Submission No 81

INQUIRY INTO COSTS FOR REMEDIATION OF SITES CONTAINING COAL ASH REPOSITORIES

Organisation: Environmental Justice Australia

Date Received: 21 February 2020

Environmental Justice Australia

Submission

in response to

New South Wales Public Works Committee Inquiry into the costs for remediation of sites containing coal ash repositories

prepared by

Environmental Justice Australia

21 February 2020

Environmental Justice Australia
ABN 74052124375

PO Box 12123
A'Beckett Street PO
Melbourne VIC 8006
L3, 60 Leicester St, Carlton

T (03) 8341 3100
F (03) 8341 3111
E admin@envirojustice.org.au
W www.envirojustice.org.au

About Environmental Justice Australia

Environmental Justice Australia (formerly the Environment Defenders Office, Victoria) is a not-for-profit public interest legal practice. We are independent of government and corporate funding. Our legal team combines technical expertise and a practical understanding of the legal system to protect our environment.

We act as advisers and legal representatives to community-based environment groups, regional and state environmental organisations, and larger environmental NGOs, representing them in court when needed. We also provide strategic and legal support to their campaigns to address climate change, protect nature and defend the rights of communities to a healthy environment.

We also pursue new and innovative solutions to fill the gaps and fix the failures in our legal system to clear a path for a more just and sustainable world.

For further information on this submission, please contact:

Bronya Lipski, lawyer, Environmental Justice Australia

T:

E:

Submitted to: Clerks Assistant – Committees: public.works@parliament.nsw.gov.au

21 February 2020

Introduction

Environmental Justice Australia welcomes the opportunity to make a submission to the New South Wales Public Works Committee Inquiry into the costs for remediation of sites containing coal ash repositories ("the Inquiry").

Environmental Justice Australia is a not-for-profit legal practice specialising in public interest environmental law.

Since 2015 we have investigated the pollution impacts of coal-fired power stations throughout Australia, including in New South Wales. In June 2019 we released a report, *Unearthing Australia's Toxic Coal Ash Legacy*, which documents the regulatory failure of state environmental agencies to protect community and environmental health and safety from coal ash dams. We have provided this report as an attachment to our submission (Attachment 1).

Our submission provides evidence and recommendations in relation to the following areas:

- The NSW government indemnification of power station operators for the costs associated with remediation, and the factors that complicate comprehensive remediation arising from these arrangements.

- The failure of institutional arrangements for robust environmental and community protection against the adverse impacts of poor ash dam management, and the consequences of poor management for effective remediation.

- The necessity for the development and implementation of *Protection of the Environment (Coal Ash Repository) Regulations*.

- The role of comprehensive remediation of coal ash dams in a just transition.

- The necessity for wide scale reuse of coal ash, and the need for more stringent regulations to guide the safe reuse of coal ash.

- The role of comprehensive remediation to provide community certainty in future land use planning.

Coal ash repositories pose the most risk to the communities and environments closest to them. We urge the Public Works Committee to hold hearings for the Inquiry in those communities, including on the NSW Central Coast, Lithgow, and Hunter Valley.

Coal ash regulation in NSW is contained in conditions imposed in the Sale and Purchase Agreements (SPAs) between the Government and the power station owners and operators during privatisation of the power industry, and the regulation of two Government agencies – Dams Safety NSW (DSN) and the Environment Protection Authority (EPA). These agencies regulate different aspects of coal ash

dams without apparent cooperation or coordination. Obtaining information on coal ash dams from the DSN and the EPA is a lengthy and cumbersome process, often requiring the application for information under the *Government Information (Public Access) Act 2009* (NSW) (*GIPA*) process.

The legal and regulatory framework to ensure best practice management of coal ash repositories is inadequate and ineffective. It does not facilitate for the comprehensive reuse of coal ash, and is not designed to comprehensively safeguard community and environmental health. This has wide-ranging consequences for the costs associated with remediation and the future health of surrounding environment and communities. Operators are not required to prepare rehabilitation and closure plans until after power stations are decommissioned.

The spectrum of risks and liabilities associated with the inadequate remediation of coal ash repositories in NSW stems fundamentally from the absence of carefully designed and rigorously implemented laws and regulation that underpin operator and State requirements for comprehensive management and rehabilitation.

Coal ash is a major component of NSW's waste stream and is too significant to be relegated to general waste regulations. Over 60 million tonnes stored and an additional 1.9 million tonnes produced by Vales Point and Eraring ash dams alone.[1] Coal ash dams provide unique challenges and risks that are not comprehensively addressed by current NSW waste regulations.

The best way to ensure that coal ash dumps are comprehensively managed, remediated and rehabilitated is to develop coal ash dam specific regulations under the *Protection of the Environment Operations Act 1997* (NSW) (POEO Act). Such regulations must ensure that contamination is cleaned up by excavating coal ash and re-siting it in purpose-built landfills, providing safe reuse mechanisms, the development of comprehensive rehabilitation, closure and post-closure plans well in advance of decommissioning, and ensuring community access to information.

Comprehensive regulations driving ash dump rehabilitation and on-going post-closure management has a three-fold benefit: job creation; environmental decontamination; and the potential use of coal ash as a resource for other industries. This is especially important for communities who have born the pollution burden of coal-fired power generation for decades, who as part of just transition planning deserve the certainty of comprehensive environmental remediation and the job opportunities that arise from this.

Recommendations

Recommendation 1: Baseline studies undertaken by the NSW Government with respect to existing contamination at the currently operational power stations should be made publicly available.

Recommendation 2: In the event that the above-mentioned baseline studies do not contain prospective quantum associated with remediation for pre-sale contamination, an estimation of that

[1] Hunter Community Environment Centre, 2019, *Out of the Ashes: Water Pollution and Lake Macquarie's Ageing Coal-Fired Power Station*s, p. 1. Available at: http://www.hcec.org.au/content/out-ashes.

quantum is must be established and made publicly available. This must include the quantum associated with closure and post-closure of coal ash dams.

Recommendation 3: The NSW Government must determine who is responsible for bearing the financial costs associated with post-closure management of coal ash dams.

Recommendation 4: The quantum associated with remediation for pre-sale contamination needs to be determined based on international best-practice for remediation of coal ash dams, taking into consideration the necessity for relocation of coal ash repositories to comprehensively clean-up contamination.

Recommendation 5: The NSW Government should release annual reports to the NSW Parliament that quantify the state's liability for remediation and rehabilitation of coal ash dams, and estimates of closure and post-closure costs.

Recommendation 6: The NSW Government must develop and implement the *Protection of the Environment (Coal Ash Repository) Regulations* to mitigate the current and future threat of contamination of land, groundwater and surface water and to prevent harm to human health, aquatic resources and ecosystems.

