

**REPORT ON PROCEEDINGS BEFORE**

**PUBLIC WORKS COMMITTEE**

**COSTS FOR REMEDIATION OF SITES CONTAINING COAL ASH  
REPOSITORIES**

**CORRECTED**

**At Lake Macquarie Council City Chambers, Speers Point, on Tuesday 6 October 2020**

**The Committee met at 12:50.**

**PRESENT**

The Hon. Daniel Mookhey (Chair)

Ms Abigail Boyd

The Hon. Sam Faraway

The Hon. Trevor Khan

The Hon. Shayne Mallard

The Hon. Tara Moriarty



**The CHAIR:** Welcome to the second hearing of the Public Works Committee inquiry into the costs for remediation of sites containing coal ash repositories. The inquiry is examining a number of aspects relating to the remediation of contaminated sites at various power stations across New South Wales. Before I commence, I would like to acknowledge the Awabakal people, who are the traditional custodians of this land. I would also like to pay respect to the Elders past, present and emerging of the Awabakal nation, and extend that respect to other Aboriginals present. Today we will hear from local and State parliamentary representatives, environmental organisations and community groups. Before we commence I would like to make some brief comments about the procedures for today's hearing.

Today's hearing is a public hearing and is being broadcast live via the Parliament's website. I extend the Committee's sincere thanks to Lake Macquarie City Council for facilitating this public hearing and hosting us today. A transcript of today's evidence will be placed on the Committee's website when it becomes available. I would also like to remind media representatives that you must take responsibility for what you publish about the Committee's proceedings. The guidelines for the broadcasting of proceedings are available from the secretariat. All witnesses have a right to procedural fairness according to the procedural fairness resolution adopted by the House in 2018. There may be some questions that a witness could only answer if they had more time or with certain documents to hand. In these circumstances, witnesses are advised that they can take a question on notice and provide an answer within 21 days.

I remind everyone here today that Committee hearings are not intended to provide a forum for people to make adverse reflections about others under the protection of parliamentary privilege. I therefore request that witnesses focus on the issues raised by the inquiry terms of reference and avoid naming individuals unnecessarily. To aid the audibility of the hearing, may I remind both Committee members and witnesses to speak into the microphones. Finally, could everyone please turn their mobile phones to silent for the duration of the hearing.

**GREG PIPER**, Member for Lake Macquarie, before the Committee

**TIM BROWNE**, Manager Environmental Systems, Lake Macquarie City Council, sworn and examined

**The CHAIR:** I invite the witnesses to make a short opening statement of no more than a few minutes.

**Mr BROWNE:** Thank you for the opportunity to participate in the Committee's inquiry into the costs for the remediation of sites containing coal ash repositories. Lake Macquarie City Council is home to a number of significant ash dams. Whilst council does not have expertise across the specific terms of reference for this inquiry, we do take a keen interest in the inquiry as the outcome will have implications for our residents and community. Accordingly, the submission you received from Lake Macquarie City Council staff focusses on the idea that coal ash should be treated as a resource, not a waste product, rather than specifically addressing each term of reference. We acknowledge the Committee has received several submissions putting a similar position forward, including submissions from individuals and organisations located within the Lake Macquarie Local Government Area.

We further acknowledge the sense of angst and concern among the community about the long-term health and environmental impacts of coal ash dams across the region. Using coal ash as a resource for Lake Macquarie, New South Wales and Australia could achieve excellent outcomes including: creating economic stimulus; improve environmental outcomes by increasing material reuse; potentially mitigate any risk with long term large scale storage of ash; create social benefits through increased local infrastructure delivery; and, improve relationships between communities and energy operators—something that we believe will be vital when planning for future closures of coal-fired power stations.

With responsibilities for delivering infrastructure like local roads, footpaths, cycleways and kerb and gutter, council represents a substantial user of cementitious materials that can include coal ash. Whilst Lake Macquarie council currently uses coal ash in construction material, the opportunity to increase the proportion of coal ash used presents an exciting opportunity to deliver more of this kind of infrastructure. Increasing the proportions used would be aided by the State government technical agencies including the Transport for NSW roads technical branch who set the standards that local government generally follows for roads. Another critical aspect to consider is the perpetual legacy of coal ash repositories. Council staff understand that remediated ash dams will be left in situ for hundreds of years and council staff would want to ensure that the State government has adequate measures in place both for on ground management and ongoing financial funding to ensure that they are managed appropriately, maximising safety and minimising environmental risks to our community and environment.

As an example we only need to look across the Lake to the legacy of the former Pasmenco lead smelter site where, thankfully, the State government was able to intervene by acquiring the site and establishing a containment cell perpetual care fund. The net proceeds from the sale of the land by the Government are to be paid into the fund, which will be used for the perpetual care of the Pasmenco containment cell site and surrounding land. As noted in our submission, council staff are of the view that coal ash should be treated as a resource, not a waste product. Focussing efforts on finding a suitable resource for coal ash would not only result in environmental benefits but likely reduce the Government's ongoing liability.

**Mr GREG PIPER:** I concur with much of what has been stated as council's position by Mr Browne. I thank the Committee for the opportunity to appear before the inquiry into the cost of remediation of sites containing coal ash repositories. Before I start, a voluntary declaration, I do not believe it has any particular bearing on my views on this particular matter but I wanted to be known, my son works for Downer, who is the lead contractor in the management of ash at the Eraring Power Station and has done so for the past 12 years. Lake Macquarie in general has a significant history in the mining of coal, in the export of coal, and the use of coal. Much of the history, as people would know, began with the development of the largest power station on the coal fields, being Wangi Power Station, which last operated in the early 1990s as an emergency station.

There is a significant history of power generation in the local area. Power generation is a significant employer either directly or indirectly through coalmining. Eraring Power Station in my electorate is the largest thermal power station in Australia and provides around 25 per cent, I understand, of New South Wales' energy needs at this point in time. We have had considerable issues over the years with the power stations generally, whether it is Vales Point, Munmorah or Eraring—and before that Wangi—in relation to a number of contaminants including SO<sub>2</sub>, nitrogen oxide, carbon dioxide, particulates and other pollutants such as thermal pollution through the cooling water discharged into the lake, which had a significant impact on the lake, and the obvious impact on the physical area by ash deposition. That is a not inconsequential impact, just because of the size of the area taken

up, whether from the Vales Munmorah ash dam or from the Eraring ash dam, however, more directly from that now are concerns about leachate of heavy metals and metallic salts into the waterways and the lake and we still have the issue of the ash dam and future emissions, particularly windborne dust. I would think that it would seem to be a failure of planning at the time—the planning approval and regulatory process that existed when the power station was built—that there were not better plans in place for the management of this material into the future. It was seen as an inconvenient by-product, but not something that had to be dealt with for environmental purposes.

With this inquiry, I believe the best-case scenario will be to develop a strategy for complete remediation of the ash dam site, which would rely on the beneficial re-use of what is now largely considered a waste product. This product should be seen as a resource, one that by its use—say, as a road base or construction material—can allow for remediation of the site and remove long-term risks to the environment. In so doing, it would reduce the demand for virgin materials from quarrying or mining. This would be a positive scenario. I say to the Committee that as we move towards what we now know is a requirement for an 80 per cent use of coal ash from the end of next year we need to be looking for how we can make even more use of that product—say 102 per cent or 105 per cent, or whatever the percentage might be—so that the material can be drawn down by a feasible and sustainable business model. Indeed, between the Eraring, Vales Point and historic Munmorah ash deposits there would seem to be plenty of material to operate a re-use industry for many years to come. I thank the Committee.

**Ms ABIGAIL BOYD:** Thank you very much for your considered submissions and for starting off the hearing. There is lots to cover in here. From what I am hearing from both of you, you believe there are opportunities for re-using more of this ash. Mr Piper, in your submission you say that you have spoken with some companies that have tried to get access to the coal ash, and it has often been hampered by existing contracts or a lack of will from those who produce it. Can you talk me through what you mean by that, what your experience has been on that and what we could do to get rid of that obstacle?

**Mr GREG PIPER:** Ms Boyd, I think it is well known that there are two major players that have been historically purchasing the ash from Eraring and, certainly, to an extent, from Vales Point, those being now Boral and Flyash Australia. They make beneficial re-use of the product, but it is a relatively low percentage of what is produced. They certainly look to—and understandably so—take the best of what is available, but that certainly leaves an awful lot of product that is still there. Right now I understand Origin Energy is indicating it is about 35 per cent re-use of its production; however, it has been significantly lower than that for quite some time, even though there was an aspirational goal of 80 per cent some years ago that was set. They now have a requirement to reach that position. It seems like we will need to see a broadening of the number of players in the market if we are going to achieve that, based on the historic take from Boral and Flyash Australia.

