



NSW GOVERNMENT
Department of Planning

***MAJOR PROJECT ASSESSMENT:
Upgrade of the Bayswater Power Station
Water Treatment Plant, Muswellbrook***

Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

April 2006

© Crown copyright 2006
Published March 2006
NSW Department of Planning
www.planning.nsw.gov.au

Disclaimer:

While every reasonable effort has been made to ensure that this document is correct at the time of publication, the State of New South Wales, its agents and employees, disclaim any and all liability to any person in respect of anything or the consequences of anything done or omitted to be done in reliance upon the whole or any part of this document.

EXECUTIVE SUMMARY

Macquarie Generation operates both the Bayswater and Liddell Power Stations which together provide 40% of the State's electricity supply. Macquarie Generation proposes to upgrade its water treatment facilities at the Bayswater Power Station. This upgrade will increase the salt removal capacity of the existing plant thereby optimising operations and ensuring the operation of the Bayswater plant for a further 30 years. The expected benefits of this project include improved water conservation, greater efficiency in power generation and greater capacity in power generation for both the Bayswater and Liddell Power Stations.

The proposed project is subject to Part 3A of the *Environmental Planning and Assessment Act 1979* and requires the approval of the Minister for Planning.

The site is located at the Bayswater Power Station, New England Highway, Muswellbrook in New South Wales and includes Lot 2 DP 327372, Lot 16 DP 701496, Lot 6 DP 966589, Lot 2 DP 574168, Lot 4 DP 247943, Lot 10 DP 700554 and Lot 331 DP 752486.

The capital cost of the proposed Water Treatment Plant upgrade is estimated at \$50 million. Approximately 80 people would be employed during construction and 15 people during its operation. If approved, construction would take approximately eighteen months.

The potential environmental planning implications of the project are limited as the proposal is essentially replacing old plant for new plant, and the Power Station is some distance from any residential areas. While concern has been raised about the observed seepage of brine discharge from the decant basin into the groundwater system, this will be addressed through remediation and monitoring of the affected site as part of the conditions of approval.

On balance, the Department considers that the proposed Bayswater Water Treatment Plant upgrade is development that would be of benefit to the State of New South Wales. This is due to the combined benefits of extending the Power Station life, employment creation, reduced Hunter River water consumption and reduced saline water discharges to the Hunter River.

Overall, the proposed Bayswater Power Station Water Treatment Plant upgrade project could be approved subject to the effective implementation of the Proponent's Statement of Commitments and the Department's recommended Conditions of Approval.

