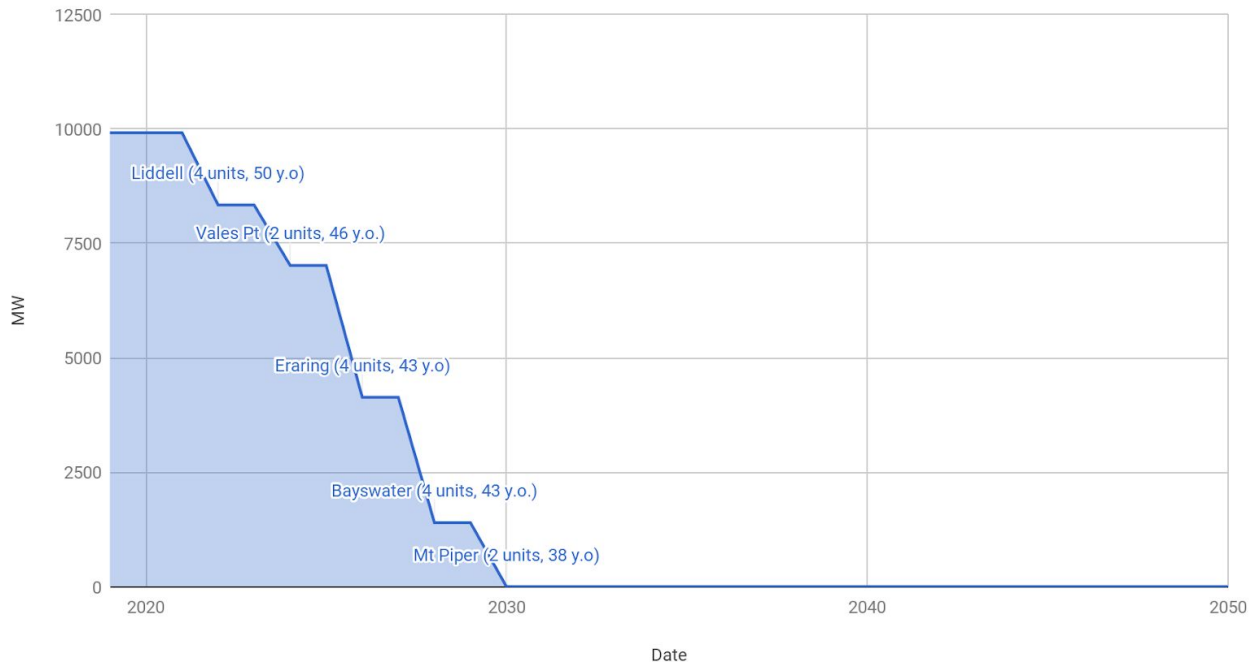
¹ Nature Conservation Council of NSW, "Repowering our Regions", 2017, available at: <https://www.nature.org.au/our-campaigns/climate-and-clean-energy/repowering-our-regions-a-clean-energy-road-map-for-nsw/>

² Australian National Waste Report 2016, Department of the Environment and Energy & Blue Environment Pty Ltd, Page 15

³ Larissa Scheider et. al, "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", *Science of the Total Environment* 490 (2014) 659–670

⁴ Physicians for Social Responsibility, "Coal Ash: the toxic threat to our health and environment", 2010, available at <https://www.psr.org/blog/resource/coal-ash-the-toxic-threat-to-our-health-and-environment/>

NSW Coal Fired Power Station Retirement Schedule - 1.5 Degree Scenario



Given that the existing ash dam approval has sufficient capacity to March 2026 under an ash reuse scenario of 40% (EA Table 1, page 7), and Origin's reuse target is 80% (EA page 8), expansion of the ash dam is both incompatible with Paris goals and unnecessary.

Groundwater

Groundwater contamination is now known to be commonplace at unlined coal ash storages globally.

In light of this, the US EPA has required ash dams, including existing ash dams, to upgrade to engineered landfills lined with composite membranes to slow contamination of groundwater⁵.