To be very specific, my understanding is that there are a number of smaller companies. I am aware of that because they have contacted my office from time to time quite frustrated with the inability to be able to engage with Origin Energy in a meaningful way. I do understand that, if I can quickly say it, because they are relatively small players, but we might need some of those in the mix anyway. Mr Browne might wish to mention Dantia later on, which is the economic development corporation or company born out of Lake Macquarie City Council. It is very much working at bringing other players into the mix. But right now it has been very frustrating for anyone who has had an idea as to how they could use this material.

**Ms ABIGAIL BOYD:** Can I drill down into that a bit, then? Are you saying that it is not economic for these smaller companies because they are smaller players—they cannot compete for the fly-ash? Or are you saying that there is an obstacle at the power station itself for some reason?

**Mr GREG PIPER:** It is my understanding that there is an obstacle with them being able to engage because of contracts that exist between Boral and Flyash Australia. On the other hand, those companies take the pick of the material that is available, so there are probably some limitations on what they can offer. What we need to do is be looking at companies that do have technologies or processes that could make use of the whole range of the ash that is being produced. I think that they have been relatively small companies, or seemingly so, and therefore not easily able to engage with Origin at this stage. That seems to be changing.

**The CHAIR:** Mr Browne, I was going to ask you about the work that Dantia has done to identify opportunities as part of its economic development agency work for Lake Macquarie. Firstly, are you able to explain what Dantia is and its mandate and, secondly, the work that it has performed in this regard?

**Mr BROWNE:** As Mr Piper alluded to, Dantia is an economic development company set up by and a wholly owned subsidiary of Lake Macquarie City Council. Although I am not familiar with the intimate details of the discussions between Dantia and Origin, I do know that Dantia is working with Origin to try and find players and people in the market who would look to use some of this fly-ash at larger quantities.

**The Hon. TREVOR KHAN:** Sorry, are we using "fly-ash" and "coal ash" interchangeably?

**Mr GREG PIPER:** Yes.

**Mr BROWNE:** I beg your pardon, yes.

**The Hon. TREVOR KHAN:** Because from what we saw today there are at least, in essence, two different products: There is coal ash—essentially the heavier, larger product—and then there is the fly-ash, which is a much finer-grade material. It is the fly-ash that is essentially the one where there seems to be a greater problem in finding a market for it, as opposed to the coal ash. That is the only reason I ask. Are we using the same definitions?

**Mr GREG PIPER:** From my point of view, yes we are. There is a gradient in the ash qualities, whether it is bottom ash, fly-ash or somewhere in the middle of that. But it is all derived from coal, so I am referring to it all as coal ash.

**The Hon. TREVOR KHAN:** Yes, I accept that. But at least from what we saw today the coal ash—the heavier material—seems to be taken up fairly well; it is the fly-ash where there seems to be a much greater problem.

**Mr GREG PIPER:** You are correct.

**The CHAIR:** Mr Piper, can you take us through your community's environmental concerns? How much are you hearing from the community about their worry about the effect of the dams on the water and on the wider environment? What are the complaints you are hearing?

**Mr GREG PIPER:** Mr Chairman, I think it would be fair to say that, whether they are individuals or environmental groups operating in the local area, I think that their concerns are fairly consistent. They are concerned that there is—first and foremost, I should say that there are probably some who would like to see the power station closed sooner rather than later, but I am not entertaining that particular part of the argument. We are dealing with the reality of the production of this material.

I think most if not all of them would agree that their concern about the impact on the environment and human health is real. That is through fugitive emissions from coal ash—from the ash dam—which largely comes down to ash dam management, but certainly is an issue from time to time. The other is the concentration of heavy metals and contaminants within the ash and the legacy that it is producing through leachate into the waterways, into the aquifer or perhaps through mine workings in the area, but certainly into the lake. I think it was mentioned by Mr Browne that we are not just talking about the here and now, the next 10 years or 50 years; we do have to be mindful of the next 100 years, 200 years and beyond. I think that the environmental groups out there certainly recognise that very long-term goal of having this material made inert as far as its ongoing impact on the local environment.

**The CHAIR:** Mr Browne, does the council maintain any relevant monitoring on this in terms of water leakage, quality of water, or anything in terms of your environmental systems?

**Mr BROWNE:** We engage the Department of Planning, Industry and Environment's science branch, which does monthly monitoring for us. That monitoring currently does not include heavy metals but looks at broader scale ecosystem health data.

**The CHAIR:** Can you explain the council's relationship with the EPA as a regulator here? Have you had to make reports to them? Have you heard information from them? Mr Piper, to what extent is the EPA effective in responding to community concerns about environmental damage or potential environmental damage?

**Mr BROWNE:** I am not aware of any complaints that have come through the EPA to my office in my time at council.

**The CHAIR:** Have you made reports to the EPA—the other way around?

**Mr BROWNE:** I personally have not, no.

**The CHAIR:** Mr Piper, to the extent to which you make good reference to the anxieties in the community that exist about the dams, is the EPA responsive to those concerns? Is there more that the EPA could be doing?

**Mr GREG PIPER:** Mr Chair, I personally believe that the EPA could be more responsive. I think it is a somewhat difficult task for members of the community to report and feel confident that their concerns are being dealt with in real time and perhaps not being parked and dealt with at some later stage or as a bigger issue.

Certainly, we have had some movement in this space. It is not directly related to the ash but in my submission I did refer to issues about stack emissions, air quality and the frustration that the community had had with not being able to have what I would consider a truly independent air quality monitor or monitoring in the area. We have subsequently had the Minister enact or have the EPA make a decision about a site for an air quality monitor. That is going to be situated near Mirrabooka, which is actually near my house. I will declare that. However, it is actually on the highest prominence and in the most logical location to be able to add value to the understanding of the air quality from Vales Point and Eraring. I would not like to disparage the EPA too much, but I think they are—understandably from some people's perspective—a difficult organisation to engage.

**The CHAIR:** When will that air quality monitoring station be operational? Have you been advised?

**Mr GREG PIPER:** It is not yet operational. The site has been determined. Mr Browne might be able to advise more there, but the site was actually decided in consultation with Lake Macquarie City Council.

**Mr BROWNE:** That is correct. The site was identified in consultation with us and my department. I am not aware if it is operational or not at this point.

**The CHAIR:** When was the decision made to construct it?

**Mr BROWNE:** I would have to go back and provide that information later. I do not have that date at hand with me today.

**Mr GREG PIPER:** Mr Chair, it was either very late last year or earlier this year. The first we knew that it would happen was the concurrence or the agreement by the Minister from a question from me in question time. I think that was last year but I think the understanding that it will go ahead was actually earlier this year.

**The Hon. SHAYNE MALLARD:** Your submissions were very detailed. I particularly want to acknowledge Mr Piper's submission which is—you obviously have a long history of involvement in these issues because it is very comprehensive. I picked up two things out of your submissions, particularly Greg's. One is that you are calling for monitoring, real-time recording and publicly accessible data. That is at least to the notion that there is a bit too much secrecy going around the management of these plants. Would you want to comment on that?

**Mr GREG PIPER:** Yes. I am not sure that it is purposeful secrecy. I think I would see it more as the way in which things have been done historically. But it certainly leads to suspicion and concern amongst the public. I think that we now expect much more in the way of transparency around these particular matters. The community is well educated and highly motivated in relation to looking after the natural environment. We do have better systems in place that actually now make it possible to be doing that. Twenty years ago, it might have been a real impediment. But we can now do telemeter-type reporting. I think that if we can do that then we should be looking to do it.

**The Hon. SHAYNE MALLARD:** That sort of segues into the area that I want to talk about briefly: the safety of the dam wall. You address the maintenance of existing dams in the last part of your submission. We went out and had a look today. We looked at the fence at the Myuna Bay Sport and Recreation Centre. We heard some very different pieces of information about why the wall was identified as having a flaw. You have got a different explanation here in your submission. You say that Origin Energy's risk assessment identified the problem. Do you want to elaborate on what happened with that wall and then talk to us about the issue around dam wall safety and if you think the dams safety authority, which is giving us evidence soon, is not doing its job or could do a better job?

