



DOC21/338705-9, SF19/354 (SSD 9697)

Department of Planning, Industry and Environment

Via Major Projects Portal

Attention: Mr Jack Turner

1 June 2021

Dear Mr Turner,

### **Bayswater Power Station Upgrade (SSD 9697) - EPA Advice on Request for Information**

I refer to your request, uploaded to the Major Projects Portal on 30 April 2021, for the Environment Protection Authority's advice on AGL Macquarie Pty Limited's (**AGLM**) response to a request for information (**RFI**) for the proposed Bayswater Power Station water management upgrade project (SSD 9697).

The EPA understands that AGLM proposes to carry out a range of upgrades to Bayswater Power Station (**the Premises**) aimed at improving the environmental performance of ash, salt and water management infrastructure and associated rehabilitation outcomes.

The EPA has reviewed the response that includes AGLM's letter to you dated 28 April 2021 comprising a consolidated response to requests for additional information; and, Appendix D that is a memorandum prepared by Jacobs dated 27 April 2021 responding to issues raised by the EPA in respect of various surface water and groundwater issues.

The potential for water pollution impacts has been raised previously by the EPA and remains largely unaddressed by the applicant's response to submissions letter. Further information is required to understand the existing and expected surface and groundwater impacts under the proposal, address the relevant Secretary's Environmental Assessment Requirements, provide input to draft conditions of consent, and inform licensing considerations consistent with section 45 of the *Protection of Environment Operations Act 1997* (**POEO Act**).

At present, there is not enough information for the EPA to determine whether the proposal is consistent with the objects of the POEO Act, including "to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development" and "to reduce risks to human health and prevent the degradation of the environment by the use of mechanisms that promote ... the making of progressive environmental improvements, including the reduction of pollution at source".

The EPA provides a summary of its advice below and detailed advice and recommendations in Tab A (surface water) and Tab B (ground water).

Phone 131 555  
Phone +61 2 9995 5555  
(from outside NSW)

TTY 133 677  
ABN 43 692 285 758

Locked Bag 5022  
Parramatta  
NSW 2124 Australia

4 Parramatta Square  
12 Darcy St, Parramatta  
NSW 2150 Australia

[info@epa.nsw.gov.au](mailto:info@epa.nsw.gov.au)  
[www.epa.nsw.gov.au](http://www.epa.nsw.gov.au)

### Summary of major water pollution issues

The proposed development involves a substantial increase in the capacity of the ash dam and significant changes to water management.

Based on the limited information provided there are likely to be increased impacts on the receiving environment and the EPA does not have sufficient information to be satisfied that there are practical and feasible options available to mitigate those impacts. Further to this, no information has been provided to demonstrate that the 'net reduction' in seepage proposed can be achieved or is sufficient to address any impacts.

It remains unclear:

- how much ash dam seepage water is bypassing the collection system and how this will change under the proposal
- what the current condition of the receiving waterways is in the context of the existing development
- how water would be managed and what pollution controls would be implemented under the proposal, and
- what the residual water pollution impacts of the proposed development would be after mitigation measures are implemented.

The EPA recently visited Bayswater Power Station and observed signs of significant seepage losses on three sides of the ash dam, including saturated ground, salt crusts and wetland vegetation downgradient of the seepage collection system. The current and predicted seepage losses have not been reliably quantified to inform the required mitigations. The Jacobs memorandum indicates that the water balance modelling is unreliable and does not accurately represent water management at the Premises, stating:

- "...the use of a water balance model to calculate likely seepage rates is fundamentally flawed"
- "The additional information provided as part of the review of the water modelling contained in the RTS has confirmed that reliance on a water balance to calculate the current BWAD seepage loss is flawed given the level of uncertainty in most input and output volumes."

Notwithstanding these issues, the memorandum predicts increased seepage under the proposed development.

### Draft Conditions of Consent

In consideration of the matters raised in this letter, the EPA is not able to comment on the draft Conditions of Consent that were emailed to the EPA on 13 May 2021. The EPA is also not in a position to recommend that the project be approved until these matters are addressed.

If you have any questions about this matter, please contact Hamish Rutherford on (02) 4908 6824 or email [RegOps.MetroRegulation@epa.nsw.gov.au](mailto:RegOps.MetroRegulation@epa.nsw.gov.au).

