

Alterations and Additions to the Existing Eraring Power Station

Environmental Assessment Scoping Report

September 2005

Prepared for:

Eraring Energy

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Alterations and Additions to the Existing Eraring Power Station
Environmental Assessment Scoping Report
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1 INTRODUCTION

1.1 Background

Eraring Energy (EE) owns and operates a coal-fired power station at Eraring, within the Lake Macquarie local government area (LGA). EE is proposing to undertake an upgrade to the existing Eraring Power Station (EPS) consisting of the expansion of its ash dam and the installation of black start/peaking generator capability.

One by-product of electricity generation through the burning of coal is ash. Currently, of the ash material produced at Eraring Power Station, approximately 35% of fly ash is sold through an agreement with Fly Ash Australia for use in other production processes, such as concrete manufacturing. All bottom ash, and a proportion of reclaimed bottom ash is sold through an agreement with Blue Circle Ash to be reused as a gravel substitute for use in landscaping and roads. EE is continuing to seek markets for the sale of ash with an expression of interest (EOI) for additional uses of the fly ash. In 2003 around 52%, or over 600,000 tonnes, of the ash produced at the EPS was recycled.

The remainder of the ash by-product is stored in an ash disposal area to the north of the power station. The plant currently uses "lean" phase disposal, which will result in the existing ash storage facility being full by 2011/2012. Eraring Power Station has an expected life beyond 2030, well beyond the capacity of the existing ash dam. EE therefore requires additional facilities on the site to meet the ash disposal requirements of the plant beyond 2011/2012.

In addition, EE is also proposing the installation of an Emergency Gas Turbine Generator to be used for black starting of the station's coal-fired units for operation when there is a shortfall of electricity supply. This generator will provide a contingency for the plant in the case of a total black-out and will ensure greater security of the NSW electricity supply.

1.2 Project Context

Construction of Eraring Power Station started in 1977. The first generating unit went into service in 1982, the second and third units in 1983, and the fourth unit was commissioned in 1984. Up until 2002, black starting capability was provided by the nearby Northern Gas Turbine Station.

Black start capability allows the restoration of system operations after a failure or shutdown. All large power systems require some contingency arrangements to enable a restart in the event that all or part of the system shuts down. The proposed black start/peaking generator would enable the power station to start-up during a power grid shutdown using its own generated electrical supplies rather than waiting for external supplies to be re-established. This black start capability is to be used primarily in the event of a system collapse and a State blackout. It would significantly shorten the time to restore the NSW power grid after a "System Black" event. The gas turbine generator would also be utilised when there is a shortfall of electricity supply, as indicated by the NEMMCO market spot price. The gas turbine would be operated only when the market spot price exceeded \$300/MWh and as the last plant in Eraring Energy's portfolio.

Whilst a total blackout has not occurred since the 1960s, such a contingency is important to ensure the security of electricity supply for NSW.

1.3 Location

The EPS site comprises approximately 1200 hectares of land and is located in a natural dip on the western shore of Lake Macquarie, near the township of Dora Creek, within the Morisset Planning District. The power station footprint covers approximately 150 hectares, with the remaining area including natural ecosystems and water canals.

1.4 Approval Regime

The proposed works to the power station fall within the definition of major development (formerly state significant development) under Schedule 1, clause 24 of *State Environmental Planning Policy 2005* (SEPP 2005), being works for the purpose of an electricity generation facility with a capital investment of more than \$30 million. The proposal is therefore eligible for assessment under Part 3A of the *Environmental Planning and Assessment Act 1979* with the Minister being the decision making authority.

A concept approval under section 75O of the EP&A Act is being sought for the proposed upgrade to allow for further details and environmental assessment to be undertaken once greater certainty of the project is assured. An outline of the proposed ash dam expansion is provided in this scoping report. Greater detail has been provided on the black start/peaking generator as this component of the project is less complex and further developed.

1.5 Purpose of this EASR

The purpose of this report is to provide the Minister with outline information and background environmental data on the site and the proposed development, sufficient to establish the key environmental issues of importance to the project and the level of environmental assessment required for the application. The report will form the basis for discussion at a Planning Focus Meeting (PFM) to be convened by DIPNR.

1.6 Sources of Information

A variety of sources of information were used to produce this EASR including:

- Biodiversity Study Eraring Energy – Winter, Eraring Power Station, Lake Macquarie, HLA-Envirosciences, 2004
- Lake Macquarie 2004 State of the Environment Report
- Lake Macquarie 2003 Community Profile
- Eraring Energy Community and Environment Report 2004
- ABS Data available at www.abs.gov.au
- Lake Macquarie Local Environmental Plan 2004

1.7 Structure of Report

To inform relevant government agencies and local councils of the level and detail of environmental assessment required, this EASR has been structured to provide information on broad areas as follows:

- Section 1 – provides a background to the project, including information about the proponent;
- Section 2 – outlines a description and justification for the project;
- Section 3 – describes the planning context, including the approvals required;
- Sections 4 and 5 – reports on the environmental implications in terms of physical and biological effects, including the baseline situation and anticipated impacts;

- Section 6 – examines the likely impacts of the Project on resources (community, natural and transport);
- Section 7 – outlines the potential community effects, including the social, heritage and cultural, and economic implications; and
- Section 8 - presents a summary of the findings and recommendations.

1.8 The Proponent

EE is a State Owned Corporation that manages a diverse set of electricity-generating assets located throughout NSW. EE operates under the *Energy Services Corporations Act* (1995) and the *State Owned Corporations Act* (1989). EE was formed in August 2000, to administer the electricity generation activities of the corporation formerly known as Pacific Power (http://www.dlwc.nsw.gov.au/care/water/wr/clu_ee.html). EE's facilities include:

- coal fired/thermal power stations (Eraring Power Station);
- wind farms (Blayney Wind Farm, Crookwell Wind Farm);
- hydro sites (Bendeela Station, Kangaroo Valley Station, and Hume, Warragamba, Burrinjuck, Keepit and Brown Mountain Power Stations); and,
- pumped storage schemes (Shoalhaven Scheme – Kangaroo Valley Station).