In addition, the EA (page 37) notes that:

"Trace metals in groundwater beneath the Ash Dam which have, on occasion, been recorded in concentrations in excess of the ANZECC 2000 criteria."

Given these two facts, NCC recommends upgrading the dam to global best practice by installing an engineered composite membrane to reduce leaching as much as possible. If water ingress can't be reduced, installing a leachate collection system may also be necessary, and conducting more rigorous groundwater monitoring to include the range of heavy metals typically found in coal ash.

⁵ US Federal Register volume 80, number 74, "EPA Hazardous and Solid Waste Management Systems: Disposal of Coal Combustion Residuals from Electric Utilities", 21302–21501 available at: <https://www.gpo.gov/fdsys/pkg/FR-2015-04-17> accessed 26 September 2018

Given the toxic nature of the ash and the potential for contamination of underlying soil with heavy metals, drilling waste from bore holes should not be irrigated to land as proposed in the EA, but treated as hazardous waste.

Underground coal mine connectivity and remediation.

We recommend that a mine remediation plan be developed and submitted prior to approval.

By placing 200,000 m³ of toxic coal ash in the mine workings, Origin could exacerbate flow of toxic chemicals into groundwater and Dora Creek. The EA notes that the “hydraulic conductivity” of the “stabilized fill” would need to be assessed to determine the effectiveness of the remediation plan. Placement of toxic coal ash in the coal seams should not be permitted until independent studies confirm that toxic chemicals will not migrate out of the ash at levels that would harm the receiving environment in the foreseeable future, i.e. thousands of years.

Closure and Rehabilitation

Prior to permitting expansion of the ash dam, NCC suggests imposing conditions for rehabilitation and closure.

Given that the Central Coast is one of the fastest growing communities in Australia, rehabilitation should be to a standard in keeping with future land-use of the surrounding area - eg. residential. Rehabilitation should also be to a standard that the leaching of toxic chemicals from the site will remain below acceptable levels even over long, thousand year time-scales. Levels of trace metals in groundwater on the site have exceeded the ANZECC 2000 criteria. Leaching can continue to increase for decades after coal ash is deposited, peaking well after the site is closed. For example, at Belews Lake, near Winston-Salem, North Carolina, a fish advisory was issued by the state authority eight years after the flow of selenium-laden water to the lake was ended, and remained in place for seven years⁶.

Rehabilitation conditions must therefore include lining the ash dam with a composite liner, capping the dam with an impermeable cap layer and a soil layer thick enough to allow future land uses and avoid ingress of water, as well as ongoing monitoring.