CONTENTS

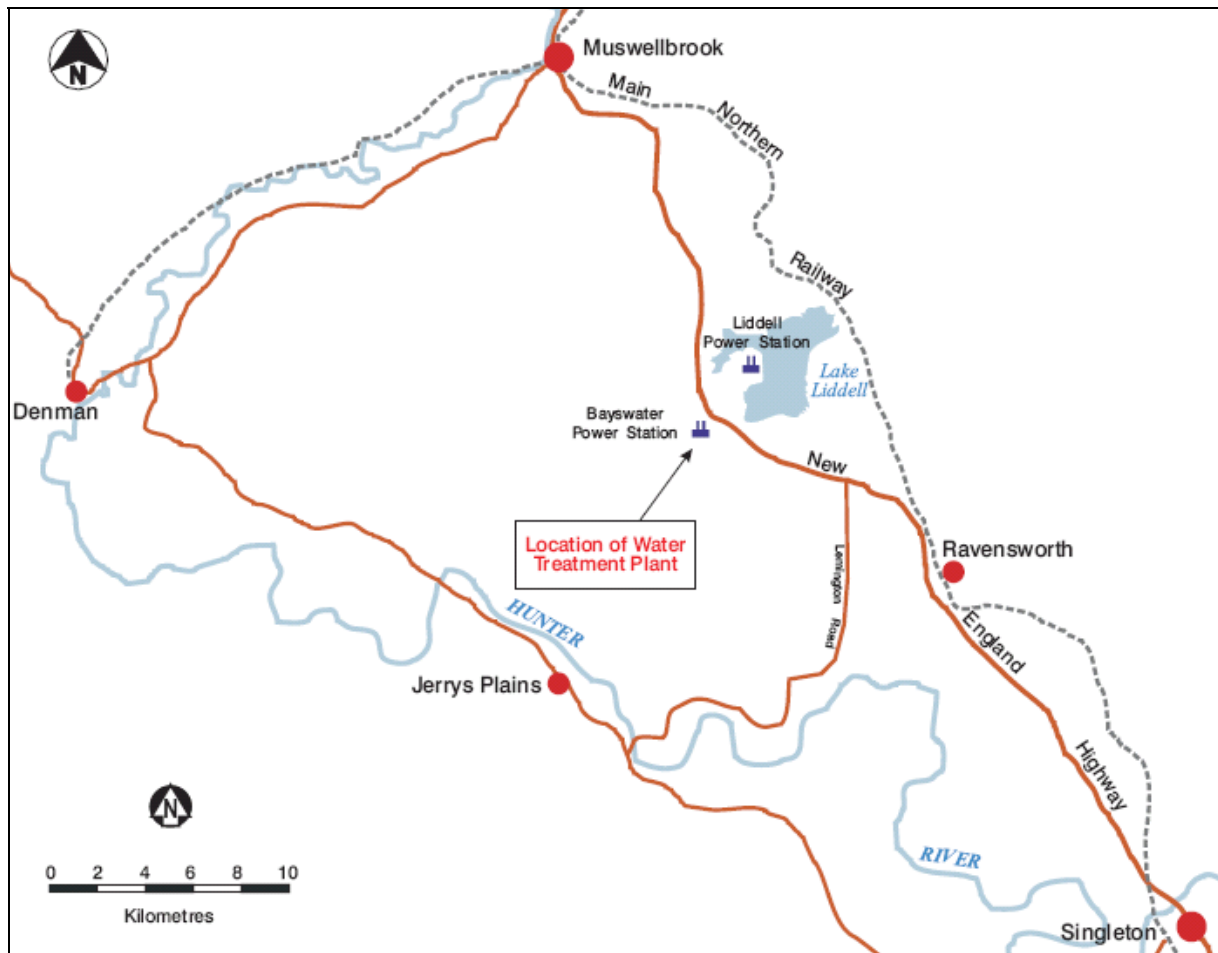
1.	BACKGROUND	1
1.1	Location.....	1
1.2	Existing Site.....	1
1.3	Previous Planning Approvals	1
1.4	Surrounding Land Use	2
2.	PROPOSED DEVELOPMENT	3
2.1	Project Description	3
2.2	Project Need.....	4
3.	STATUTORY CONTEXT.....	5
3.1	Major Project	5
3.2	Permissibility	5
3.3	Minister's Approval Power	5
4.	CONSULTATION AND ISSUES RAISED.....	7
5.	ASSESSMENT OF ENVIRONMENTAL IMPACTS.....	9
5.1	Water Cycle Management.....	9
6.	CONCLUSION	11
7.	RECOMMENDATION	13
	APPENDIX A – RECOMMENDED CONDITIONS OF APPROVAL.....	15
	APPENDIX B – STATEMENT OF COMMITMENTS	17
	APPENDIX D – SUBMISSIONS.....	19
	APPENDIX E – ENVIRONMENTAL ASSESSMENT	21

1. BACKGROUND

1.1 Location

Macquarie Generation proposes to upgrade the existing Water Treatment Plant (WTP) at the Bayswater Power Station located between Singleton and Muswellbrook in the Upper Hunter region of New South Wales (refer to Figure 1). The site is located on the New England Highway and includes the following lots: Lot 2 DP 327372, Lot 16 DP 701496, Lot 6 DP 966589, Lot 2 DP 574168, Lot 4 DP 247943, Lot 10 DP 700554 and Lot 331 DP 752486

Figure 1: Site Location (reproduced from the Proponent's Environmental Assessment)



1.2 Existing Site

The site for the WTP upgrade is located beneath the cooling towers of the Bayswater Power Station within the footprint of the existing plant. Additionally, one of the two possible project options for the WTP upgrade would involve the construction of four sludge lagoons located within the existing Pikes Gully ash dam.