**Mr GREG PIPER:** That is quite a difficult question to answer, but I will say that I have had some robust discussions with Origin Energy over this particular matter. I do not have a particular concern with them as such. I understand why they would be hyper aware and hyper cautious about safety from part of their infrastructure. I was very concerned about the way in which the decision was taken to close the sport and recreation centre there. There was a lack of transparency about that. The community, the local member, the Minister, the Government were all blindsided by that decision that we understood Origin Energy first of all said was not their decision to close but the department of sport and rec's decision. However, on the day Origin Energy did put out a press release thanking the Office of Sport for acting on their requests. They could not distance themselves from that in that sense; however, the process is such that it is impossible to unscramble that particular egg.

I do not think there would be anybody willing to sign off to say that the status quo will now be safe. Until the dam wall is made safe—in my view the best way to do that is ultimately to reduce the weight on it by re-using this material and getting it out of there. After that, that site can be made open for a public purpose again. It may

not and I doubt will ever be a sport and rec centre again, but it should be made available for a public purpose. That can only be done when we have absolute belief in the integrity of that site and its safety. Mr Mallard, if I can say, I have no argument with what came from the Dam Safety Committee. We did have through the Minister's office a number of reviews, including from Snowy Mountains Engineering Corporation, and that was referred to the Dam Safety Committee. I am just not in a position to argue the case for their final decision. But from a political point of view I can argue that I was unimpressed with the method that they used to get us to this point.

**Ms ABIGAIL BOYD:** The rec centre was closed, as I understand it, due to a risk to life. Is that correct? It was because of the numbers of people who could be there. At this point has Origin done the remediation works to the wall or are we still at a position where, if it were to breach, it would go into the lake?

**Mr GREG PIPER:** I can start. I would say there are a number of factors there that concerned people. Obviously the sport and rec centre—there was a decision by the Office of Sport CEO at the time, Matt Miller. He believed that the risk that was being expounded for the site was too great for them to bear because, while they could in perhaps daylight hours put in place an emergency management protocol, if it was 2.00 a.m. in the morning and we had many young people asleep in dormitories, that would be unlikely to be able to be effectively done. So I do understand a heightened concern. The Roads and Maritime Services [RMS] immediately looked at the risk to the road. They felt that there was no risk there that warranted any particular action. I understand Lake Macquarie Council also had some considerations about the use of the park that you would have seen nearby at Myuna Bay. Once again the risk was quite low. What was never discussed in any of this was the major impact and probably ultimate impact on the natural environment being the lake if this cataclysmic event occurred.

I was on this council for 21 years, mayor for 8½ years. I chaired the committees that did the remediation of this lake and brought it back from being close to eutrophic in the late 1980s. It is a magnificent waterway and people absolutely love it now. Even if they do not know that history they love Lake Macquarie bay, they love the environment. I think many of them, including people who are protesting out here tonight, could not believe that the risk to the natural environment barely rated a mention in this whole process. I am very concerned at that because it should have, to me, been given—I do not think there should have been a weighting of them as they are all very important factors: human life, human safety and the natural environment.

**Ms ABIGAIL BOYD:** And so has the dam wall now been—

**Mr GREG PIPER:** My understanding is that preliminary works have commenced. I think part of that may have included de-watering. I am not sure if that is something that Mr Brown can refer to. My understanding was a lot of the pressure on the wall was to do with obviously the moisture content of the ash. I think that there has been some action there. I will be also visiting the site with Origin Energy in the very near future and these are the sort of things that we were going to be reviewing.

**The Hon. TREVOR KHAN:** In that regard is the dewatering issue the movement by Origin Energy to use—what I will describe it as—a more concentrated slurry that they are putting into the ash depository as opposed to a more concentrated form of slurry? It is reducing the amount of water that is actually used in terms of transporting the ash?

**Mr GREG PIPER:** Yes.

**The Hon. TREVOR KHAN:** Is that what you understand it has done already?

**Mr GREG PIPER:** Yes, the Hon. Trevor Khan that is correct. Historically it was a very wet slurry so there was an awful lot of moisture in there which led to this, under this seismic event scenario, earthquake that you would get a liquefaction of the slurry very quickly. Nobody has been able to describe to me what this breach of the wall would be like but obviously the less moisture in there then the slower the event would occur if there were such a thing. If I could refer once again to the question of Ms Abigail Boyd, I understand the work is going ahead for pile driving and the physical reinforcement of the wall as well.

**The CHAIR:** Mr Piper, in your statement you referred to your surprise at the lack of consideration with the lake and the natural environment as a factor to be considered in a preliminary risk assessment. Why was it not considered? Were you ever given an explanation as to why it was not a consideration?

**Mr GREG PIPER:** No, I have never been given an explanation for it. I have raised it in a number of locations, including with the Minister. I think people just quietly agree with me. It really seemed to be, if it was a secondary consideration, very low down on people's radar at the time because it was really about concerns for human health and how we are going to deal with the political fallout of closing one of the most popular sport and recreation centres in New South Wales.



**The CHAIR:** Just to be clear, so I properly understand it because I do not think I have heard this before, you are saying that in undertaking the risk assessments of a dam collapse they were never required to assess the impact on the river?

**Mr GREG PIPER:** Of the lake?

**The CHAIR:** Yes.

**Mr GREG PIPER:** If it was in there, I have missed it, but it was very much a very minor part of the consideration. The environmental impact on the lake just did not rate very highly in the considerations.

**The CHAIR:** To the best of your knowledge it is in any risk assessment that is to be done from here on in it is still not required to be considered?

**Mr GREG PIPER:** I do not believe so, but I could be wrong on that. I have been re-educated on some of the things I have stated this time but it is a complex area. In that particular issue I do not think it is too complex at all: you are either elevating the consideration for the environment or you are not. I think it has been relegated way too low.

**The CHAIR:** Just so we are clear, who is the decision-maker who has decided that that is not really a factor that should be given heavy weight? Is it the dam's authority or Dams Safety NSW?

**Mr GREG PIPER:** Mr Chairman, I do not believe it would be the Dams Safety Committee to consider those off-site implications. I believe it now sits with Origin Energy and whoever its advisers are, its geotechnical advisers in relation to that. But I also think we have some responsibility that has to be shared by the Minister for the environment. I am not saying that it was brought to his attention but the Minister for Energy and Environment has obviously, what I would think, a fairly significant role in considering the impact on the environment.,

**The Hon. TREVOR KHAN:** Mr Piper, you may or may not know the answer to this question, but do I take it that Origin Energy would have been required—maybe Mr Browne knows—to hold a licence with respect to, in essence, the operation of that dam, that is, the dam wall has to be licensed by the dam safety authority?

**Mr GREG PIPER:** Yes.

**The Hon. TREVOR KHAN:** Am I right that in terms of the maintenance of that licence the dam safety authority, Dams Safety NSW, if that is its new name, actually can give directions with regards to various steps that a licensee has to undertake with regards to any dam? Is that right?

**Mr GREG PIPER:** Any regulated dam, that is correct. My understanding is that the information that came forth from an assessment that Origin Energy caused to happen—I believe it may well be in relation to a number of high-profile, certainly one high-profile tailings dam failure that happened in South America, was it?

**The Hon. TREVOR KHAN:** No, in the United States of America.

**Ms ABIGAIL BOYD:** In New Zealand?

**The Hon. TREVOR KHAN:** Yes, yes.

**Mr GREG PIPER:** No, there was one in South America.

**The Hon. TREVOR KHAN:** Yes, one of the BHP sites?

**Mr GREG PIPER:** Yes.

**The CHAIR:** You mean the massive collapse?

**The Hon. TREVOR KHAN:** Yes.

**Mr GREG PIPER:** Yes, a number of events have occurred. I am sure that that played on people's minds when they realised that they had a massive ash dam there. They sought the information that brought up what many people, including myself, would say is an improbable scenario based on the advice of Geoscience Australia for this event, this earthquake that might occur. I think it was one in 6,000 or a greater event that would cause this to occur. However, the risk appetite is clearly fairly low in this particular situation. This was all new information and I am sure it was something that was not available to the Dam Safety Committee prior to that coming forward. My contention is that we should have had a broader conversation about it earlier than when we found out on the day that the sport and recreation is going to close.

**Ms ABIGAIL BOYD:** We have a situation where Origin clearly is responsible for the integrity of that dam. The impact of the assessment and having to close the sport and recreation centre is dealt with by the State

because that was public land and part of the community. Do you know if Origin was then required to pay any compensation? Where does the liability sit, if there were an event?