This Regulation must, as a minimum:

a. implement enforceable standards for ash repository management and remediation consistent with international best practice. The standards should apply to both active and inactive, open and closed ash dumps. The development of these standards should actively involve stakeholders, including impacted communities;

b. amend power station EPLs to incorporate the state-wide coal ash repository management and remediation standards;

c. require ash dump owners and operators to convert wet dumps to dry ash emplacements;

d. prohibit the construction of new wet dumps;

e. require comprehensive monitoring of groundwater for coal ash contaminants and provide public access to all groundwater monitoring data (current and historical) via a website similar in function to the website for air pollution monitoring maintained by the NSW EPA. Data should be interpreted through reference to current best practice international standards;

f. require operators to take timely remedial action when groundwater contamination exceeds water quality standards, including excavating and re-siting operational ash dumps to thoroughly rehabilitate existing sources of contamination to best practice standards;

g. require coal ash operators to prepare comprehensive best practice rehabilitation, closure and post-closure plans in consultation with the communities who live near these toxic sites.

h. oblige DSN to make publicly available the annual inspection reports and five-yearly surveillance reports produced by coal ash repository operators;

i. require EPA conduct regular unannounced audits of coal ash repositories, inspecting the management and remediation of each repository at least twice each year;

j. require EPA to publish and make public annual reports on the reuse of coal ash from all repositories, including the quantity of coal ash generated at each power station, the destination and purpose of all coal ash transferred for reuse;

k. require ash dam operators to prepare and make public annual coal ash test reports on coal ash reused for other purposes;

l. establish and mandate accurate testing methods for coal ash leaching to replace the current leach test that does not accurately reflect the behaviour of coal ash and can underestimate the level of toxic contaminants that leach from ash; and,

m. create a levy payable on tonnes of coal ash sent to ash dams to provide further funding for the EPA to adequately monitor compliance with the regulations.

Recommendation 7: The NSW Government should make access to information about coal ash repositories transparent and available, including all existing management plans, details of financial assurance, rehabilitation plans, pollution incidents, fines and other enforcement actions taken by regulators, monitoring data, hydrogeological assessment, predictions for future contamination, and predictions for future land-use planning.

Recommendation 8: The NSW Government must release annual reports to the NSW Parliament that quantify the state's liability for remediation and rehabilitation of coal ash dams.

Recommendation 9: The NSW Government must conduct and publish an audit of the extent of coal ash reuse from the state's five operating coal-fired power stations during the last 10 years, identifying the power stations where the coal ash was generated, and the quantities, destinations and purposes of all the coal ash transferred for reuse.

Recommendation 10: The NSW Government must commission a comprehensive and independent assessment of the health and environmental impacts of coal ash pollution from coal ash repositories at NSW's coal-fired power stations to understand the full extent of the toxic threat and make strong recommendations to protect human and environmental health. This assessment must include, at a minimum, obligations enforcing operators to:

a. test groundwater wells providing drinking, irrigation or stock water within 0.8 kilometres of all coal ash repositories to determine the presence of coal ash contaminants. Each operator shall report the findings of the groundwater survey to NSW EPA, which shall make results publicly available.

b. test surface water downstream of coal ash repositories for the presence of coal ash contaminants. Each operator shall report the findings of the surface water survey to NSW EPA, which shall make results publicly available.

c. install air monitors that measure fugitive dust emissions from coal ash repositories, including the presence of particulate matter, including PM 2.5 and PM 10. Each operator must report the findings of the air monitoring survey to NSW EPA, which must make such results publicly available.

Recommendation 11: The NSW Government must establish standards for the reuse of fly ash in concrete in all government projects, including road building and infrastructure by setting a minimum level of fly ash substitution for Portland cement.

Recommendation 12: The NSW Government should appoint a panel of qualified scientific experts and community stakeholders to examine and evaluate the practice of placement of coal ash into and on top of surface and underground coal mines, taking into consideration the long-term structural stability of such placement and the potential for contamination of surface water and groundwater.

Recommendation 13: The NSW Government should solicit information from both the public and international dam safety and coal ash experts and hold hearings to obtain public comment. The Government should issue a report on its findings, including recommendations for further regulatory action to ensure protection of human health and the environment from placement of coal ash in coal mines.

Recommendation 14: The NSW Government should evaluate and promote opportunities for local employment in the comprehensive remediation and rehabilitation of coal ash repositories, and ensure that employment opportunities are factored into rehabilitation planning.

1. Prospective quantum of government liability.

This section addresses Terms of Reference (TOR) (a): prospective and/or current quantum of government liability for remediating contamination at sites associated with NSW power stations.

Environmental Justice Australia obtained documents through the GIPA process from NSW Department of Treasury regarding government liability for remediating coal ash dams for Eraring, Vales Point, Bayswater, Liddell and Mt Piper power stations.

These documents include:

- Put and Call Options Deed for Vales Point power station ("Vales Point Deed");[2]
- Contamination Liabilities Deed for Eraring power station ("Eraring Contamination Deed");[3]
- Schedule 8 of the Sale and Purchase Agreement for Bayswater and Liddell power stations

[2] Vales Point Post Closure Deed between NSW Government, Delta Electricity, Vales Point Investments Pty Ltd, Sunset Power International Pty Ltd, Document 2624839-v7\SYDDMS, executed 17 December 2015.
[3] Contamination Liabilities Deed between State of NSW, Origin Energy Power Limited, Eraring Energy, prepared by Clayton Utz, Document 310371581.2, executed 28 June 2013.

- which contains Contamination and Rehabilitation Provisions ("Bayswater and Liddell Contamination Provisions");[4] and

- Schedule 10 to the Sale and Purchase Agreement for Mt Piper power station which contains Contamination and Rehabilitation Provisions ("Mt Piper Contamination Provisions").[5]

(collectively "Contamination and Rehabilitation Provisions").

The Contamination and Rehabilitation Provisions in the schedule to the various SPAs show that the NSW Government must indemnify and keep indemnified the private owner and operator of the coal-fired power stations against any loss suffered or incurred as a result of loss arising in connection with "pre-existing contamination" and in the case of Vales Point "ash dam contamination", including after a Government Order, an obligation to remediate that pre-existing contamination and ash dam contamination, or breach of an environmental law.[6]

"Pre-existing contamination" was determined prior to the completion of the SPAs through baseline studies to determine the extent of pre-sale contamination at the sites. These baselines studies are not publicly available. Environmental Justice Australia does not know whether these baseline contamination studies contain the prospective quantum of government liability for undertaking the remediation of contamination described in the baseline studies. However, the cost for remediation of coal ash generated and stored prior to the sale of the state's coal-fired power stations is currently identified in NSW Treasury briefings as an uncalculated contingent liability.[7]

The paucity of information about NSW coal ash dams generally is a recurring theme in this submission. The Committee of Inquiry has an important role to play in ensuring that information required to inform the NSW public of the financial and environmental risks associated with coal ash dams is made available and able to be independently scrutinised. EJA urges the Committee to make public, at the very least, the baseline studies and ash management plans prepared as part of SAPs at privatisation of the power industry. Release of this information will assist independent experts in determining as best as possible the quantum of government liability for comprehensively remediating coal ash dams.