Yours sincerely



2 June 2021

**ADAM GILLIGAN**  
**Director Regulatory Operations**

Encl. Tab A and Tab B.

## Tab A

### Bayswater Power Station Augmentation, RFI, review of surface water pollution issues

#### Overview

---

The surface water pollution issues raised previously by the EPA in its submissions on the *Environmental Impact Statement (EIS)* and *Response to Submissions (RtS)* are largely unaddressed by the additional information provided in the applicant's letter (dated 28 April 2021). The EIS, RtS and letter do not provide the information required to address the relevant SEARs and licensing considerations consistent with section 45 of the *Protection of Environment Operations Act 1997*. The major issues are:

1. The current water pollution impacts and potential risks to receiving waterways under the proposal are not adequately characterised. The EIS and RtS provide only limited surface water monitoring results from largely historical data. The RtS presents results of a single recent sampling event that only provides a snapshot of water quality at the time of sampling. The EPA previously commented that an appropriate characterisation of current surface water quality, under a range of operational and weather conditions, is required to understand the existing impacts and potential risks. The applicant's letter does not address this deficiency.
2. The EIS, RtS and letter provide limited information about the mitigation measures considered and proposed to be implemented, indicating that the specific water pollution controls would be developed post-approval at the detailed design phase. Further details of mitigation measures would be required to ensure appropriate management of potential water pollution risks, with a range of mitigation measures considered, and justification provided regarding which measures would be adopted with reference to managing potential risks to waterways.
3. The EIS, RtS and letter do not appropriately characterise the quality, quantity, frequency, and volume of the proposed discharges or assess the potential impacts of discharges (including ash dam seepage) on the environment.
4. The EPA requested a water pollution impact assessment, consistent with the national and state framework for assessing and managing water quality, including a discharge characterisation and details of practical measures proposed to address residual impacts. The EPA noted that the RtS did not adequately address this. The applicant's letter does not address this.
5. The letter indicates that water pollution impacts associated with ash dam seepage are likely to increase under the proposal, stating "...the Project may result in an additional 0.3 ML/d of seepage from the BWAD (0.2 ML/d south of the BWAD and 0.1ML/day at the Main Embankment)."
6. The letter suggests that the water balance modelling used to estimate seepage volumes in the EIS is unreliable and does not accurately represent water management at the premises. The letter states:  
"...the use of a water balance model to calculate likely seepage rates is fundamentally flawed"  
"The additional information provided as part of the review of the water modelling contained in the RTS has confirmed that reliance on a water balance to calculate the current BWAD seepage loss is flawed given the level of uncertainty in most input and output volumes."

*In summary, it remains unclear:*

- *what the current condition of the receiving waterways is in the context of the existing development*
- *how water would be managed and what pollution controls would be implemented under the proposal*
- *what the residual impacts of the proposed development would be on the receiving waterways after mitigation measures are implemented.*

*It also appears that the proposed development is likely to result in increased seepage related impacts to waterways.*

The applicant's responses to the EPA's submissions are discussed below (numbered as per the EPA's submissions).

## 9) Current water quality impacts

---

### **The current surface water quality and water pollution impacts from the existing development remain unclear**

The SEARs require, "A description of the existing environment likely to be affected by the development ..."

The EPA commented that the EIS and RtS provided limited surface water monitoring results, largely from historical data that did not include information for key waterways potentially impacted by the existing development.

*The applicant's letter does not provide any additional relevant information.*

## Ash dam

---

### 10) Seepage mitigation

#### **The information provided indicates that water pollution impacts associated with ash dam seepage are likely to increase under the proposal**

The SEARs require, "a description of the proposed water management system, water monitoring program and all other proposed measures to mitigate surface water and groundwater impacts..." The EPA requested details of options considered and proposed to minimise seepage losses to the environment, including, but not limited to:

source controls to avoid and minimise seepage, such as clean runoff diversions, groundwater interception bores and lining areas of high seepage measures to improve interception and return of seepage water including improvements to seepage collection drainage, collection pond sizing and lining, return pump capacity and pumping duration options.

The EPA commented that the potential impacts of ash dam seepage from the current development are not well understood, noting that the EIS and RtS did not adequately characterise seepage water quality or consider how this could impact on surface water quality currently and under the proposal.