**Mr GREG PIPER:** The liability, I imagine, sits squarely with Origin Energy but it has not denied that. From day one they have said that they will replace the sport and rec centre. That is to provide a site and to reconstruct. It would be the first new sport and rec centre in some 40 years in New South Wales. However, it is not quite as easy as that because we are replacing something that is on land and that is highly useful for the purpose for which it was set aside. We do not seem to be able to easily identify something that is equivalent, although there is some land there. That was obviously part of the negotiations that went on behind the scenes with Mr Miller at the time—the CEO of the Office of Sport—and Origin Energy. Origin have never resiled from that. We just have not come to a conclusion as to how we are going to advance it, but it is in process.

**Ms ABIGAIL BOYD:** Once they bolster that dam wall and the risk has been dealt with, why not then open the sport and rec centre?

**Mr GREG PIPER:** That is a good question and it is something that has been postulated by a number of people. My understanding is that even with the reinforcement of the wall, there is some view that there is an element of risk there that it is not worthwhile to reopen it when there could be a new centre developed prior to that being finalised, if you can understand what I am saying. It is a time line that we would be looking at. It is hard to know which would come first. It seems that it may well be that we could actually have a new sport and rec centre operating on another nearby location that has modern infrastructure prior to them coming to a point where they feel confident about the safety of their works.

**Ms ABIGAIL BOYD:** Can we talk a bit about the jobs that you think might be—we are talking about these two power stations. Both the Vales Point and the Eraring ones are closing within the next 10 years. We heard in some of the submissions people suggesting that moving to a re-use industry nearby or onsite would be quite a good transition for workers. Have you looked into that either at a council level, Mr Browne, or from your perspective, Mr Piper, as to whether that is a good fit in terms of skills and job matching?

**Mr BROWNE:** We have not done any modelling—economic modelling—around that case. We are identifying that, at a conceptual and strategic level, when these coal plants shut down there are a number of highly skilled people who work out there, and it is not a dissimilar industry.

**The Hon. TREVOR KHAN:** Why do you say it is not dissimilar? This would be an extraction and some sort of processing plant that is a bit different from a turbine operator, for instance. I am not quite sure what the similarity of skills are between a coal plant operator and a skilled turbine operator, who might well by that stage be in his 60s.

**Mr BROWNE:** What I was alluding to there is they are typically trained engineers and technicians who know how to work at the power station. As I said, we have not done economic modelling. There may or may not need to be retraining undertaken. We feel that there is an opportunity there that we would like explored at a strategic level. That may determine that there is not an opportunity there, but we feel that it would be worthwhile exploring it.

**The Hon. TREVOR KHAN:** I am not arguing about the opportunity; I am just wondering about the skill mix.

**Mr BROWNE:** That is what I was referring to.

**Mr GREG PIPER:** Mr Chairman, can I also just comment on Mr Khan's question? Mr Khan, my understanding is from speaking to Origin Energy that they have no plan to decamp the site. They are looking at opportunities to continue to use it in some way, including for power generation. I would imagine that whether it is renewables, or whatever goes into the mix, there will still be those skilled jobs there. I guess that the plant and site management jobs around ash and all of those sorts of things would leave. That is more where there would be transition into jobs for re-use of that material. Ms Boyd, I cannot quantify what the opportunities are in terms of job numbers either but I keep in close contact with Dantia, and I know that they are doing quite a bit of modelling there. It really would depend on whether or not it is one big plant or a number that come in.

If you did visit the site today, you may either see or be told about Daracon, who are on site. Daracon is a very large civil contractor in the area—I am sure that most people would know who Daracon is—who have a plant out there producing aggregate. I think the term is an agglomerator, but that might be something that I dreamt. They are certainly using the lower quality material—coming back to Mr Khan's earlier question—to produce an aggregate that could be used in construction—

**Ms ABIGAIL BOYD:** Onsite?

**Mr GREG PIPER:** It is onsite, and it is something that I am looking forward to seeing in the near future.

**The CHAIR:** Mr Browne and Mr Piper, at various points you have made allusions to beneficial re-use, particularly on road construction. And Mr Browne, that was a heavy part of your opening statement. Have you had engagement with Transport for NSW and/or the previous Roads and Maritime Services about that proposal from a council perspective?

**Mr BROWNE:** From a council perspective, my department has not specifically had engagement. I will need to take that question on notice. We would be happy to provide details of any engagement that has happened through other departments within the council.

**The CHAIR:** Mr Piper, have you had the opportunity to talk to them?

**Mr GREG PIPER:** Mr Chairman, I have raised this matter with RMS, or Transport for NSW, senior people—the regional manager in particular—but also with people within the Minister's office. I have recently just missed the opportunity to have the Minister for transport—Andrew Constance—visit the site, but I understand of course that we also have Minister Toole, who would be valuable to be able to appraise this issue. There has been a lot of correspondence, I understand, with RMS over a period of time and, frankly, it seems to me that Transport for NSW, and therefore the State Government, could be one of the major solutions to this particular issue and this burden of legacy coal ash.

**The CHAIR:** When you say that you have had engagement with senior officials, are you talking about Mr Wakelin-King—regional head at RMS?

**Mr GREG PIPER:** No, no, sorry. I have spoken to Anna Zycki about this and about who would be the people within this area. Obviously, it is not her area either. It is really hard to find who to engage with. I am very well aware that RMS know a lot about this. Once again, if I can refer back to Dantia, they have had quite a bit of engagement with RMS about the opportunities here and RMS seem quite reluctant at this stage to enter into a resource that is not particularly known to them, even though it is quite well known as a quality material for constructing roads. Probably one of the most significant examples is the private haul road, which I am sure you would be aware of—are you?

There is a network of haul roads that connect to the mine. Cooranbong Colliery through to Newstan, to Teralba and back to Eraring Power Station. This is all now owned by Origin Energy, and it was constructed quite some time ago. It has probably been added to. Probably in the last 30 years it has had some extensions. I am told that sections of that were constructed with 92 per cent ash content. Its characteristics seem to be superior to what is being achieved by other road-based materials. It seems like it could be used in that sense. I am also aware from Origin's submission to your inquiry that the requirements that RMS is placing on the supply of this material go beyond what is required from the Australian standard.

**The CHAIR:** Yes. It is quite remarkable that we have three energy companies willing to sell the material but no-one seems to be able to identify who the decision-maker is in RMS who would have to make that decision that would allow that industry to effectively boom here. Have you had a response from the Minister or the Minister's office in this respect?

**Mr GREG PIPER:** I have not. I certainly have not had a negative response so I am very hopeful. I just think the logic of looking at it should prevail and I am very hopeful.

**The CHAIR:** Given that we are about to embark upon another major part of road construction, amongst many other things, as a stimulus measure to recover from the pandemic, it would seem like we are hitting a pretty time-critical point to make this decision. Would you agree?

**Mr GREG PIPER:** I would.

**Mr BROWNE:** We would, Mr Chair. We would support the ability for council to use increased proportions of ash in the road content.

**The CHAIR:** But Transport for NSW's power here is in two regards: both as the biggest buyer of road construction in the country, I think, and equally as the standard-setter for everybody else who buys roads in this State. So, you are saying that you need them to engage both their powers for coal ash to become beneficially re-used.

**Mr GREG PIPER:** Yes, I agree. Obviously, where RMS, or Transport for NSW, goes in their construction standards, others will certainly follow. But certainly I think we have Transport for NSW, we have huge demand from local government and perhaps from the private sector as well in sourcing materials for road construction. Transport for NSW can set the tone there but they would also be one of the major users of it if the scenario plays out as we would think it should.

**The CHAIR:** We will take final questions from all Committee members.

**The Hon. TREVOR KHAN:** This is perhaps a musing: If the material can be used, for instance, as road base—so what we do is go to one of these coal ash repositories, which hopefully have been de-walled, and enthusiastically extract the material over a period of time. What do we then do with the void that is left? We are actually going to end up with potentially a body of water behind what might be deemed to be a potentially unstable dam wall, so what do we then put in the place in the meantime? It seems to me that one alternative—and I know this is not necessarily popular—is to cap it and ensure that it is dry and therefore, hopefully, not leeching stuff out into waterways. But once you start digging holes and playing with it, you actually are creating a series of potential other environmental problems created by this historical environmental problem. So, I am just wondering what you think of that sort of conundrum.

**Mr GREG PIPER:** Mr Khan, I think it is an ongoing employment opportunity; to reinstate the natural landform. I think that is all that people would expect and it would happen in other scenarios, I imagine. But if you quarried, mined, or whatever the term is, this material down, it will take you down to the original landform. This was a natural valley that was dammed off and I would imagine that as you progressively drew it down you would have a plan for extracting it and you would have a rolling rehabilitation or remediation of that land. Obviously, you are correct that while there is ever a wall there and there is need to dam it, you would be accumulating water there just from rainwater. That would be something that would just need to be managed. I imagine it could be engineered quite well. I put a lot of faith in engineers. If they are given the opportunity, they do amazing things and I do not think this would be particularly difficult to do.