---

[4] Sale and Purchase Agreement, Schedule 8: Contamination and Rehabilitation Provisions, Bayswater and Liddell power stations, Document 2331348-v11\SYDDMS.
[5] Sale and Purchase Agreement, Schedule 10: Contamination and Rehabilitation Provisions, Mt Piper power station.
[6] Vales Point Post Closure Deed between NSW Government, Delta Electricity, Vales Point Investments Pty Ltd, Sunset Power International Pty Ltd, Document 2624839-v7\SYDDMS, executed 17 December 2015, cl. 4.11; Contamination Liabilities Deed between State of NSW, Origin Energy Power Limited, Eraring Energy, prepared by Clayton Utz, Document 310371581.2, executed 28 June 2013, cl. 2.1; Sale and Purchase Agreement, Schedule 8: Contamination and Rehabilitation Provisions, Bayswater and Liddell power stations, Document 2331348-v11\SYDDMS, cl. 2.1; Sale and Purchase Agreement, Schedule 10: Contamination and Rehabilitation Provisions, Mt Piper power station, cl. 2.1.
[7] Brief to Treasurer, Charles Casuscelli, Residual government liabilities remediation of power station ash dams, 21 July 2015. Docs 68-79, Order for Papers 22/8/19 'Contamination at power station associated sites'

To estimate liability for remediation costs, it is necessary to first clarify the required method of remediation. The contamination and rehabilitation provisions refer to the need for rehabilitation to be "cost-effective",[8] and NSW Treasury documentation refers to remediation requiring 'minimum legal standards'.[9] There are two immediate problems with this. The first is that "cost effective" is not defined in the SAPs. The danger here is that "cost effective" will be taken to mean "least amount of dedication of financial resources on the part of either the Government or operator". When they purchased the Vales Point power station for just $1M, Sunset Power International accepted a maximum $10M liability for the rehabilitation of the power station, including its coal ash repository.[10] To put this into context, Duke Energy estimates that the clean-up bill for nine coal ash repositories at its North Carolina operations will cost in the order of USD$10B – to excavate and relocate 100 million tons of ash to lined landfills and cap with appropriate impervious material.[11] Engie, operator of the Hazelwood Power Station in Victoria, has estimated that the clean-up of the power station site which includes the ash dams at $304 million.[12]

With respect to the Put and Call Options Deed for Vales Point and the Contamination Liabilities Deed for Eraring, concerning observations regarding the prospective and current liability for remediating contamination include:

a. Neither Vales Point nor Eraring power station ash dams are lined. Given the ash dams were not initially constructed by current operators and that subsequent to SPA execution neither power station has been required by relevant NSW agencies to line ash dam expansions, how can the State accurately separate liability for remediation and rehabilitation of either ash dam for contamination that is the result of a poorly constructed repository?

b. Selenium contamination from both Vales Point and Eraring power station ash dam has been known to the NSW Government and the NSW EPA for decades. The Additional Baseline Contamination Assessment for Vales Point Power Station identified in 2017 that elevated levels of selenium concentrations above adopted guidelines values were reported in 6 of 8 sediment locations in Wyee Bay. The Assessment identifies the coal ash dam and operation of Vales Point power station as contributing to these selenium levels, and acknowledges the adverse impacts of selenium on marine organisms with Wyee Bay and surrounding water bodies.[13] Why has nothing been done to address this contamination? And what are the costs associated with contamination of ecosystems in Lake Macquarie to the community for failure to mitigate selenium contamination?

---

[8] Reference from Vales Point, Cl 4.21.
[9] NSW Treasury, Crown Entity: Notes for the financial statements for the year ended 30 June 2014, Contingent Liabilities, Briefing for the Treasurer, Public information on residual generator liabilities, File no P15/2980.
[10] https://reneweconomy.com.au/nsw-exposed-to-unquantifiable-liabilities-for-vales-point-decommissioning-documents-show-84435/.
[11] 5/4/19 'The big Duke coal ash clean-up: Where things stand and what to expect next', *NC Policy Watch*, available at: http://www.ncpolicywatch.com/2019/04/05/the-big-duke-coal-ash-cleanup-where-things-stand-and-what-to-expect-next/
[12] https://www.abc.net.au/news/2017-01-20/hazelwood-rehabilitation-to-cost-743-million-engie-says/8197784.
[13] Jacobs Group, Additional Baseline Contamination Assessment – Vales Point Power Station, Document IA 137000-N-CL-RP-Vales Point Baseline CA, July 2017, vii.

c. The degree to which Baseline Studies contain state liability for structural integrity of the coal ash repositories is unknown. The 2019 closure of the Myuna Bay Sports and Recreation Centre highlight the seriousness that poorly constructed ash dams pose to the surrounding community, however the extent to which the NSW Government is liable for the financial risks associated with remediating structurally ambiguous ash dams is unclear.

d. The purchaser of Vales Point power station and the NSW Government entered into a Put and Call Option Deed as part of the SAPA for the power station which differentiates between legacy contamination, pre-existing contamination, and ash dam contamination. In order to remain indemnified by the NSW government for ash dam contamination, the power station must operate in accordance with an Ash Dam Management Plan.[14] As part of a GIPA request, EJA has learned from the Department of Treasury that as at [enter date of advice] Sunset Power International is not operating under a current Ash Dam Management Plan in accordance with its operating obligations under the Put and Call Option Deed,[15] thus potentially operating in such a way that would void their indemnity.

The costs associated with coal ash dams are not just financial burden of the State or the operator. Other costs include the loss of marine ecosystems, the loss of community space, the inability for local government to use land in the future, and the employment costs in not creating jobs in the coal ash reuse market and employment associated with comprehensive remediation.

The second problem is that minimum standards for coal ash dam remediation are not contained in a single regulatory document. Currently, operators are required to cap ash dams as an obligation of their environment protection licences issued by EPA under the POEO Act. Rehabilitation planning does not occur until after a power station has been decommissioned. This generally involves capping the ash dams in place, and does not require remediation of pre-existing contamination or removal of ash from poorly constructed dams to safeguard against future contamination. There are no best-practise rehabilitation, closure or post-closure plans for coal ash dams in NSW or Australia generally.

There is an opportunity for NSW to lead the country on best practise coal ash dam management and remediation by preparing minimum legal standards by developing coal ash specific regulations under the POEO Act. This is addressed more in section 2 of this submission.

After a coal ash dam has been rehabilitated (to whatever degree) it is necessary to monitor, collect and treat any ongoing seepage and contamination for decades. The SPAs specify that the NSW Government's obligations end three years after decommissioning. Who will cover the costs of monitoring, collecting and treating groundwater and surface water after that three year period?

A significant question regarding the cost of remediation and impediment to comprehensive remediation may be the NSW government's liabilities regarding pre-existing contamination

[14] Vales Point Put and Call Option Deed, cl. 10. 5.
[15] Email correspondence between Environmental Justice Australia and NSW Department of Treasury, 29 January 2020.

determined in the baseline studies in the SAPs. Comprehensive remediation of existing sites will require remediation of pre-existing contamination and issues associated with the coal ash repositories whilst they were state-owned. In the event that the law is strengthened to require comprehensive remediation, the SPAs entered into between the NSW Government and the power station owner require the NSW Government to reimburse the owner for legal obligations to remediate that pre-existing contamination.

It may be the case that the NSW Government does not require more comprehensive remediation of coal ash dams and the development of robust coal ash dam regulations because the State is liable for that remediation.

Moreover, the NSW government has exposed itself to the potential that all remediation of coal ash repositories can be linked back to pre-SAP contamination issues contained in the baseline studies. For example, the government failed to construct coal ash dams to comprehensively mitigate against either groundwater or surface water contamination, away from sensitive waterways such as Lake Macquarie and the Cox's River.