*The applicant's letter does not provide further details of the seepage water quality or mitigation measures.*

Appendix D of the applicant's letter concludes that "...the use of a water balance model to calculate likely seepage rates is fundamentally flawed". However, Appendix D indicates that seepage related impacts are likely to increase under the proposed development, stating "...the Project may result in an additional 0.3 ML/d of seepage from the BWAD (0.2 ML/d south of the BWAD and 0.1ML/day at the Main Embankment)."

## 11) Managed overflows

### **It remains unclear what measures to avoid, minimise or mitigate overflows from the augmented ash dam would be implemented under the proposal**

The SEARs require, “a description of the proposed water management system, water monitoring program and all other proposed measures to mitigate surface water and groundwater impacts...”

The EPA submission on the EIS requested further consideration of practical and reasonable measures to avoid or minimise managed overflows from the ash dam and mitigate the potential impacts of these overflows, noting that measures considered could include:

- removing ash water from the ash dam for treatment and reuse
- increasing evaporation from the dam through, for example, mechanical barrel fans.

The EPA’s submission on the RtS noted that it was unclear what mitigation measures have been incorporated into the design and that the ash dam water balance results were unchanged from the EIS.

*The applicant’s letter does not provide any relevant additional information to address this issue but defers providing details of management measures to a post-approval water management plan.*

## 12) Controlled discharges

### **It remains unclear whether controlled discharges are proposed to manage freeboard within the ash dam**

The SEARs require, “a description of the proposed water management system, water monitoring program and all other proposed measures to mitigate surface water and groundwater impacts...”

The EPA’s submission on the RtS requested clarification regarding whether controlled discharges from the ash dam are proposed, noting that, if controlled discharges are proposed, a water pollution impact assessment would be required. The EPA indicated in its submission that the RtS did not address this.

*The applicant’s letter does not provide any relevant additional information to address this issue but defers providing details of management measures to a post-approval water management plan.*

## 13) Water pollution impact assessment

---

### **The potential water pollution impacts of the proposed development remain unclear**

The SEARs require:

- “a description of the proposed water management system, water monitoring program and all other proposed measures to mitigate surface water and groundwater impacts
- an assessment of the likely impacts of the development (including flooding) on the quantity and quality of the region’s surface and groundwater resources, related infrastructure, adjacent licensed water users and basic landholder rights, and measures proposed to monitor, reduce and mitigate these impacts”.

The EPA commented that the EIS did not adequately characterise the quality, quantity, frequency and volume of the proposed discharges or assess the potential impacts of those discharges on the environment. The EPA requested a water pollution impact assessment consistent with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018; the national Water Quality Guidelines), however, as indicated by the EPA’s submission the RtS did not address this.

*The applicant’s letter does not provide any relevant additional information to address this issue.*

## 14) Water balance modelling

---

### **The likely effectiveness of the discharge mitigation measures remains unclear**

The SEARs require:

“a description of the proposed water management system, water monitoring program and all other proposed measures to mitigate surface water and groundwater impacts  
an assessment of the likely impacts of the development (including flooding) on the quantity and quality of the region’s surface and groundwater resources, related infrastructure, adjacent licensed water users and basic landholder rights, and measures proposed to monitor, reduce and mitigate these impacts”.

The EPA’s submission on the EIS recommended that the applicant carry out daily time-step modelling of observed rainfall over a longer period representing a range of conditions to predict the likely frequency of spills from the ash dam over the life of the proposal, with sensitivity testing to determine the effect of the proposed mitigation measures on discharge frequencies and volumes.

The RtS indicated that the water balance modelling undertaken for the EIS was applied at a daily interval despite results being presented as monthly averages. The EPA commented that the RtS did not provide further details of the modelling or sensitivity testing.

*The applicant’s letter does not address this.*

It should also be noted that Appendix D of the letter states, “The additional information provided as part of the review of the water modelling contained in the RTS has confirmed that reliance on a water balance to calculate the current BWAD seepage loss is flawed given the level of uncertainty in most input and output volumes.” This suggests that the water balance modelling is unreliable and does not accurately represent water management at the premises.