**The CHAIR:** Mr Browne, did you have anything to add to that?

**Mr BROWNE:** Only that we do, as our submissions say, consider that there is an opportunity of using the ash as a resource and if it was to be mined or quarried, or whatever the term is, we would expect that that is done in a planned and managed way that does not increase any risk to safety or the environment.

**The CHAIR:** But are we correct in saying, just to follow up on Mr Khan's question before we go to Ms Boyd, it is not like we are re-using all the ash that is being deposited daily right now. It is only at 35 per cent. We are still depositing into the dams.

**Mr GREG PIPER:** Yes.

**The CHAIR:** Even if we were to go from 35 per cent to 100 per cent before you even have to disturb any of the ash that is currently there, you could double the amount that is being re-used without ever having to quarry or mine what is in the dams right now? Is that not agreed?

**Mr GREG PIPER:** Mr Chairman, I am not quite sure what you are alluding to.

**The CHAIR:** We are burning more coal. For every coal we burn that creates ash, that ash is still being deposited. It is not like it is a net-zero addition.

**Ms ABIGAIL BOYD:** So, start with the new stuff before—

**The CHAIR:** Yes, start with the new stuff; re-use the new stuff before we dig the old is basically it.

**Mr GREG PIPER:** Mr Chairman, you are correct that we are producing—I forget how many tonnes. Was it 1 million tonnes per annum or something like that? But once we develop an industry, I would imagine that we would be looking to—

**The CHAIR:** Expand it.

**Mr GREG PIPER:** Expand it. I did say in my opening remarks that I would like to see us get beyond 80 per cent at the end of next year—if we achieve that. I certainly would hope we do. But we get to 102 or 105 or 110 per cent so that we are actually positively—

**The CHAIR:** Taking out ash.

**Mr GREG PIPER:** Drawing down the ash that is there—the nearly 40 years.

**The CHAIR:** But we have a lot of work to do to get to the point where it is more than 100 per cent.

**Mr GREG PIPER:** We certainly do, yes.

**The Hon. SHAYNE MALLARD:** Mr Chair, can I add to that? It would be right to say that as these older coal-burning power stations are decommissioned—these two have been decommissioned—and there is no appetite for building new coal-powered power stations, at some point in time if you increase the demand for the recycled coal ash, they can then start to mine the stored coal ash because the supply will start to taper off. So it could be a long-term, strategic way to deal with it. Would that be right?

**Mr GREG PIPER:** Mr Mallard, yes, correct. I am not sure what the quantum is. I am not sure if anyone has actually worked out what quantum is in there but we can probably get pretty close if you look at what is in Eraring Power Station, the Vales Munmorah power station and other repositories around the State. I would imagine that there is a lot of material there. Earlier I did use the word "feasibly". I think we have to look at whether or not this is entirely going to be market-driven but, to start with, I suspect that it might require some assistance from the State, whether it is direct assistance or whether it is indirect through take-up by Transport for NSW.

But I do not think it is something that we should, as a government—not that I am speaking for a government—but I do not think it is something that government should shy away from. Where there are environmental needs, they have stepped up in the past; I recall in two tranches, of Labor and the Coalition Government, assistance for the ethanol industry. That was in response to environmental needs there. Here we have environmental needs and environmental benefit, as many would argue with ethanol as well. I think we should be looking at how we do that, whether it is RMS as a customer and leading the industry, or whether it is some considerations and some direct incentives from the State to address this problem so that it is not a problem in 50, 100, 200 years time.

**Ms ABIGAIL BOYD:** Very briefly, are either of you aware of PFAS contamination at Eraring?

**Mr BROWNE:** I am not aware, no.

**Mr GREG PIPER:** Ms Boyd, no, I am not. I am aware of some assessments that have been done in the area but I have not been made aware of any issues in relation to Eraring.

**The CHAIR:** Thank you for your attendance today. Your evidence has been most useful. You have 21 days to answer the questions that you have taken notice, Mr Browne. Mr Piper, I do not believe you took any questions on notice but if you have anything further to add, send it through. Thank you very much for your appearance.

**(The witnesses withdrew.)**

**(Short adjournment)**

**LYN FRASER**, Member, Warners Bay Area Sustainable Neighbourhood Group, affirmed and examined

**DAVID TAIT**, Member, Keep Lake Macquarie Clean, affirmed and examined

**BRUCE MACFARLANE**, Member, Keep Lake Macquarie Clean, sworn and examined

**STEPHEN DEWAR**, Secretary, Lake Macquarie Sustainable Neighbourhood Alliance Inc., affirmed and examined

**HEINZ-JOACHIM MULLER**, Steering Committee Member, Community Environment Network Central Coast and Lake Macquarie, affirmed and examined

**The CHAIR:** I welcome our next set of witnesses. I ask that one representative of each of the organisations make a short opening statement if they so wish.

**Mr MACFARLANE:** Thank you, Mr Chairman. If you do not mind, Mr Tait will do the first bit—we have a joint opening statement. If he does the first bit, I will finish off the conclusions, if that is okay.

**The CHAIR:** Of course. Let's just keep it relatively short though.

**Mr MACFARLANE:** Sure.

**Mr TAIT:** Keep Lake Macquarie Clean is a group of concerned professional people living in Wangi, which is a peninsular located about five kilometres east of the Eraring ash dam on the western side of the lake. Our group possesses varied professional skills, ranging from journalism through engineering and environmental management. In our submission we address the terms of reference, concentrating on terms of reference 1 (d), 1 (e), 1 (f) and 1 (g). If I can just briefly hit on the high points of what we talk about in our submission, with respect to term of reference 1 (d), basically as it stands we consider the existing regulatory regime to be inadequate. We cite several reasons why we think that, mostly focused on the inadequacy of the monitoring regime for surface water and groundwater and particularly for leachate contaminants leaching out of the existing ash dams.

There appears to be no published attempt to analyse or interpret that monitoring data in any way that is comprehensible to the general community. I in my retired professional capacity have undertaken some analysis of that data. It does not look nice in that the data are inadequate for any reasonable conclusions to be drawn. Moving on a little bit, we are aware of a hydrological study conducted in 2007 that indicates that an uncontrolled discharge over the top of the weir occurs during rainfall events that occur on average once a year but there is no monitoring of that discharge. We do not know what is actually getting into the lake from those discharges.

Moving away from water quality to air quality, we are aware that Vales Point power station operates to some extent on load-based licensing for discharges of fine particulates. Environmental Justice Australia did an analysis earlier this year of national pollutant inventory data which shows that there has been, I think, a massive increase in the amount of fine particulates emitted due to a failure in part of the filtration equipment at the power station. It seems that the price per kilogram for those emissions is so substantially less than the cost of fixing up the problem in the first place that the power station is just going ahead and paying the extra licensing fee or penalty, basically. That is despite there being a clause in their environment protection licence that requires them to keep their equipment in good order and condition. That appears not to be enforced.

In terms of term of reference 1 (e), conflict of interest, we believe that there is a clear potential conflict of interest with the Government being both the regulator and the previous owner responsible for prior contamination when it owned the power stations. The lack of comprehensive environmental monitoring over time makes it impossible to assess the division of responsibilities between the Government as prior owner and the current owners. The way this is working it looks to us that the EPA seems more sympathetic to the demands of the industry than the needs of the community it exists to serve. On risks and liabilities, while the exact ash dam emplacement continues to exist it has the potential for cumulative effects of heavy metal contamination of the lake continuing. While "cap and cover" may address the more obvious air pollution issues, it will not by itself prevent cumulative effects of leachate entering the lake over time. The long-term health effects on marine life and on the consumption of fish and crabs is already at concerning levels and will only increase with ongoing of pollution.

**Mr MACFARLANE:** I just want to make four points in conclusion. The first point is that you cannot manage what we do not know. We believe there are gaping holes in the data, as Mr Tait has said. The costs cannot be determined with any accuracy without the full knowledge of exactly what needs to be remediated, the extent of that remediation and how that remediation will be undertaken safely and in an environmentally appropriate

manner. The second point relates to transparency. The citizens of Lake Macquarie are not receiving meaningful reports on water and air quality. Regular testing and other investigations should be carried out by independent and impartial organisations, in our view, and the results should be promulgated in language that everyone can comprehend, with regular, clear and comprehensive communications.