However, the SAPs do provide that environmental laws must be adhered to whether those laws were in force before or after the date that the contamination liabilities of the State were executed.[16] This means that if more stringent laws are created with respect to current management of coal ash dams, a greater financial burden is placed on current operators which may offset future state liabilities for the costs associated with rehabilitation.

Recommendations

Recommendation 1: Baseline studies undertaken by the NSW Government with respect to existing contamination at the currently operational power stations should be made publicly available.

Recommendation 2: In the event that the above-mentioned baseline studies do not contain prospective quantum associated with remediation for pre-sale contamination, an estimation of that quantum is must be established and made publicly available. This must include the quantum associated with closure and post-closure of coal ash dams.

Recommendation 3: The NSW Government must determine who is responsible for bearing the financial costs associated with post-closure management of coal ash dams.

Recommendation 4: The quantum associated with remediation for pre-sale contamination needs to be determined based on international best-practice for remediation of coal ash dams, taking into consideration the necessity for relocation of coal ash repositories to comprehensively clean-up contamination.

[16] For example see: Vales Point Post Closure and Put and Call Option Deed, Document No. 2624839-v7A\SYDDMS, 17 December 2015, Definition "Environmental Law", p. 8; Bayswater and Liddell Sale and Purchase Agreement, Document No. 2331348-v11\SYDDMS, Schedule 8, pp.131-132.

Recommendation 5: The NSW Government should release annual reports to the NSW Parliament that quantify the state's liability for remediation and rehabilitation of coal ash dams, and estimates of closure and post-closure costs.

2. New laws are needed to ensure NSW coal ash dams are comprehensively, consistently and effectively remediated.

This section addresses the following TORs:

> (d): adequacy and effectiveness of the current regulatory regime for ensuring best practise remediation of coal ash repositories;
>
> (f): risks and liabilities associated with inadequate remediation including community and environmental health impacts; and,
>
> (g): any other related matters.

It is EJA's position that the current regulatory regime manifestly inadequate to ensure either best practise management or remediation of coal ash dams in NSW. Coal ash specific regulations need to be established under the POEO Act.

The NSW Government has no coherent standards or rules for the management and remediation of coal ash repositories. The management of coal ash dams from construction through to decommissioning has significant implications for rehabilitation and closure costs.

The institutional arrangements for coal ash management in NSW is complicated by the fact that regulatory responsible is shared between two statutory authorities: the EPA and the DSN who regulated Coal ash dumps under the DS Act, and POEO Act respectively. The carving out of regulatory oversite by DSN and EPA of coal ash dams and the adverse implications of this for both current management and rehabilitation is discussed below.

The institutional arrangements for coal ash dam management and remediation is further complicated by the financial obligations of the NSW Government and power station owners and operators in the conditions of the SAPs, as described in the previous section.

Dams Safety NSW

The DSN has regulatory oversite of "declared dams" which include Eraring, Vales Point, Bayswater and Liddell power station ash dams.[17] This regulatory oversite includes auditing the compliance of owners of declared dams with operations and maintenance plans,[18] formulating measures to ensure

[17] *Dams Safety Regulation 20198* (NSW) Cll. 4(1)(d). List of declared dams: https://www.damsafety.nsw.gov.au/wp-content/uploads/Dams-safety-declared-dams-list-2.pdf.
[18] *Dams Safety Act 2015* (NSW) ss. 9(d) (DS Act).

dam safety,[19] keeping the public informed of dams safety standards,[20] and applying best practise principles in regulating dams safety.[21]

Power station operators are required to submit reports to the DSN. There is no requirement that power station operators or the DSN make reports under the DS Act publicly available. The public therefore has no knowledge of structural issues until these are made public.

This occurred in 2019 when it was revealed that the Eraring power station ash dam posed risks to the Central Coast community in the event of an earthquake resulted in the permanent closure of the Myuna Bay Sports and Recreation Centre. Origin Energy Eraring released an engineering report to the NSW Office of Sport which found that the ash dam could not safely withstand a 5.7 earthquake. It is not clear whether DSN or Origin Energy Eraring had previously identified this risk. The DSN appears to fail in its function to keep the public informed of dams safety and its object to promote transparency in regulating dams safety with respect to coal ash dams.[22]

It is a function of DSN to apply, as far as reasonably practicable, best practise regulatory principles in regulating dams safety.[23] Although DSN has risk consequence ratings and assessment methodologies,[24] there is no currently available information about the consequence categories of the coal ash dams, and no best-practise regulatory principles specific to coal ash dams.

EPA

The EPA issues individual environment protection licences (EPLs) under the POEO Act to the operators of each power station. The EPLs include conditions relating to environmental monitoring, capping and rehabilitation materials, waste acceptance conditions, and pollution reduction programs to determine better management of ash waste.[25]

Although the POEO Act provides that financial assurance can be imposed in EPLs the EPA does not require power station operators to hold a financial assurance for the ash dams.[26] Nor does the EPA require power station operators to prepare comprehensive rehabilitation plans in advance of decommissioning. There is no evidence to suggest that any rehabilitation will be in accordance with international best practice. Both financial assurance and preparation of rehabilitation plans are authorized under the POEO Act and could be requirements of EPLs.

---

[19] DS Act ss. 9(f).
[20] DS Act ss. 9(c).
[21] DS Act s. 3(b).
[22] DS Act s. 3(b).
[23] DS Act s. 9(3)(b).
[24] Natural Resources Access Regulator, Dams Safety NSW, Societal and individual risk rating methodology for Dams Safety Act 2015, and Declared dams consequence category assessment and determination methodology for Dams Safety Act 2015, NSW Government Gazette, Number 94, Friday 23 August 2019. Available at:
[25] To access power station environment protection licences, see: https://apps.epa.nsw.gov.au/prpoeoapp/
[26] *Protection of the Environment Operations Act 1997* (NSW) ss. 70, 296-307.

EPA audits of coal ash dam compliance is lax. Between 2016 and 2017, the NSW EPA conducted a compliance audit program to assess licensees' level of compliance with the requirements of their EPLs and to improve their environmental performance.[27] The audit was arlarminly narrow in its scope and was further restricted in scope by several operators' failure to provide sufficient information to the auditor.

For instance, dust management was only assessed at two of the seven premises, despite a history of complaints, investigations and enforcement actions relating to dust.[28] Similarly, seepage to groundwater was not assessed, despite documented evidence of groundwater contamination at the time the power stations were sold by the NSW Government. Operators were unable to provide the auditors with consistent records of compliance inspections.

Coal ash dams in NSW are not lined to effectively mitigate against groundwater contamination. Both coal ash dams on the NSW Central Coast – Origin Energy Eraring and Sunset Power International Vales Point power station ash dams are unlined despite their proximity to Lake Macquarie and surrounding communities. Despite repeated approvals to expand the Eraring power station ash dam, consent authorities in NSW have not required the ash dam to be lined as a condition of consent approval. This includes the most recent expansion approval granted by the Independent Planning Commission in late-2019. Independent technical assessment of this expansion raises serious concerns about the threat of the Eraring ash dam to the environment. We have provided this assessment as an attachment to our submission (Attachment 2).