## 15) Coal handling plant water management system

---

### **It remains unclear what specific changes would be implemented to mitigate potential water pollution impacts from the coal handling plant**

The SEARs require, “a description of the proposed water management system, water monitoring program and all other proposed measures to mitigate surface water and groundwater impacts”.

The EPA’s submission on the EIS requested:

- a report that describes the measures proposed to minimise pollution from and mitigate impacts of discharges from the coal handling plant, noting that the water balance modelling should be revised to reflect the proposed measures;
- an assessment of the potential residual water quality impacts of discharges after these measures are implemented, noting that substantial volumes of water discharge daily from the coal handling plant sediment basin.

The EPA commented that the water balance remained unchanged in the RtS and the assessment appeared inconsistent with the proposed water management system. The EPA noted that the RtS provided an overview of proposed mitigation measures, but deferred details of the proposed water management system changes to detailed design.

*The applicant’s letter does not provide any details of the proposed mitigation measures.*

The letter refers to a report prepared to meet pollution reduction program conditions under the applicant’s existing environment protection licence and indicates that the report recommends, ‘subject to further design and optimisation’, optimising the coal handling plant’s launder system to reduce launder flows to the basin. It is unclear what specific changes would be implemented as part of this optimisation. The letter indicates that final details of the upgrade would be provided via a post-approval water management plan.

## 16) Stockpiles

---

### The applicant's letter adequately addresses this issue

The SEARs require, "a description of the proposed water management system, water monitoring program and all other proposed measures to mitigate surface water and groundwater impacts".

The EPA recommended that:

"the applicant considers options to avoid locating stockpiles on the floodplain if stockpiles are proposed to be located on the floodplain, the applicant provide details of measures that will be implemented to mitigate potential risks to waterways an assessment of potential residual water pollution impacts, as part of the water pollution impact assessment."

The EPA commented that the RtS indicated that stockpiles would be 'located away from drainage lines, waterways or areas susceptible to wind erosion or flooding'. The EPA recommended that the applicant specifies the proposed minimum buffer distance between stockpiles and drainage lines/waterways.

The applicant's letter indicates that a minimum buffer distance of 40m between stockpiles and drainage lines/waterways would be adopted.

## 17) Erosion and sediment controls

---

### It remains unclear whether appropriate erosion and sediment controls would be implemented

The SEARs require, "a description of the erosion and sediment control measures that would be implemented to mitigate any impacts in accordance with *Managing Urban Stormwater: Soils & Construction* (Landcom 2004) ..." The EPA requested:

- details of proposed erosion and sediment controls including the design storm capacity of any proposed sediment basins;
- consideration of measures to avoid stormwater discharges (e.g. stormwater reuse) and minimise potential associated pollution (e.g. discharging stormwater to vegetated areas away from waterways);
- if stormwater discharges to waters cannot be avoided, an assessment of the potential impact of proposed stormwater discharges on receiving waterways.

The EPA noted that the EIS and RtS did not provide details of erosion and sediment controls (such as the design storm capacity of sediment basins), with the applicant indicating that this information would be included in a *Stormwater, Erosion and Sediment Control Plan* if the development is approved.

*The applicant's letter does not provide any relevant additional information to address this issue.*

## Tab B

### Bayswater Power Station Augmentation, RFI, review of groundwater pollution issues

The additional information has not satisfactorily addressed the characterisation and impacts of seepage losses to groundwaters from the Ash Dam or as a result of its proposed augmentation. This remains an outstanding concern for potential groundwater impacts of the proposal.

Mitigation measures for potential groundwater impacts from the Ravensworth ash pipeline and salt cake landfill components of the project have been previously conditioned.

#### Existing Environment

Appendix D of the applicant's letter concludes that "...the use of a water balance model to calculate likely seepage rates is fundamentally flawed". A revised methodology described in Appendix D indicates that seepage related impacts are likely to increase under the proposed development, stating "...the Project may result in an additional 0.3 ML/d of seepage from the BWAD (0.2 ML/d south of the BWAD and 0.1ML/day at the Main Embankment)."

The revised approach does not present new information and is disproportionate to previously modelled and reported seepage, while raising concerns around reliance on other modelled findings. The model and estimations concur that following augmentation, seepage to the receiving environment will increase.