The third point is that we have no confidence that the Environment Protection Authority [EPA] is in control of the industry. We are concerned that it is not focused on meaningful environmental outcomes and protection of community health. Adequate control of the industry should be implemented by increasing surveillance resources and increasing licence penalties. Finally, some of you on this committee who live in other parts of New South Wales may not appreciate just how much we as citizens of Lake Macquarie love our lake. It is as close to our hearts as Sydney Harbour is to the people of Sydney. It is the very essence of our community. So we ask that you appreciate this and that your findings show that appreciation in a way that best preserves the health of the lake and the health of those of us who live around it.

**Ms FRASER:** The Warners Bay Area Sustainable Neighbourhood Group really appreciates the opportunity to address members of the Public Works Committee. The Warners Bay sustainability group is one of many around Lake Macquarie. We have members from Croudace Bay, Eleebana, Lakelands, Macquarie Hills and Warners Bay. We have become aware of growing concern in communities about the health and environmental impacts of the coal ash dams. Much more is known about coal ash dams since my dad worked at Wangi power station and brothers and sisters worked at various other power stations.

The ash dams were built before current environmental legislation. They are unlined. They are not fit for purpose. They do not meet current international best practice standards and there are legacy issues. The problem is that coal ash is hazardous. Communities have witnessed cloud dust from the coal ash blowing into their communities and into their schools. We are aware that such cloud dust can contain mercury, arsenic, lead and other heavy metals. We are also aware that heavy metals can contaminate groundwater and foul the ecosystem. In humans, coal ash has been linked to asthma, cardiovascular disease and other health problems. We note that the Boral safety data focuses on crystalline silica and draws attention to skin irritations, eye irritations and the potential for silicosis. The Hunter Community Environment Centre submission outlined in detail the heavy metals contained in the coal ash dams and leak into our environment. A submission from the Doctors for the Environment Australia outlined a list of health impacts on communities.

More recently, volunteers from the Actuaries Institute of Australia calculated the health bill from coal-fired power stations to be \$2.4 billion in Australia every year. This health bill does not just represent a cost to government or taxpayers, it represents the suffering of individuals and their families. We want improvements in regulations, monitoring, licensing provisions, better access to information for communities, a proper rehabilitation planning process and adequate funding set aside. We also want the coal ash exemption of 2014 repealed because coal ash is hazardous and should be treated as such. Finally, we do not want an environmental and health catastrophe that was witnessed from the collapse of the ash dam in Kingston, Tennessee, in 2008, which has prompted the EPA to start monitoring coal ash dams. Nor do we want the disaster experienced by residents in Port Augusta (Sth Aust) when Alinta Energy closed the power station and the ash dam caused severe health problems for the local community. We want to see leadership on this issue.

**Mr DEWAR:** The Lake Macquarie Sustainable Neighbourhood Alliance is an award-winning, unique combination of sustainable neighbourhoods in each township around Lake Macquarie, so we represent quite a lot of the community. Our alliance has a special concern about the existence and expansion of the ash dams at Eraring and Vales Point power stations. Our concern was certainly heightened by the sudden closure of Myuna Bay Sport and Recreation Centre in March 2019. The closure raised serious issues: How safe were the ash dams? If the recreation centre was threatened, why not the main arterial road, Wangi Road, and surrounding suburbs—Wangi, Eraring and Morisset? Were the ash dams properly lined? Of course, we now know they were not. Were there other environmental and health risks with these ash dams? Our community concerns were heightened by anecdotal reports of a partial collapse of the Vales Point ash dam in the early 1970's, which was covered up and taken care of by the Vales Point Power Station under the electricity commission.

Also, concerns were raised by continual reports of ash deposits in suburban areas from the two coal-fired power stations causing serious health problems, and the Environmental Justice Australia report that Ms Fraser mentioned of serious leaching into the lake. Therefore, we sincerely ask that there be public access to all groundwater monitoring data. The power stations need to prepare comprehensive rehabilitation and closure plans—we are dealing with a closure in a matter of the next decade or so—until the EPA is satisfied that the coal ash dam problems are comprehensively dealt with. Coal ash operators should be required to prepare these closure plans for the ash dams in consultation with the EPA and the State Government, and their liability clarified. The

rehabilitation occurring at present, where plantings occur over the top of coal ash, should not be continued. The safe re-use of coal ash in cement and construction materials is most probably from facilities right next to the coal ash dams. In overseas countries 50 per cent to 80 per cent of coal ash is re-used in a safe way. The present contract system that constrains any re-use needs to be overhauled.

Obviously our two coal power stations are nearing the end of their lives so we need to address the issue of the 61 million tonnes of coal ash in the two dams. There are heavy metals leaching into the lake and, when the ash is dry, dust blows into the local environment and our communities. There is a lethal cocktail of mercury, lead, arsenic, chromium and especially selenium, which have particular effects on our population. Our concerns are about the adequacy of the current unlined ash dams that are exposed to the atmosphere and the plans to expand these ash dams. This was further highlighted by Ms Fraser when she mentioned the dangerous coal ash spill in Tennessee in the United States in 2008 and the clean-up that caused the death of quite a number of people involved. We do not want that. As well, Lake Macquarie is an important tourist area where people boat, swim, fish and do many other activities; people from Sydney come up and use our area because it is a tourist area.

In the event of a coal ash dam failure, severe contamination with heavy metals will occur. Therefore, there is absolutely a need for stringent monitoring and enforcement, with this information available to the public, especially the impact on groundwater. The measures in place now are not adequate. The cheap form of rehabilitation of the ash dams being covered with soils and then revegetated with a few plants is unacceptable. The coal ash needs to be progressively removed from the site and adequately stored as hazardous waste and re-used for materials like other countries do—facilities near the ash dams are the safest way. New contracts are needed for the safe re-use of the fly-ash as an asphalt additive, cement additive, manufacturing tiles—one manufacturer cannot get them in at the moment—and other uses to greatly reduce and get rid of coal ash. Both Lake Macquarie power companies need to be part of the solution and the move to much greater re-use of the material and rehabilitation of the sites; otherwise, our community and taxpayers will increasingly bear the financial and health risks while the operators reap the profits.

**Dr MULLER:** Just to my background, I have a PhD from the University of Stuttgart, Germany, in industrial chemistry. Part of my education has also been industrial processes including energy generation from power plants. I thank you for the opportunity to speak here on this important matter on behalf of Community Environment Network. Wetlands and the quality of water are close to our heart and we are very concerned to see ash dams in direct neighbourhood to water bodies and wetlands. I will make some comments about best practice in dealing with coal ash. We have various options. Option number one is business as usual—what we do today—and I am glad that we all seem to agree that this is not the right way of doing it. Option number two is remediation, or what is called remediation—it is actually not worth the name.

It is covering the ash with a permeable layer of fill and that is protecting against dust blowing off but it is not preventing rain water seeping in. We have about 600 millimetres of rain water every year and it trickles through, percolates through the ash, and the water coming out ends up in the groundwater or as effluent. The third use would be using the coal ash as road fill or engineering material, which is about the same as using the ash dam as such, because if it is not covered against intrusion of water it will eventually leach out. Maybe not today or tomorrow but over decades and even centuries. Number four would be to use—it has been proposed—coal ash as a soil additive to improve the soil, but in my mind it makes the soil worse because it has not only the normal leaching process I just described but biological processes will actually lead to faster leaching out of heavy metals and toxic components.

Number five is the first of the options that I see as acceptable. That is dry storage. That is being undertaken in the United States at the moment. That is taking ash out of the wet storage and putting it into a dry storage, but this is a vastly expensive undertaking and a back of the envelope calculation of that leads to several billions of dollars just for the area here. The sixth method, is really best practice and that is to avoid having coal ash storage at all. It can be done. It is being done overseas in many countries. Germany actually has no coal ash storage at all. People argue that it is a different coal. No, it is not. It is Australian coal they are burning. It is much better to encase the coal ash in products like concrete or similar materials.

We had the submission from Poliac who actually describes such a way of doing things. These methods, if you find a market for the final product, will be much more cost efficient than dry storage. As a final comment there was the information that solar farms will be built on the dams. As much as I love solar farms and solar energy as such, this is the wrong solution here because it is just hiding a problem not solving it. Finally, the targeted and re-use rates of coal ash in Australia is completely insufficient. We must not only reuse all the produced ash as it comes out from the power plant but also remove the ash from the existing ash dams.



**Ms ABIGAIL BOYD:** Thank you for coming along and giving your detailed submissions today. I want to touch first on the issue of capping and unlined dams. What are the risks of that? Dr Muller, we had a site visit and looked over some of the ash dams that had been "rehabilitated". There was some low-level vegetation and we heard that nature takes over. Can you talk us through why that is not a solution?