In the United States, non-government researchers conducted an audit of groundwater monitoring data near 265 coal-fired power stations.[29] Their audit identified groundwater contamination above standards considered safe at 91% of these power station ash dumps. More than half of the ash repositories had caused groundwater contamination above the health-based threshold for arsenic, lithium and sulfate. A significant number of the sites examined pose significant cumulative risks to human health and environment, with unsafe levels of several toxic pollutants.[30]

The NSW EPA has imposed a limit for selenium for one monitoring point at Eraring, and no monitoring points for Vales Point. Groundwater contamination studies for the power stations are not publicly available other than through the GIPA process, including the Ash Dam Seepage Report that EPA required Sunset Power to prepare for Vales Point in 2013 and is listed on the POEO Register. There is no public policy reason why the public should not have unrestricted access to this information.

---

[27] NSW EPA, 2017, *Environment Compliance Report: Coal Ash Dams and Emplacements*, available at: https://www.damsafety.nsw.gov.au/wp-content/uploads/Gazette_Methodologies-_2019_2019-94.pdf. https://www.epa.nsw.gov.au/publications/licensing/environment-compliance-report-coal-ash-dams-170276

[28] NSW EPA, 2017, *Environment Compliance Report: Coal Ash Dams and Emplacements*, p. 3.

[29] Russ, A., Bernhardt, C. and Evans, L., 2019, Coal's Poisonous Legacy: Groundwater Contamination by Coal Ash Across the US, Environmental Integrity Project, available at: http://www.environmentalintegrityproject.org.

[30] Russ, A., Bernhardt, C. and Evans, L., 2019, Coal's Poisonous Legacy: Groundwater Contamination by Coal Ash Across the US, Environmental Integrity Project, p.16.

The long-term rehabilitation and maintenance of coal ash repositories will require a rigorous and transparent environmental monitoring program. Currently, environmental monitoring for groundwater and air quality adjacent to coal ash repositories is conducted by the coal ash dump operators. To access and interrogate this data, it is necessary to navigate the websites of several different companies, download pdfs that provide only partial data and manually create a dataset. EJA has done this previously and found the process prohibitively laborious. The constraints that we encountered are also constraints to environmental regulators. It should be possible to access a centralised dataset that includes all monitoring data for all coal ash repositories.

The EPA has not imposed stringent limits on toxins such as selenium, cadmium, arsenic and lead in EPLs, despite evidence that power station ash dams on the NSW Central Coast contribute to selenium and cadmium levels so high that toxicity levels in certain species of crab prohibit their consumption.

Moreover, coal ash dumps in NSW contain more than toxic ash from the coal-combustion process. The EPLs for the power stations state what additional materials the ash dumps can receive.

The Eraring ash dump is licenced to receive additional wastes generated at the power station, including fabric filter bags used to capture air pollutants, boiler chemical cleaning residues, coal conveyor wash-down, and mine dewatering from Awaba State mine.

The Vales Point ash dump can receive additional wastes including residual detergents and oil sheens, coal mine dewatering, dirty water drains, soil contaminated with oil and chemicals, fabric bag filters and chemical cleaning solutions.

The Mount Piper ash dump can receive wastes including fabric bag filters, chemical clean solution and cooling tower sediments.

Both the Liddell and Bayswater EPLs list wastes that the power stations can dispose of, but it is not clear from the EPLs where this waste is disposed of.

The EPA can approve other materials to be disposed of in these ash dumps. However these approvals are not publicly available and it is unknown what these materials are. The presence of other toxins in coal ash dams has implications for coal ash reuse, and necessitates the development of robust coal ash reuse policies.

The current regulatory regime fails to protect the environment and communities

The regulatory arrangement for coal ash dams undermines robust environmental protection and the community's right to know how ash dams are managed and the risks the ash dams pose to the community and surrounding environment. It is harder for community members to access information about licencing obligations and compliance when multiple agencies are involved. Information about coal ash repositories in NSW is extremely limited. Requests for information under the GIPA process is time-consuming, potentially expensive, and is subject to objection by well-resourced power station owners and operators who deem the information commercially sensitive.

Given the opaqueness of the regulatory framework that governs coal ash remediation, it is likely that there is significantly more information that demonstrates the inadequacy of the Government, DSN and EPA to mitigate the impact of coal ash on the surrounding environment. By contrast, in Victoria the EPA has sole regulatory oversight of ash dumps, and environmental audits for these sites are publicly available.[31]

It is unclear if, and how, the EPA and DSN work together to ensure that ash dumps are safe and that pollution risks are mitigated. Pollution from coal ash dams is related to their construction. If the dump is constructed and lined in accordance with best practice, then pollution risks are mitigated. It is unclear which authority ought to take responsibility for ensuring that ash dam construction facilitates environmental protection. The EPA audit of ash dump compliance makes very little mention of DSN and does not mention any cooperation between the two authorities.[32] If the regulation of ash dumps is spread over two government authorities then the community has a right to expect that these authorities are working together to ensure the dumps pose no environmental or human health risk and that communities are protected against potential dump failure.

NSW must prepare and implement *Protection of the Environment (Coal Ash Repository) Regulations*

Coal ash dam management and rehabilitation must be streamlined into fit for purposes regulations. EJA proposes the development of *Protection of the Environment (Coal Ash Repository) Regulations* under the POEO Act. As the principle pollution control Act in NSW, the POEO Act has the most robust powers to prepare stringent and comprehensive regulations to protect the environment and communities from the adverse impacts of coal ash dams. Moreover, the considerable issues associated with poor ash dam management, enforcement provisions, and third-party enforcement provisions are stronger under the POEO Act.

Coal ash is a major component of NSW's waste stream, with over 60 million tonnes stored and an additional 1.9 million tonnes produced by Vales Point and Eraring ash dams alone.[33] The volume and nature of the waste stream mean that it is inappropriate to be relegated to general waste regulations. Coal ash dams provide unique challenges and risks that are not comprehensively addressed by current NSW waste regulations. The issues that have been identified by EJA and that are likely to emerge throughout the Inquiry process warrant government action to establish specific coal ash regulations. The public interest in ensuring that coal ash is comprehensively managed is paramount to public and environmental protection.

---

[31] Latrobe Valley environmental audit reports can be accessed here: https://portal.epa.vic.gov.au/irj/portal/anonymous?NavigationTarget=ROLES://portal_content/epa_content/epa_roles/epa.vic.gov.au.anonrole/epa.vic.gov.au.searchanon&trans_type=Z010

[32] See: New South Wales Environment Protection Authority, Environment Compliance Report, *Coal as dams and emplacements*, 2017 (https://www.epa.nsw.gov.au/-/media/F296D19215D348A8BC16DEB4D2021A52.ashx).

[33] Hunter Community Environment Centre, 2019, *Out of the Ashes: Water Pollution and Lake Macquarie's Ageing Coal-Fired Power Station*s, p. 1. Available at: http://www.hcec.org.au/content/out-ashes.

The Committee has an opportunity to ensure that the way coal ash is regulated is reformed to ensure that these toxic sites are managed, rehabilitated and reused in a way that safeguards environmental and community health well into the future and maximises the opportunity best reuse the sites.