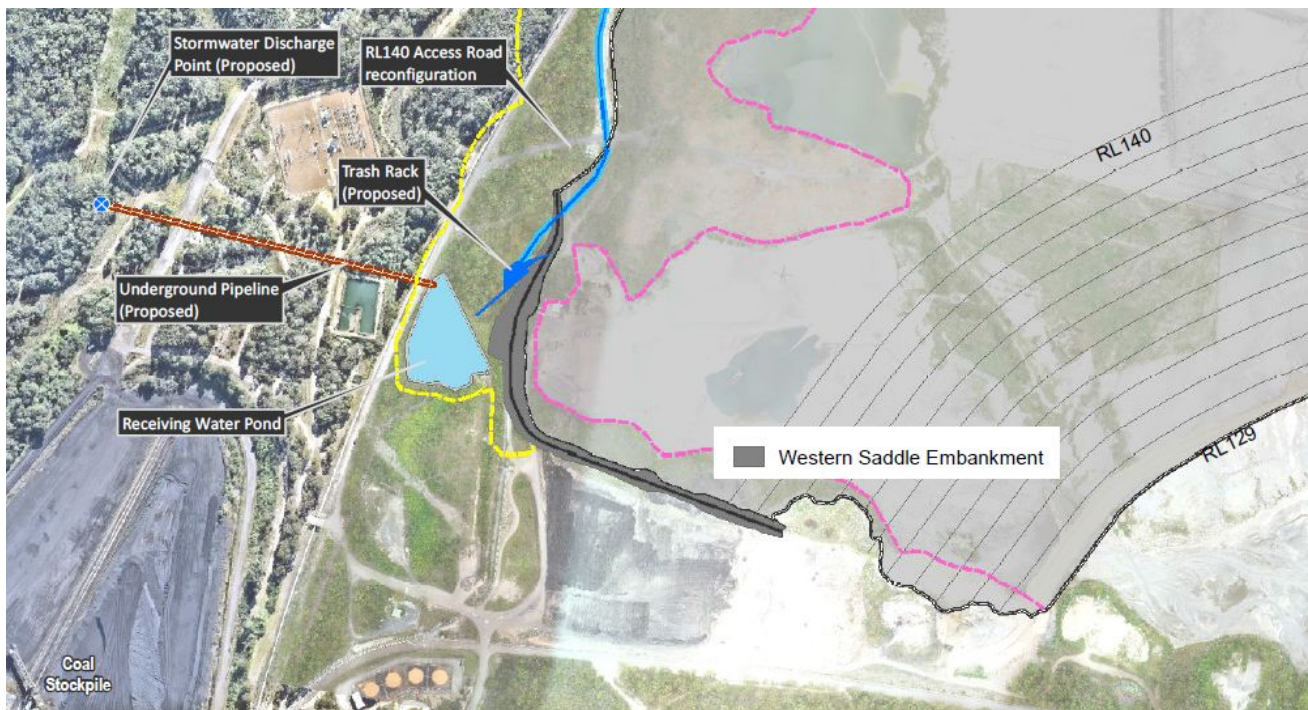
Deposition of an additional 5 million cubic metres of ash, and shaping the ash into “terraces” will hamper the possibility of effective long-term rehabilitation.

Seepage and receiving water

It is important to maintain separation of clean water from the nearby bush, wetlands and lake from the contaminated water of the ash dam.

Placement of the receiving (clean) water pond at the base of the new 10m high Western Saddle Embankment (see extract of EA Figure 2 below) means that seepage from the embankment will be difficult to detect and impossible to capture without polluting the receiving water pond. The current design increases the likelihood of contamination of the coastal wetlands, Dora Creek and Lake Macquarie.

⁶ Physicians for Social Responsibility, “Coal Ash: the toxic threat to our health and environment”, 2010, page 12



Excerpt from Figure 2, EA p12

Air Pollution

In 2017 Origin Energy were fined \$15,000 by the NSW EPA for an air pollution breach at this ash dam, following complaints from residents. The EA notes that dust incidents at the dam are regular. Changing the storage technique storing ash in terraces increases the surface area of the dam, makes wetting the ash more complex due to the stability and erosion of the terraces, and increases the risk of further air pollution events. There is no evidence that Origin can satisfactorily manage this more risky storage method.

Impacts on threatened species

There are 75 EPBC listed species that are known or likely to occur in the Lake Macquarie region⁷. Given the revelations in the EA concerning toxic chemicals leaching from the ash dam into groundwater, flowing into Dora Creek, and regularly leaving the site in dust events, it is imperative that the downstream impacts of pollution leaving the site on these species be assessed. The EA is deficient in that it does not contemplate or assess the impacts of pollution flowing off the site. Instead the EA states that "the project is not expected to result in additional indirect impacts on the biodiversity values of surrounding lands". Specifically, the impacts of elevated Selenium and Cadmium levels on the seven species known or likely to occur in Lake Macquarie which are listed as threatened under the Fisheries Management Act 1994 should be assessed, in addition to impacts on other species, including migratory species.

⁷ NSW listed threatened species as at November 2017, available at <https://www.lakemac.com.au/downloads/ECCB833FF031FB66429D863AA7D82814764A1152.pdf>, accessed on 27 September 2018

NCC would be happy to appear at a hearing and to provide any further information that would help the Minister come to a decision.

Warm regards,



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