**Dr MULLER:** Yes, nature takes over everywhere, that is how nature is. But, you will never see a tree on that site because trees cannot grow on that material. If roots go too deep the roots will die. The problem is much more, as I see it, the permanent percolation of rainwater through the system. The fill is actually bringing a financial profit, putting the fill in, because it is actually fill from WestConnex, so they get fees paid for it. It is not watertight. There is no watertight soil or anything in it. The water trickles through it and then the water trickles through the whole ash layer like through coffee in a coffee filter and overtime I must say, as a chemist, everything is soluble it is just a question of what is the concentration that comes out of it. If you give it enough time—decades, even centuries—the contaminants are leached through, as long as there is water coming through and leaching and out.

**Ms ABIGAIL BOYD:** Do you know if, in other countries, they cap in a different way, with some kind of impermeable layer?

**Dr MULLER:** Yes. What they do in the US is they actually have, number one, a watertight lining of the dams and then they fill in the ash and then they put a watertight cap on top of it. This could be either soil materials like clay but it also could be a plastic lining, but it has to be watertight.

**Ms ABIGAIL BOYD:** When you said the solar farm idea was not a good one because it covers up the problem, is that simply because you are then not dealing with it or is there an additional problem with putting a structure on top of an ash dam?

**Dr MULLER:** There was a discussion initially to put polls in and I thought that would be a bad idea because then you break everything up, but now they use just a weight load and concrete blocks to hold the solar panels so that is good enough but the cover-up is a bad thing. In parliamentary language it is like putting lipstick on a pig.

**Ms ABIGAIL BOYD:** What is the danger of leaving it? We have this discussion a lot in the Committee room. If you look at the very old ash dam sites, such as Tallawarra, that have not been used for a very long time, some of the community there say do not disturb it, because it is not a problem until you disturb it. What is your view on the idea of just leaving it?

**Dr MULLER:** I do not like the idea. You have a constant quantity of heavy metals coming out and seeping into the groundwater. If it is not lined the rainwater has to go somewhere, so it goes down. It is compacted but it is permeable, so water will seep through and take everything in small quantities. Heavy metals are only soluble in small quantities at this level but if this happens all the time over time eventually it will get out.

**Mr MACFARLANE:** Could I just add to that discussion? It is not just the water that is percolating from rainfall that is coming down through the cap if it is not an impervious layer, you also have groundwater from the hills, in this case, that is seeping through horizontally, if you like, through the ash if it is left there. That then converts into leachate which gets into the lake. If you leave it there you not only have the problem of stopping the rain from percolating down vertically, you still have the problem of leachate coming from outside or upstream of the ash, through the ash emplacement and into the lake.

**Ms ABIGAIL BOYD:** And that would explain why on the environmental reports they talk about horizontal versus vertical seepage or leakage from the groundwater. That is the reason why you need to line the whole receptacle. Lining the top might protect against rainwater but not against that horizontal flow?

**Mr MACFARLANE:** That is correct.

**Ms ABIGAIL BOYD:** Could I ask then are there certain types of ash dams, depending on the geography—that is not the right word—the surrounding land formation where that horizontal flow is not very great and so putting on a watertight capping would be not a bad solution, or do you still think that you would need to line it to not have a risk of leakage?

**Mr MACFARLANE:** That gets back to one of our main points, that we do not know. There is not sufficient bores to monitor groundwater that is coming from upstream through this. We simply do not know the extent of groundwater that is coming through from outside.

**Ms ABIGAIL BOYD:** That is my next question, and then I will throw over to my colleagues. You have all mentioned that there is not a lot of available, understandable information in relation to groundwater; we have

known for a while in relation to air pollution. What is it that you would want to see, ideally, in terms of being able to then have that better information? What is it that you would recommend we need to do?

**Mr MACFARLANE:** Can I throw that to my friend Mr Tait, who is more an expert on that?

**Mr DEWAR:** I will give a couple of points after he has spoken.

**Mr TAIT:** We have written out some of these answers because we anticipated this question.

**Ms ABIGAIL BOYD:** Predictable.

**Mr TAIT:** I am quite happy to go through the dot points, but also perhaps for clarity we could table that document.

**Ms ABIGAIL BOYD:** That would be very useful.

**Mr TAIT:** Basically we would want all surface water—including episodic discharges over the ash dam spillway and groundwater discharged—monitored in terms of terms of quantity as well as quality. If there is no existing monitoring bore hole in a suitable location then we should be creating some more—this is getting to the point Mr Macfarlane was making. In relation to that, a couple of years ago the hydrological report we referred to recommended sinking some new bore holes upstream or up gradient. I believe that was done, but the up-gradient bore hole is on the margin of the ash dam itself.

**The Hon. TREVOR KHAN:** Sorry, which ash dam?

**Mr TAIT:** Eraring, sorry. Wangi, closest to Eraring—sorry, that has been our focus. Depending on the rate of flow of the groundwater across the ash dam, under the ash dam, we have no way of telling whether that bore hole is in fact into clear water or is in fact in the plume of leachate from the ash dam. There is no information, there is no monitoring on that rate of flow. We do not know. We want that kind of information as well and, if necessary, to put in a new bore hole further up gradient to ensure that we getting water that is uncontaminated by the ash dam. As it stands, for all we know with the bore holes that they are monitoring there may be very little additional—the natural groundwater, given the rock strata, coal seam, wherever it comes through, might already be contaminated. We do not know what its quality is. That was never established as a baseline, apparently, in the seventies when this was all started. In addition to that—

**Ms ABIGAIL BOYD:** Sorry, so that is that difference between what they call the background data and the—

**Mr TAIT:** That is right, yes. We would also want regular, publicly available monthly monitoring of the chemical quality of the lake water itself. Currently the monitoring is done on physical parameters like temperature, clarity and salinity, but the concentration of these metals that we are concerned about—like selenium, arsenic, cadmium—is not regularly monitored in the lake at all. The only indication that we have got as to whether or not there is something to be concerned about there is the NSW Health report earlier this year, which told us that we should not eat certain seafood more than once or twice a week. That is a concern.

**Ms ABIGAIL BOYD:** Sorry, I just wanted to drill into that as well. How were you told about that restriction? How do people know that there is that restriction?

**Mr TAIT:** There was media reportage of it. Of course, we all live around the lake, so the underground network—sorry, that was an ABC News article.

**The Hon. TREVOR KHAN:** What is the date of that?

**Mr TAIT:** The date of that article is 11 March 2019.

**The CHAIR:** Can you table that, Mr Tait? I think Mr Dewar would like to add something at this point.

**Mr DEWAR:** Yes. It seems to be that there is some sort of feeling there is not evidence about this, but we know from the Environmental Justice Australia report, which was looking at the heavy metals that are actually in the lake near the ash dams—those sections where it would come down into the lake—actually reported a high concentration of heavy metals. We only know from what transparency there is through the power stations that they will only monitor, I think, selenium. We now know that there is indeed a high concentration of heavy metals coming in.

As was just mentioned, we are not allowed to eat any more big quantities of certain sorts of seafood that come from the lake, particularly in the southern area of the lake where the two ash dams are. As well as that, we know that there have been dust events that our communities have told us about of dust coming off the ash

dams. These events occurred in summer 2016 and also in November last year. Since we do not have the EPA or the power stations telling us, we now know that there is actually a problem here with groundwater.

What you have got to realise is that our lake has quite high hills and mountains around the lake. We actually depend upon the groundwater coming along the creeks into the major creeks. That is why in the 1990s Lake Macquarie was actually in danger of being declared a dead area, because of the amount of stuff that was coming down. We know from the old sulphide works there was quite a lot of selenium coming out of that along Cockle Creek. We are actually finding out more and more in the last year that it actually is a problem, particularly with the heavy metals being leached in the groundwater, horizontally and vertically.

**The Hon. TREVOR KHAN:** Mr Dewar, was it not one of your opening submissions that we should cease capping of the ash repositories? If my understanding in that regard is correct, then your evidence with regards to the danger of dust contamination, particularly during those drought periods that you referred to, is greatly exacerbated by the failure to cap. You cannot have one without the other.

**Mr DEWAR:** Yes, true. I am just reporting on some of the events that have occurred with the dust. That is anecdotal, really.