Recommendations

Recommendation 6: The NSW Government must develop and implement the *Protection of the Environment (Coal Ash Repository) Regulations* to mitigate the current and future threat of contamination of land, groundwater and surface water and to prevent harm to human health, aquatic resources and ecosystems.[34]

This Regulation must, as a minimum:

a. implement enforceable standards for ash repository management and remediation consistent with international best practice. The standards should apply to both active and inactive, open and closed ash dumps. The development of these standards should actively involve stakeholders, including impacted communities;

b. amend power station EPLs to incorporate the state-wide coal ash repository management and remediation standards;

c. require ash dump owners and operators to convert wet dumps to dry ash emplacements;

d. prohibit the construction of new wet dumps;

e. require comprehensive monitoring of groundwater for coal ash contaminants and provide public access to all groundwater monitoring data (current and historical) via a website similar in function to the website for air pollution monitoring maintained by the NSW EPA. Data should be interpreted through reference to current best practice international standards;

f. require operators to take timely remedial action when groundwater contamination exceeds water quality standards, including excavating and re-siting operational ash dumps to thoroughly rehabilitate existing sources of contamination to best practice standards;

g. require coal ash operators to prepare comprehensive best practice rehabilitation, closure and post-closure plans in consultation with the communities who live near these toxic sites.

h. oblige DSN to make publicly available the annual inspection reports and five-yearly surveillance reports produced by coal ash repository operators;

i. require EPA conduct regular unannounced audits of coal ash repositories, inspecting the management and remediation of each repository at least twice each year;

[34] The *Protection of the Environment Operations Act* provides that the Governor may make regulations, not inconsistent with this Act, for or with respect to any matter that by this Act is required or permitted to be prescribed or that is necessary or convenient to be prescribed for carrying out or giving effect to this Act. See: *Protection of the Environment Operations Act 1997* (NSW) s. 323(1).

j. require EPA to publish and make public annual reports on the reuse of coal ash from all repositories, including the quantity of coal ash generated at each power station, the destination and purpose of all coal ash transferred for reuse;

k. require ash dam operators to prepare and make public annual coal ash test reports on coal ash reused for other purposes;

l. establish and mandate accurate testing methods for coal ash leaching to replace the current leach test that does not accurately reflect the behaviour of coal ash and can underestimate the level of toxic contaminants that leach from ash; and,

m. create a levy payable on tonnes of coal ash sent to ash dams to provide further funding for the EPA to adequately monitor compliance with the regulations.

Recommendation 7: The NSW Government should make access to information about coal ash repositories transparent and available, including all existing management plans, details of financial assurance, rehabilitation plans, pollution incidents, fines and other enforcement actions taken by regulators, monitoring data, hydrogeological assessment, predictions for future contamination, and predictions for future land-use planning.

3. Economic and employment opportunities associated with coal ash reuse, site remediation and repurposing of land

This section addresses TOR (c): economic and employment opportunities associated with coal ash re-use, site remediation and repurposing of land.

As the five remaining coal-fired power stations in NSW retire, there will be impacts on regional employment and economies. In the regions where they are located, these power stations are significant employers. With each closure, there will be both direct and indirect job losses at least in the short term, notwithstanding the growth of employment in the renewable energy sector which now employs more people in installing and maintaining solar panels than coal-fired power stations.[35] When Hazelwood power station closed in 2017, about one-third of the workforce was retained for site decommissioning.

Comprehensive remediation is a fundamental to a just transition for workers and the broader community who has had to bear the pollution burden of coal fired power generation. It will provide economic and employment opportunities, remediate the environment, and provide certainty regarding future land use planning.

Comprehensive remediation must be part of a just transition

[35] Burke, P.J., Best, R. & Jotzo. F., 2019, Closures of coal-fired power stations in Australia: Local unemployment effects, Australian Journal of Agricultural and Resource Economics, 63(1), online available at: https://onlinelibrary.wiley.com/doi/full/10.1111/1467-8489.12289.

To date, Australia generally has not comprehensively considered job opportunities in environmental rehabilitation to mitigate the toxic impacts of coal-fired power generation and the role of environmental remediation as part of a just transition for coal communities. Fortunately, other jurisdictions have commenced this planning, including assessing the employment benefits for comprehensive rehabilitation and remediation of the environment where power stations and coal ash dumps are located.

Research undertaken by the Northern Plains Resource Council (NPRC) of Montana, United States, in collaboration with the International Brotherhood of Electrical Workers Local Union 1638, shows that there are substantial environmental benefits and employment opportunities in coal ash repository rehabilitation.[36] We have provided this research as attachments to our submission (Attachments 3 and 4).

This rehabilitation includes excavating coal ash from its current location to thoroughly remediate contamination and prevent ongoing groundwater and surface water contamination, and building water treatment plants to clean up contaminated water. These processes are much more comprehensive, job intensive, and have much greater environmental benefits than the current rehabilitation approach in NSW which is to "cap-in-place", that is, cover the coal ash with fill without excavating the coal ash to thoroughly remediate contamination and prevent future adverse environmental impacts.

A "cap-in-place" approach to rehabilitation is especially problematic for unlined ash dumps, such as the Vales Point and Eraring ash dumps, as it leaves contaminated soil and water in place. This ensures the likelihood that contamination of waterways and land will continue well into the future and puts the local environment and community health at risk.

As described in section 1 of this submission, the contamination and rehabilitation schedules in the SPAs of the power stations at privatisation emphasise the necessity of cost-effectiveness of remediation. This suggests the NSW Government is unlikely to require comprehensive rehabilitation to mitigate as much as possible the ongoing impacts and risks to the surrounding environment and communities associated with coal ash dam rehabilitation and closure.

As an example, there is very little information about the solar farm Sunset Power International intends to build on a section of the Vales Point power station ash dump that it deems "rehabilitated".[37] There is little information about how Sunset intends to mitigate long-term environmental impacts from the site, which is a "cap-in-place" approach to ash dump rehabilitation. The environmental assessment for the solar farm contains very little information about the

---

[36] See: Northern Resource Plains Council and International Brotherhood of Electrical Workers Local Union 1638, *Doing it Right: Colstrip's Bright Future with Clean-up*, 2018, available at: https://northernplains.org/wp-content/uploads/2018/07/DoingItRight_FullStudy_FNL_WEB.pdf; Northern Resource Plains Council, *Doing it Right II: Job creation through Colstrip clean-up*, April 2019, available at: https://northernplains.org/wp-content/uploads/2019/04/DIRTII_FINAL_WEB.pdf/.

[37] Thomas Muddle, 'Vale Point Solar Project: Environmental Impact Statement' (Jacobs Group, 31 January 2018), xi. See: https://www.planningportal.nsw.gov.au/major-projects/project/5276/.

rehabilitation of the site before the solar panels are installed, and the long-term mitigation strategies for toxic coal ash leachate into Lake Macquarie and groundwater tables is not addressed.

If the coal ash was excavated, re-sited and or reused first rather than covered, jobs would be created during the excavation process, coal ash suitable for reuse under the NSW *Coal Ash Order 2014* could be provided to the coal ash reuse market, and the site could be thoroughly rehabilitated before the solar panels were installed.