The land upon which the development is proposed is owned by Macquarie Generation. It is zoned 5(a) – Special Uses “A” Zone in the *Muswellbrook Local Environmental Plan 1985* which permits uses ancillary to the electricity industry.

1.3 Previous Planning Approvals

Development consent for the power station was granted by Muswellbrook Shire Council in September 1980.

1.4 Surrounding Land Use

Surrounding land uses predominantly consist of coal mines and the Liddell Power Station. The New England Highway and Main Northern Railway Line traverse the lands adjacent to the site. Agricultural clearing for the purposes of grazing is also present.

The Antiene subdivision is the nearest residential area. This area is located behind a ridge line and is five kilometres to the north of the site.

2. PROPOSED DEVELOPMENT

2.1 Project Description

Coal-fired power stations need to use water as part of their power station cooling system. Before this water can be used the naturally occurring salts within the water need to be removed. The proposed WTP upgrade seeks to increase the effective salt removal capacity of the existing WTP. This would see the current design capacity of around 28,000 tonnes of salt removed per year increased to an effective removal capacity of 38,200 tonnes per year.

The proposal consists of two potential options for the project, both of which address the limitations of the existing treatment plant. This assessment has focused on the combined worst-case aspects from each of the possible component parts of the proposed project. The component parts of the two options for the proposed WTP upgrade are detailed below (Table 1). The preferred project option will not be selected until the detailed design stage of the project. At this time the Department recommends that the Proponent be required to submit a report to the Director-General that demonstrates the consistency of the selected WTP upgrade option with the original envelope described in the EA.

The total project cost is estimated at \$50 million. The project would employ approximately 80 people during its construction and 15 people during operation.

Table 1 – Options for WTP Upgrade (Reproduced from the Proponent's Environmental Assessment)

Option 1	Option 2
<p>Lime Softening Plant</p> <ul style="list-style-type: none"> • The upgraded LSP would treat Hunter River water, which would then be fed to Lake Liddell. The upgraded plant would result in consistent softening and alkalinity reductions, and would also result in a gradual reduction of TDS in Lake Liddell. • Refurbishment of the hydrated lime feed system. This would involve the installation of a new feeder, a new solution preparation tank with mixer, and new dosing pumps. • Upgrade of the lime dosing equipment through the replacement of dosing pumps, lime slurry tanks and the lime feeder to allow continuous recirculation of water, which would prevent the lines from becoming clogged. • Installation of an acid dosing system that would consist of a bulk acid storage tank and acid dosing pumps. • Installation of a new polymer dosing system in the existing clarifiers. 	<ul style="list-style-type: none"> • Minor changes would be made to lime dosing and storage equipment. • Installation of an acid dosing system, which would require the installation of a 60,000 litre bulk acid storage tank in a suitably bunded area.
<p>Circulating Water Treatment Plan</p> <ul style="list-style-type: none"> • Reinstatement of the AR function and three of the four WAC units from each AR plant. These units would require new rubber lining and replacement of the existing under-drain collector. • Installation of a 2.7m high de-carbonator tower down-stream of the WAC units to remove the carbon dioxide that is a by-product of the WAC process. The tower would be located on framework over the existing dual media filter clear water sump. • Installation of a new set of transfer pumps in the filtered water pump in order to pump filtered effluent to the WAC units. • Reinstatement of the soda ash dosing system. • Installation of an acid dosing system in the feed to the de-carbonator to be used in the event that excess alkalinity is discharged from the WAC unit. • Replacement of piping and valves associated with 	<ul style="list-style-type: none"> • The AR plants would be returned to service and a clarification step would be added prior to the suspended solids filters. The installation of the clarification step would ensure efficient suspended solids removal; failure of this step in the current WTP led to the decommissioning of the AR plants. Processed water from the AR plant would provide feed for the RO plant. Excess process water would be recirculated to the main cooling towers. • Installation of new membranes within the existing RO plant. • Replacement of the RO chemical dosing system. • The media in the dual media filters would be changed to a mono sand bed, providing better filtration efficiency.