**The Hon. TREVOR KHAN:** Mr Dewar, I grew up in Wollongong. I know what dust coming off industrial sites is like. But if your answer to solving one problem is not to cap, thereby leaving the community exposed to contamination by dust, I am a bit concerned as to whether the outcome is—

**Ms ABIGAIL BOYD:** Mr Khan, I do not think anyone is saying—

**The CHAIR:** Mr Dewar can respond and then Ms Fraser—

**Mr DEWAR:** Obviously some sort of capping would keep the amount of dust down, but what we are talking about is that that is sort of an intermediate solution. What we are talking about here is a major problem of the whole sort of thing. Obviously some sort of growing of shrubs and whatever on top of the ash dam, as we have been pointing out, might ameliorate some of the conditions. But I think what we are dealing with here is a major overall problem. The groundwater seepage underneath that capping is of very great concern to us.

**Ms ABIGAIL BOYD:** Just to clarify on that, you are not for a moment suggesting that if there is a choice between leaving it uncapped forever or capping it that you would not have it capped. What you are suggesting, as I understand it, is that there are better ways to deal with it long-term. No-one was ever suggesting just leaving it uncapped.

**The Hon. TREVOR KHAN:** Go back and look at what Mr Dewar said in his opening—

**Mr DEWAR:** I understand, and I think my answer explains it—and other witnesses here might be able to explain a bit more. I agree that there might be temporary solutions, but you have got to realise that overseas—even in the US, where they have realised this is a major, major problem where they are having to deal with it all over the place and where communities are impacted much more, probably, than our community. We need to look at what other countries are dealing with—it is a more comprehensive solution. I think our major emphasis is that there is a way to actually re-use this material and find safe ways to maybe have contracts open up and we could try and—that is another way to ameliorate the problem.

**The CHAIR:** Ms Fraser, did you want to add something to that?

**Ms FRASER:** Yes, thank you. The submission from the Lake Macquarie Sustainable Neighbourhood Alliance does expand on that a bit, advising that the problem is that covering it with soil and vegetation may in some way temper the problem, but it is not an ongoing solution because of the ongoing leaching. If we look at the experience at Port Augusta, where with severe weather events—and we know that severe weather events are going to happen more often. With that severe weather event, you had soil and then the dust landing in that community. If I may I will just read to you a statement by Physicians for Social Responsibility in the US, who said:

... that coal ash is dangerously toxic and poses a threat to human health. Its wet storage should be phased out, and its dry storage should be engineered for maximum control to prevent leaching, blowing or leakage of toxicants.

I understand that this is a bit difficult in terms of what should come first and all that, but I want to get to the point that it is hazardous but there are safe ways to recycle it. We understand that there are start-up companies in this local area who want to get a hold of the ash and do work with it, like producing lightweight aggregate for the building industry. This is far better than a situation we have at the moment where you can go to a garden shop or a horticulture shop and you can see coal ash on sale uncovered and out in the open within metres from cafes where people are having their lunch and people are buying plants. That is because people do not know it is hazardous.

I do not blame the plant shop but, I tell you what, my sister who is asthmatic—I suggested to her that she not go and have lunch there on a windy day because I have seen the ash blowing around. That is a problem when the ash is not considered to be hazardous. There are all kinds of ways in which it is being distributed in the community now. I understand that Boral looks at the Asian and the Australian market as a source of lots of coal ash and puts a value on it between US\$25 and US\$75 or I have even seen US\$150 for a tonne. Now imagine looking at this 61 million tonnes of coal ash and how much money they can see in that. But the thing is: Where is the responsibility? Where does it go? Without having it categorised as hazardous, there is not that monitoring taking place.

**Ms ABIGAIL BOYD:** Coming back to that monitoring, we had this situation in Lake Macquarie where there was the cadmium that resulted in the numbers of crabs or fish not being able to be eaten. I asked you about how you were informed about that. What further monitoring has been done on the back of that? Was that just an exception where they found that once and that was it, or are they now monitoring?

**Mr MACFARLANE:** As far as I know that ABC article that we have tabled came after a report had been issued by the EPA that identified those issues with the crustaceans and fish in the lake. I think that was only released after there had been a freedom of information issue application made by the Hunter Community Environment Centre, so it was not freely given. My understanding is that that information was not freely released by the EPA. It was only under some pressure from a local group. To answer your question, as far as we know there has been no other monitoring in the lake of crustaceans since that report. That report—I think the testing was done about two years ago now.

**Mr TAIT:** I will add a little bit to reinforce—we are not aware of any further monitoring or any further follow-up studies at all from that. As to whether that was just coming out of ancient sediments from maybe the Pasmenco smelter up in the north of the lake, whether it was the surficial sediments that are current depositions, whether it was coming out of the water body which is from surface water run-off or leachates—we do not know.

**Ms ABIGAIL BOYD:** When it comes to the dust storm or the dust blow-over issues, is there any advice given from anybody to the community as to what to do in those circumstances?

**Mr TAIT:** No, I think, other than not breathing. I know at our place when the wind blows from that direction we just get grey and black dust deposits on everything. Again I think one of the licence conditions for Eraring is to make sure that they have got good dust suppression in place on the ash dam, so that when they get the dry weather and strong winds that—the technology is up to them. I do not know what they use—that is not my area—but clearly they do not. I am not aware of anything that the EPA is doing to enforce that licence condition.

**The Hon. SHAYNE MALLARD:** The question is directed to most of you, but I think Dr Muller might be the one who has the qualifications to answer. You would desire the extraction of the stored coal ash and recycling and removing it. We have to look at other options to consider. I wanted to ask a question about—I am surprised it is not capped with clay. In my career in local government we capped landfill tips with clay. Then we put pipes in that and extracted the methane and then we put soil on top and made it a public park. That is quite common. Why can't that approach be the way going forward for the coal ash deposit?

**Dr MULLER:** I think it is about money. The coal ash dams actually make money from putting landfill in, so they actually act as a landfill for WestConnex.

**The Hon. SHAYNE MALLARD:** Or for anything. It is not just WestConnex.

**Dr MULLER:** For anything, yes.

**The Hon. SHAYNE MALLARD:** I was involved with some remediation of petrol stations in the city. There are new technologies of injecting gels and types of compounds that pull—I did do some chemistry at university but I am not going to—the toxins into a concentrated area. In your knowledge, is that a technology that would address this issue in terms of contamination going forward?

**Dr MULLER:** I can't imagine. I guess petrol stations or petrol is quite a different issue because that is just mineral oil or derivatives of that. Here, we talk mainly about heavy metals and other metals. I would not see any method of how you can concentrate that in groundwater by trapping it. Maybe I need to check ion-exchange resins. That is something I remember being done in the US, not for that purpose but in groundwater remediation. So you actually dig a deep hole into the groundwater, put ion-exchange resin in and take it out after some time and exchange it again, so you concentrate it at this part. But then you actually have to re-monitor the groundwater flow and actually put your traps in the right spots and that is quite an effort.

**The Hon. SHAYNE MALLARD:** My last question is about the groundwater. No-one here is a hydrologist. What we saw today was a valley that is filled in where formally a creek ran—it is not a pit that you have filled up. Are you suggesting that the groundwater has come up into, say, for example, six metres plus a half-meter cap that the groundwater comes up into that?

**Dr MULLER:** I am not sure. I do not know but my uneducated guess at this—I am not a hydrologist—is that actually the main component is the rainwater. So you have high quantities of rainwater coming in every year, and the water has to go somewhere.

**The Hon. SHAYNE MALLARD:** I come back to my first question which is about a clay cap. I acknowledge a clay cap is an expense—

**Dr MULLER:** I agree a clay cap would actually solve a lot of problems. It would not solve it completely but it would make it much better.

**Ms ABIGAIL BOYD:** Dr Muller, in your submission you talk about the transition plan for mining workers. The Committee asked the earlier panel about how applicable are the skills of mineworkers or workers at the power stations to put them into other types of industries. How do you see that working?

**Dr MULLER:** Yes, part of my study was in process engineering you talk about unit processors. So digging, mining or sieving or filtering, no matter what you do, it is the same kind of process you do. I guess the skills are readily applicable. The only concern I have is it is not huge numbers of people which would be involved because this is actually a low-cost product, high volume, so companies will go straight for automation which means not too many workers.

**The CHAIR:** Mr Macfarlane, do you want to add anything?

**Mr MACFARLANE:** At the beginning of this session I was remiss in not tabling a supplementary submission. Will the Committee accept that?

**The CHAIR:** Yes, of course, table it.

**Mr MACFARLANE:** I want to table that supplementary submission as well as David Tait mentioned the dot points about what we saw as being necessary for testing. I can table that as well with your permission.

**The CHAIR:** Yes. I thank all the witnesses for their appearance and the diligence with which they have provided evidence and taken questions.

**(The witnesses withdrew.)**

**The Committee adjourned at 14.49.**