Comprehensive ash dam rehabilitation planning before power stations are decommissioned provides impacted communities and power station employees with certainty regarding job prospects and environmental benefits. This includes identifying where local training and education providers can support transitioning workers to acquire the skills needed to work in ash dump remediation, as well as: preparing new workers entering the workforce with necessary skills; future land use planning potential on thoroughly remediated sights; "flow-on" employment benefits to other businesses and services in regions; and regional pride in workers being involved in the comprehensive rehabilitation of their home areas.

There is a significant role for the NSW Government to play in ensuring that a just transition for workers and communities impacted by power station closure is achieved. A just transition must include comprehensive environmental remediation. The employment and economic opportunities in comprehensive remediation of coal ash dams must be determined, and include an economic assessment of failure to undertake comprehensive remediation.

Coal ash reuse, the Coal Ash Order 2014, and health and environmental protection

The least harmful fate of reused coal ash is 'encapsulation', where coal ash is incorporated into a solid substrate such as concrete, bricks and tiles. Such reuse is much safer than other reuses because the potential for leaching of toxic chemicals to water or release of coal dust to air is greatly reduced.[38]

The primary encapsulated reuses of coal ash in Australia are concrete and bricks. A US EPA report on reuse of coal combustion residuals (CCRs) describes the environmental benefits of coal ash reuse including reduced greenhouse gas emissions, reduced need for disposing of coal ash residuals in landfills, and reduced use of virgin resources. It also identified economic benefits including job creation in the beneficial use industry, reduced costs associated with CCR disposal, increased revenue from the sale of CCRs, and savings from using CCRs in place of other more costly materials.[39]

---

[38] S. Slesinger, *Coal Ash: Why it is better recycled than as a waste* (Feb. 13, 2014) https://www.nrdc.org/experts/scott-slesinger/coal-ash-why-it-better-recycled-waste; US EPA, *Methodology for Evaluating Encapsulated Beneficial Uses of Coal Combustion Residuals* (2014), https://www.epa.gov/coalash/methodology-evaluating-encapsulated-beneficial-uses-coal-combustion-residuals.

[39] USEPA, 2014, 'Coal Combustion Residual Beneficial Use Evaluation: Fly Ash Concrete and FGD Gypsum Wallboard', available at: https://www.epa.gov/coalash/coal-combustion-residual-beneficial-use-evaluation-fly-ash-concrete-and-fgd-gypsum-wallboard

Certain types of fly ash can be used as a partial substitute for Portland cement in concrete. Fly ash can improve the performance of concrete, including increasing its durability and strength. Reduction in the production of Portland cement also conserves resources and avoids adverse impacts from cement production, including mercury and greenhouse gas emissions. The US EPA evaluated the use of fly ash in concrete and determined that it does not pose greater health or environmental hazards than the use of Portland cement.[40]

The work undertaken by the Hunter Community Environment Center on the reuse potential of coal ash on the NSW Central Coast highlights the environmental and job gains in coal ash reuse.[41] A strategy developed in 2013 by Beyond Zero Emissions (BZE) proposed replacing up to 50% of the cement used in concrete with geopolymer cement – fly ash from power stations and furnace slag from steelmaking.[42] This strategy avoids the generation of greenhouse gases. Cement production is the source of up to 8% of global greenhouse emissions.[43] Portland cement used in concrete can be blended with replacement materials. BZE proposed replacing up to 70% of Portland cement with fly ash, slag, clay and ground limestone. Over 10 years, this strategy would make beneficial use of 3.8 million tonnes of fly ash. BZE estimates that the stockpiles of coal ash remaining once Australia's fleet of coal-fired power stations are replaced by renewable energy are sufficient to supply domestic concrete production for 20 years.[44]

The ability of ash to be used depends entirely on its heavy metal content. Fly ash is toxic, and there is very little publicly available information about the toxicity of coal ash in NSW ash dams. As described above, most NSW ash dams are licenced to accept other toxic wastes such as fabric bag filters, boiler cleaning chemicals, acid solutions and solid acids, and asbestos. This means that strict reuse policies and regulations must be developed and implemented that include testing of coal ash and public release of information before widespread reuse is undertaken.

The NSW Coal Ash Order 2014 outlines the procedure for which coal ash can be reused, and applies to anyone who generates, processes or recovers supplies of coal ash.[45] Generators of coal ash must undertake sampling and testing of the coal ash before supplying it to ensure that heavy metal and other contaminants are within the range specified in the Order.[46] A generator of coal ash must provide a supplier with written statements certifying that compliance with the Order has been

---

[40] US EPA, Coal Combustion Residual Beneficial Use Evaluation: Fly Ash Concrete and FGD Gypsum Wallboard, February 2014, *available at*: https://www.epa.gov/sites/production/files/2014-12/documents/ccr_bu_eval.pdf
[41] See: Winn, P., Woods, G., Lunch, J., *Out of the Ashes: Water pollution and Lake Macquarie's aging coal-fired power stations*, Hunter Community Environment Centre, 2009, pp. 64-69. Available at: https://drive.google.com/file/d/1-3qbiaitKC1rI7vFdkAQ8JQFsx22ybIL/view.
[42] Beyond Zero Emissions, *Zero Carbon Industry Plan: Rethinking Cement*, 2017. Available at: http://media.bze.org.au/ZCIndustry/bze-report-rethinking-cement-web.pdf.
[43] Beyond Zero Emissions, *Zero Carbon Industry Plan: Rethinking Cement*, 2017, p. 9.
[44] Beyond Zero Emissions, *Zero Carbon Industry Plan: Rethinking Cement*, 2017, p. 7.
[45] Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 (NSW), The Coal Ash Order 2014.
[46] Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 (NSW), The Coal Ash Order 2014, Part 4: Generator requirements.

achieved, and copies of both the Order and Coal Ash Exemption 2014 (or links to them) either at or before the time at which the generator supplies coal ash.[47] Although generators and suppliers of coal ash must maintain records of testing and report to the NSW EPA if it discovers it is non-compliant with the Order,[48] this process is largely self-regulated. As discussed below, it can lead to oversights with potentially serious environmental and health impacts.

In January 2019, AGL Macquarie announced to the Australian Stock Exchange that the coal ash it generates from its Bayswater and Liddell power stations was suspended from sale after the company discovered the heavy metal content of the ash exceeded the levels set by the EPA in the Coal Ash Order.[49] These heavy metals included chromium, cadmium and copper. An AGL spokesperson told EJA that these exceedances may have been occurring since the company bought the power stations in 2014, demonstrating an alarming gap in the testing and reporting process from generator to third-party. After an investigation at which the public was kept uninformed, AGL Macquarie entered into an enforceable undertaking with the EPA to contribute $100,000 towards an air quality monitoring network and weed eradication program in the Upper Hunter Valley region.[50]

Whilst these are important outcomes for the local community, it does nothing to address the lack of regulatory oversite of the coal ash reuse process. EPA director of Waste Compliance Greg Sheehy has said that coal ash can contain high concentrations of heavy metals and other contaminants, which need to be handled in accordance with coal ash reuse orders in order to protect communities and the environment.[51] However the testing requirements in the Coal Ash Order 2014 is not robust enough to protect communities and the environment.