<p>the gravity filter.</p> <ul style="list-style-type: none"> • Installation of a facility for caustic dosing and contingent dosing of antiscalant on the discharge of the existing RO cartridge filter supply pumps. • Installation of a new high efficiency RO unit after the RO stage. This would increase water recovery to 95% and reduce the wastewater volume from the current 7.8 ML/day to between 1.9 and 2.3 ML/day. The existing solids water separation system would be retained. • The permeate would be directed to the existing RO flush water tank, and from there would overflow to the circulating water basin. The permeate produced would have a TDS of approximately 40 – 60 parts per million (ppm) compared with the existing concentration of 400 - 450 ppm 	
<p>Brine Concentrator Units</p> <ul style="list-style-type: none"> • Removal of one of the two BCs from service and modification of the remaining BC to take RO reject. • 5% of the BC holding pond would be sectioned off for RO reject to ensure that the RO reject and the BC feed do not mix. This would ensure that the BC stream would be free from hardness, eliminating the need for further chemical treatment. 	<ul style="list-style-type: none"> • Upgrade of the two BC units and installation of a third BC for optimal concentration capacity. A new flood box distribution system would be installed for each existing brine concentrator to eliminate blockages in the brine recirculation system. • Installation of new pre-heaters and deaerators.
<p>Waste Brine Disposal System</p> <ul style="list-style-type: none"> • The final waste brine disposal process would consist of feeding the BC waste to a mechanical vapour recompression crystalliser. This would produce approximately 0.2 ML/day of a 55% solids slurry for disposal in the existing decant basin through the existing pipe network. • Four sludge lagoons would be constructed in the Pikes Gully ash dam to receive sludge from the CWT lime-soda clarifier plants. 	<ul style="list-style-type: none"> • A mechanical vapour recompression brine crystalliser is proposed to concentrate waste brine from the BC plant. It would produce a pumpable slurry that would be directed to the existing brine decant basin. The volume of water in the waste stream to the decant basin will be reduced from around 75% in the waste from the existing BC plant to 37% from the crystalliser.

2.2 Project Need

The purpose of the WTP is to reduce the salinity of the water that will be used in the Power Station cooling system. Saline water results in scale on the heat exchanges which in turn reduces their efficiency and reliability. Water restrictions placed on the Hunter River, alterations to the Hunter River Salinity Trading Scheme and operational limitations of the existing WTP, has resulted in increased salinity levels in Lake Liddell. As this Lake serves as a source of cooling water, operating efficiency levels are negatively affected for both the Bayswater and Liddell Power Stations.

Existing WTP performance removes 13,000 tonnes of salt per year and this is considered inadequate for current and projected electricity generation needs. The proposed WTP upgrade addresses this need by removing the operational limitations and expanding capacity to 38,200 tonnes of salt removed per year.

3. STATUTORY CONTEXT

3.1 Major Project

The project is declared to be a Major Project under *State Environmental Planning Policy (Major Projects) 2005* because it is development for the purpose of an electricity generation facility for coal fired generation that has a capital investment value of more than \$30 million (clause 24(a)). The project will therefore be assessed and determined by the Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act 1979*.

3.2 Permissibility

The *Muswellbrook Local Environmental Rural Plan 1985* applies to the site and zones the land 5(a) – Special Uses "A". The purpose of this zone is to enable the continued operation, growth or expansion of the existing uses such that associated, ancillary or other related uses can be accommodated. As the primary land use is for power generation, the WTP upgrade is considered to be permissible on the land.

3.3 Minister's Approval Power

The application and environmental assessment was placed on public exhibition from Friday 24 February to Monday 27 March 2006 and submissions invited in accordance with Section 75H of the Act. The Department has met all its legal obligations so that the Minister can make a determination about the project.

4. CONSULTATION AND ISSUES RAISED

The Department received two submissions on the project – from the Department of Environment and Conservation and from the Department of Natural Resources. No submissions were received from the public.