The existing seepage management collection efforts are unsatisfactory, and the leakage footprint of the dam is extensive. The captured seepage reported in the additional information does not consider this visible seepage bypassing the existing measures or quantify it. No further characterisation of seepage water quality was presented in the additional information that would accurately delineate the existing environment.

Although not considered part of the EIS, impacts from existing seepage will need to form the baseline of which to measure any net reduction in seepage loss. The existing containment performance of the ash dam is indicative of the capital works required to achieve the commitment of a net reduction to seepage loss.

#### Seepage Collection Upgrades

No detailed design or significant commitments to upgrade existing measures were presented in the additional information.

A commitment to a net reduction in seepage losses is made, under the previously mentioned lower seepage rate as estimated in the additional information. These existing passive retention measures are unsatisfactory and artesian groundwater pressures exist at all downgradient areas of the ash dam significantly increasing the environmental footprint. These revised seepage volumes reported in the additional information do not account for these additional losses that bypass the existing measures at the main embankment or north saddle wall under the revised methodology. This results in an inadequate benchmark for which to assess the commitment to a net reduction of seepage.

#### Proposed Ash Dam Augmentation

The feasibility of relining the ash dam under its current management as a singular cell is clear. No detailed design on seepage upgrades that would mitigate this approach were provided in the additional information. Additional pressure head from increased ash storage will exacerbate existing seepage. The issue of seepage management is not actively addressed to a design phase for the feasibility of a net reduction to be achieved or committed to.



The alternative “do nothing” scenario, not increasing the ash dam capacity, is more likely to result in more immediate and long term benefits to surrounding groundwaters and environment than under the existing proposal. Where the existing management of the dam has failed to contain the ash repository to the dam confines, the closing and capping of the dam for water management purposes at its current capacity would prevent an ongoing increase to seepage from the main embankment, southern area and north saddle wall to the receiving environment.

## Recommendation

The EPA cannot support the additional head of pressure resulting from the augmentation without assessing the feasibility of improvements to the proposed seepage collection upgrades. These are yet to be adequately conceptualised as per SEAR requirements to characterise the groundwater environment and develop sufficient mitigation measures.

A significant investment in capital expenditure is likely to be required for seepage upgrades to meet this objective. Further information is required to support the practicability and feasibility of achieving a net reduction in seepage impacts from the augmentation.

## Previous Recommendations

Recommendations from EIS review	Addressed in RTS	Comment	Additional Information Provided
Bayswater Ash Dam (BWAD)			
The proponent provide further information on the existing impact of the BWAD seepage on receiving groundwaters.	Sections 0, 4, 4.6	<p>Partially addressed. More information required.</p> <p>Further discussion on the conceptual fate of seepage from the ash dam is provided in the RTS.</p> <p>A full characterisation of seepage and the receiving environments is not provided for the required understanding of existing impacts and potential risks from the proposal. The existing environment is described but not quantified or qualified.</p>	<p>Unsatisfactory.</p> <p>The further information revised seepage to the measured passive seepage collection through V notches as in the EIS. The south seepage investigation and additional return/process-water estimations as summarised in Appendix D of the applicant’s letter.</p> <p>The existing seepage management collection efforts are unsatisfactory, and the leakage footprint of the dam is extensive. This existing captured seepage reported in the additional information does not consider this visible seepage bypassing the existing measures. No further characterisation of seepage water quality was presented.</p> <p>Although not considered part of the EIS, impacts from existing seepage baseline of any net reduction in seepage loss and are indicative of existing containment performance.</p>