The characterisation of coal ash required by the Coal Ash Order, by determining the concentration of heavy metals, is not a reliable indication of the threat posed by coal ash via the development of leachate containing metals in toxic quantities. It is well established that the toxicity of coal ash leachate is not directly related to the amount of the toxic chemical in the ash. The formation of toxic leachate depends on multiple factors including the pH of the water and liquid solid ratios. Consequently, the use of a reliable leach test, such as the Leaching Environmental Assessment Framework (LEAF), must be conducted on coal ash prior to reuse in any unencapsulated application such as for agricultural purposes.[52]

---

[47] Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 (NSW), The Coal Ash Order 2014, cl. 4.9.
[48] Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 (NSW), Coal Ash Order 2014 (NSW) cll 4.10–4.12.
[49] See: https://www.agl.com.au/about-agl/media-centre/asx-and-media-releases/2019/january/agl-coal-ash-update.
[50] See: https://www.epa.nsw.gov.au/news/media-releases/2020/epamedia200110-agl-macquarie-ordered-to-give-$100000-to-community-projects-after-breach
[51] See: https://www.miragenews.com/agl-macquarie-ordered-to-give-100-000-to-community-projects-after-breach/
[52] See: US EPA, Leaching Environmental Assessment Framework (LEAF) How-To Guide (2017), available at: https://www.epa.gov/sites/production/files/2019-05/documents/final_leaching_environmental_assessment_framework_leaf_how-to_guide.pdf

While the LEAF test is the most accurate leach test currently available for coal ash, the best practice is to require site-specific testing. To determine the magnitude of potential leaching from coal ash, it is crucial to select a leaching test that adequately mimics the ash disposal or spill scenario. Geochemical conditions greatly impact the overall amount of contaminants leached from coal ash, such as arsenic and selenium. The selection of just one test to assess leaching potential could result in an underestimate of leaching if that test is not representative of disposal conditions. Therefore site-specific testing is necessary to ensure leaching does not result in contamination of groundwater or surface water.

The characterisation of coal ash required by the Coal Ash Order 2014 does not determine the level of threat posed to human health via inhalation. Coal ash reuse can result in harmful dust emissions, particularly when large amounts of ash are used in structural fill projects. The level of the threat posed to human health via inhalation is related to the size of the coal ash particles, not solely to the concentration of chemicals in the ash. Therefore, coal ash should be tested for the presence of $PM_{2.5}$. Further, mandatory controls on fugitive dust emissions and requirements for covering the ash must be imposed on all users.[53]

Repurposing of land

Failure to plan for rehabilitation and closure of ash dams has significant implications for r future land use planning. For example, the NSW Central Coast is fast-developing area which is already exposed to the risks associated with poor ash dam management. Inadequate management has resulted in an increase in selenium and cadmium concentrations in Lake Macquarie, the permanent closure of the Myuna Bay Sports and Recreation Centre because of structural fears associated with the Eraring power station ash dam. Rehabilitation and closure planning for ash dams that excludes excavation of material to facilitate comprehensive remediation ensures the likelihood of contamination occurring in the future and means that land is unlikely to be repurposed.

Without comprehensive reconstruction of these ash dumps to contain ash in a lined repository and cap with impermeable material, the environment will continue to be contaminated for decades and future land use planning will be uncertain at best, and impossible at worst.

As an example, the continuation of groundwater and surface water seepage and contamination means that community members face a health risk when consuming fish, crabs and other marine species caught in neighbouring waterways such as Lake Macquarie. The Eraring and Vales Point ash dams both leach toxic heavy metals and other contaminants into Lake Macquarie. In 2019 HCEC conducted water and sediment sampling in Lake Macquarie near water discharge points close to both the Vales Point and Eraring power stations. HCEC's report shows concentrations of a number of heavy

[53] Lipski, B, *Unearthing Australia's Toxic Coal Ash Legacy*, 2019, p. 39.

metals, including arsenic, nickel, aluminium, copper and lead, to be at levels likely to be having a harmful impact on aquatic ecosystems, including edible fish, molluscs and crustaceans.[54]

Future land use planning in the area cannot maximise the potential for the highest possible use of land without local authorities being aware of and having access to comprehensive rehabilitation plans for power station ash dams. Communities who live around these sites must be provided with information about the intended rehabilitation planning, the health risks of exposure to coal ash and the risks that inadequate remediation poses to both human and environmental health.

Comprehensive laws and regulations driving ash dump rehabilitation and on-going post-closure management has several benefits: job creation, environmental decontamination, and the potential use of coal ash as a resource for other industries. In order to facilitate job opportunity, economic development in coal ash dump remediation, and prepare for future land use planning in location government areas, the NSW Government and regulatory agencies need to require that ash dump rehabilitation and closure plans are prepared well in advance of power stations being decommissioned.

Recommendations

Recommendation 8: The NSW Government must release annual reports to the NSW Parliament that quantify the state's liability for remediation and rehabilitation of coal ash dams.

Recommendation 9: The NSW Government must conduct and publish an audit of the extent of coal ash reuse from the state's five operating coal-fired power stations during the last 10 years, identifying the power stations where the coal ash was generated, and the quantities, destinations and purposes of all the coal ash transferred for reuse.

Recommendation 10: The NSW Government must commission a comprehensive and independent assessment of the health and environmental impacts of coal ash pollution from coal ash repositories at NSW's coal-fired power stations to understand the full extent of the toxic threat and make strong recommendations to protect human and environmental health. This assessment must include, at a minimum, obligations enforcing operators to:

a. test groundwater wells providing drinking, irrigation or stock water within 0.8 kilometres of all coal ash repositories to determine the presence of coal ash contaminants. Each operator shall report the findings of the groundwater survey to NSW EPA, which shall make results publicly available.

b. test surface water downstream of coal ash repositories for the presence of coal ash contaminants. Each operator shall report the findings of the surface water survey to NSW EPA, which shall make results publicly available.

[54] Hunter Community Environment Centre, 2019, *Out of the Ashes: Water Pollution and Lake Macquarie's Ageing Coal-Fired Power Station*s, available at: http://www.hcec.org.au/content/out-ashes.

c. install air monitors that measure fugitive dust emissions from coal ash repositories, including the presence of particulate matter, including PM 2.5 and PM 10. Each operator must report the findings of the air monitoring survey to NSW EPA, which must make such results publicly available.

Recommendation 11: The NSW Government must establish standards for the reuse of fly ash in concrete in all government projects, including road building and infrastructure by setting a minimum level of fly ash substitution for Portland cement.

Recommendation 12: The NSW Government should appoint a panel of qualified scientific experts and community stakeholders to examine and evaluate the practice of placement of coal ash into and on top of surface and underground coal mines, taking into consideration the long-term structural stability of such placement and the potential for contamination of surface water and groundwater.

Recommendation 13: The NSW Government should solicit information from both the public and international dam safety and coal ash experts and hold hearings to obtain public comment. The Government should issue a report on its findings, including recommendations for further regulatory action to ensure protection of human health and the environment from placement of coal ash in coal mines.

Recommendation 14: The NSW Government should evaluate and promote opportunities for local employment in the comprehensive remediation and rehabilitation of coal ash repositories, and ensure that employment opportunities are factored into rehabilitation planning.