Neither the DEC nor DNR objected to the project, subject to the imposition of conditions to manage potential environmental impacts, particularly with respect to water quality. A key issue identified in both submissions relates to the intention of the Proponent to continue to use the existing brine decant basin despite saline seepage into the groundwater system and the long term impact of the decant basin on groundwater being unknown. In response to this issue, the Department has included conditions recommended by the DEC and DNR that address this concern. The approach proposed by the DEC, and agreed by the Proponent, is the submission of a detailed schedule of measures to prevent, contain and remediate saline seepage. The details of these works must be submitted no later than 15 August 2006. Further, the Department has recommended that a performance assessment of any remediation activities in relation to this issue has been included as a requirement of the Environmental Audit that must be submitted to the Director-General as part of the conditions of this consent.

5. ASSESSMENT OF ENVIRONMENTAL IMPACTS

The key issue raised in the submissions to the proposal and/or identified during the Department's assessment is water cycle management.

All other issues are considered to be minor and have been addressed as part of the Proponent's Statement of Commitments.

5.1 Water Cycle Management

Issues

The main issue raised regarding water cycle management focused on the continued use of the brine decant basin when the basin is known to experience saline seepage into the groundwater system. Further, the EA implies that the long term effect of continued use of the brine decant basin on groundwater is not known and that this will be better known once the WTP design has been finalised.

The Proponent has indicated its intention in the Environmental Assessment to continue working in conjunction with the DEC and DNR toward a solution to this issue.

Consideration

The Department recognises that saline seepage is an existing issue associated with water treatment at the power station, and irrespective of the Minister's decision on the subject project application, will continue to be a matter to be addressed by the Proponent in consultation with the DEC and DNR.

While the broader issue of saline seepage is being managed as a separate process to the water treatment plant upgrade works, the Department highlights the interrelation of the two issues, particularly given that the upgraded plant will continue to direct brine to the decant basins. The Department therefore considers it appropriate to reflect the Proponent's commitment to address the issue of seepage through explicit conditions of approval for this project. In this manner, additional regulatory weight will be given to the Proponent's commitment, and a clearly enforceable and public requirement established.

The Department recommends adopting the DEC's suggested approach, which includes the requirement that the Proponent prepare a Contaminated Groundwater Report specifying works to be undertaken to prevent, contain and remediate saline seepage. The Report would be required to be submitted to the DEC and DNR by 15 August 2006.

In addition, the Department recommends that this work be complemented with a Water Monitoring Program, imposed as a condition of approval, aimed at optimising water use and quality across the site, including both surface and ground waters. The Department also recommends the inclusion of a performance assessment for any remediation work undertaken in relation to the brine decant basin saline seepage be included in the Environmental Audit conducted as part of the conditions of consent for this project.

The Department considers that provided the environmental measures outlined above are undertaken, adverse water quality and water cycle management issues will be manageable.

6. CONCLUSION

The Department has assessed the EA, Statement of Commitments and submissions on the proposal, and is satisfied that the impacts of the proposal can be mitigated and/or managed to ensure an acceptable level of environmental performance.

The project is essentially replacing old plant with new plant and as such resides within the existing footprint of the plant. Further, the plant is considerably removed from the nearest residential area so disturbances due to construction or operation are considered negligible. It is believed that the follow on benefits of the WTP upgrade such as reduced Hunter River water usage and reduced saline discharges to the Hunter River will have a positive impact on the local environment.

Environmental measures have been outlined which seek to address the main environmental issue, that is, saline seepage from the brine decant basin. Provided these and the measures proposed in the Statement of Commitments in the EA are undertaken, the adverse environmental impacts of the project are believed to be negligible.

The Department is of the opinion that the proposed project would meet its objective, that is, to improve the water treatment process such that it is adequate for existing and future power generation needs.

7. RECOMMENDATION

The Department recommends that the Minister for Planning consider the findings and recommendations of the Departments report and grant consent to the proposal, subject to the recommended conditions of consent.

APPENDIX A – RECOMMENDED CONDITIONS OF APPROVAL

APPENDIX B – STATEMENT OF COMMITMENTS

APPENDIX D – SUBMISSIONS

APPENDIX E – ENVIRONMENTAL ASSESSMENT