			<p>The quantification of seepage through both those modelled in the EIS and RTS and those explanations provided through the existing passive seepage measures and water balance modelling remains unclear.</p> <p>The EPA cannot support the additional head of pressure resulting from the augmentation without assessing the feasibility of improvements to the current seepage collection, which is yet to adequately conceptualised as SEAR requirements.</p>
<p>The proponent submit additional detailed information on proposed upgrades to the BWAD seepage collection system, demonstrating an increase to the protection of receiving groundwaters.</p>	<p>Sections 4.2, 4.6, 9, 10</p>	<p>AGL commits to:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> updated hydrogeological assessment of seepage as part of detailed design;</li> <li><input type="checkbox"/> further details of seepage improvement works which will be sized and designed to maximise seepage collection and return to ensure a net reduction in seepage loss;</li> <li><input type="checkbox"/> the development of site specific environmental goals – informed by existing site conditions – to ensure no material impacts result from the works forming part of the Project (noting that impacts related to existing approved operations do not form part of the Project);</li> </ul>	<p>No detailed design or significant commitments to upgrade existing passive measures were presented in the additional information.</p> <p>A commitment to a net reduction in seepage losses is made, under a lower reported seepage rate in the additional information. These existing passive retention measures are unsatisfactory and artesian groundwater pressures exist at all downgradient areas of the ash dam significantly increasing the environmental footprint. The revised seepage volumes reported in the additional information does not account for these additional losses at the main embankment or north saddle wall under the revised methodology.</p> <p>The dam augmentation, as currently proposed, will exacerbate and extend the duration of these impacts without significant upgrades. The feasibility of any improved design measures ensuring a net reduction are not able to be assessed with the information provided.</p>

<p>The proponent provide further information on the technical specifications of the BWAD augmentation, including the use of a liner, to prevent increased seepage to local and regional groundwaters.</p>	<p>Sections 5, 11</p>	<p>Partially addressed. More information required on seepage collection enhancements and designs.</p> <p>The Bayswater Ash Dam Pollution Reduction Program (PRP) (AECOM 2016b) recommends that the BWAD Main Embankment Seepage Ponds be upgraded and/or have new seepage cut-off / collection ponds constructed (AECOM 2016b). The existing ponds and any additional ponds that are constructed will be lined if it is considered necessary at the time of design</p>	<p>Unsatisfactory</p> <p>The feasibility of relining the ash dam under its current management as a singular cell is clear.</p> <p>No detailed design on seepage upgrades that would mitigate this approach were provided in the additional information. Additional pressure head from increased ash storage is going to exacerbate existing seepage. The issue of seepage management is not actively addressed to a design phase for the feasibility of a net reduction to be achieved or committed to.</p>
<p>The proponent provide information on the post-closure and rehabilitation of the BWAD including any ongoing seepage management.</p>	<p>Section 6</p>	<p>Satisfactorily addressed</p> <p>Additionally, the capping of the BWAD will define the end of water input into the BWAD cycle, and ultimately lead to a decline in seepage from the structure. That is, peak seepage rates should coincide with the closure and rehabilitation of the BWAD.</p>	<p>The ongoing management of increased seepage was not addressed.</p> <p>The alternative do nothing scenario, not increasing the ash dam capacity, is more likely to result in immediate and long term benefits to surrounding waters and environment than under the existing proposal.</p> <p>Where the existing management of the dam has failed to contain the ash repository to the dam confines, the closing and capping of the dam for water management purposes at its current capacity would prevent an ongoing increase to seepage from the main embankment, southern area and north saddle wall.</p>
<p>The proponent provide further information on the underground ash disposal and</p>	<p>Section 7</p>	<p>Satisfactorily addressed</p>	

discharge of excess ash process water to mining voids and impact to groundwaters.			
Salt cake landfill			
The proponent provide further information on the site design, technical specifications and liner compatibility of the proposed salt cake landfill.	Section 8	Satisfactorily addressed	Previously recommended Condition of Consent As part of the detailed design for the salt cake landfill facility a detailed groundwater monitoring and management system will be required including a trigger action response plan for the detection of potential leakage.
The proponent investigate the feasibility of additional liner properties to meet the AIP quality minimum impact criteria.	Section 8	Satisfactorily addressed. Noting DPIE Waters comments on AIP compliance.	
The proponent prepare and submit detailed Groundwater Monitoring Plan for the proposed Salt Cake Landfill.	Section 8	Satisfactorily addressed. Included as a condition of approval.	

### SEARs for groundwater

The response to the response to submissions did not include new information to assess the SEARs.

The SEARs state the EIS must address the following specific matters to waters:

- an assessment of the likely impacts of the development (including flooding) on the quantity and quality of the region's surface and groundwater resources, related infrastructure, adjacent licensed water users and basic landholder rights, and measures proposed to monitor, reduce and mitigate these impacts;
- a description of the proposed water management system, water monitoring program and all other proposed measures to mitigate surface water and groundwater impacts.