In total, EE has a combined generating capacity of approximately 3041 megawatts (MW).

2 DESCRIPTION OF PROJECT

2.1 Overview of Project Objectives

The project consists of two parts, each with its own specific objective:

1. Upgrade and expansion of the existing ash disposal facility to ensure the EPS has the necessary facilities required for the operational life of the EPS, predicted to be another 20 – 30 years or beyond; and
2. The installation of an Emergency Gas Turbine Generator (EGTG) to ensure the EPS has the capacity to black start operations in the event of a system shutdown and for safeguarding the supply of electricity to the EPS switchboard network when there is a shortfall of electricity supply in the State's power system.

2.1.1 Ash Disposal Facility

Currently, ash material is stored in an ash disposal area north of the existing power station. The presently used method of disposal, "lean phase" disposal, will result in the current ash storage facility being full by 2011-2012. Eraring Power Station has an expected life beyond 2030, well beyond the capacity of the current ash storage facility and will therefore require altered or additional facilities for ash disposal beyond 2011/2012.

After reviewing a variety of available technologies (**Section 2.2**), EE has focussed on a conceptual design for high concentration, known as "dense phase" ash disposal. This method of disposal is critical to the future operation of Eraring Power Station. An additional benefit of this method of disposal is that it allows for a much smaller footprint in ash disposal.

The ash disposal facility will consist of an extension of the existing ash dam and associated infrastructure.

2.1.2 Emergency Gas Turbine Generator

The proposed Emergency Gas Turbine Generator (EGTG) would be used for:

- Black starting of the station's coal-fired units; and
- Operation when there is a shortfall of electricity supply.

In 2002, the Northern Gas Turbine Station (NGTS), which provided the EPS with black start capability, was decommissioned and removed. Installation of the proposed EGTG at the EPS would restore the black start capability previously offered by the now decommissioned NGTS.

Furthermore, as the EGTG would be directly connected to the EPS's main switchboards it would provide additional security for in-service unit power supplies.

In addition to providing black start capability for the coal fired units, the EGTG would be operated to secure the power supplies for essential auxiliaries of two coal fired units when there is a shortfall of electricity supply, as indicated by NEMMCO messages or market pool price excursions. When combined with test runs and annual black start testing of a coal fired unit, the EGTG would be expected to be operated for up to approximately 200 hours per year.

2.2 Options Considered

Ash Disposal Area

EE considered a number of options for the ash disposal area, including constructing a new dam using the same technology as the existing “lean” phase disposal method. The proposed “dense” phase high concentration method has been selected based on the technology’s capacity to store waste on a smaller footprint, and is currently at concept stage design.

EGTG

Two types of EGTG have been considered by EE which would allow for black start capability as follows:

Criteria	Frame 6B (PG6581B)	LM 6000
MW Output	41.5	50 (for LM6000PC Sprint)
Heat Rate (kJ/kWh)	11330	8961
Fuel Consumption at max MW (l/h)	12355	11790
NOx (mg/m ₃ at 15%O ₂)	65 with water injection 42 Dry low NOx burners	42 with water injection
Exhaust Temp (°C)	546	438
Exhaust Flow (kg/s)	147	135
Noise Level (dBA at 1m)	95dBA (standard enclosure) 85dBA (additional enclosure)	TBA
Plant Size	30m(L) x 6m(W) x 6m(H) Stack Height – 30m	20m(L) x 15m(W) x 11.6m(H) Stack Height – 30m

2.3 Site Information

2.3.1 Location of Project Components

Ash Disposal

The proposed ash disposal area would be located within the EPS site. However, as part of the new system for ash placement, the expanded ash disposal area will require an additional 35 hectares of land adjacent to the existing ash disposal area. EE is currently negotiating with the Department of Lands to procure the additional land.

EGTG

The EGTG would be located within the existing power station core area, south-east of Unit 3/4 chimney stack and north of the Fire Systems Pump House.

2.3.2 Ownership

EE owns and operates the EPA site which comprises the following parcels of land:

- Lots 301 & 302 DP 806475;
- Lot 3/8 Section L DP 6747;
- Lots 13/16 Section O & Part Lot 13/16 Section U DP 6747; and
- Lot 7/16 DP 262501.

2.4 Key Components

The EPS upgrade project has separate components, as follows:

Ash Disposal Facility

The proposed ash disposal facility will comprise an additional area for ash disposal by expanding the existing ash dam as well as new infrastructure to allow for storage and transportation of fly ash, and would include:

- installation of new larger storage vessels on each hopper of each unit (8 per unit);
- additional storage for dry ash;
- a new plant for conditioning ash; and
- new pump facility to pump the dense phase slurry to the ash disposal area.

EGTG

TransGrid's "NSW Power System Restart Capability Strategy Paper" 2004 outlined the recommended sizing and capability requirements for the EGTG. The EGTG would be capable of generating up to 50 MW of electrical power and would be the minimum size required to achieve the restart of two coal fired 660MW units, auxiliaries and resynchronisation of the units without external power supplies. The proposal for the installation of a black start capability EGTG at EPS is strongly supported by the Department of Energy, Utilities and Sustainability (DEUS) and forms part of the industry wide response in this matter required by the NSW government (see letter from Treasurer of NSW in Appendix A).

The EGTG would be a simple cycle generator fuelled by automotive distillate, which would be gravity fed from existing fuel storage tanks at the EPS. The most likely machine type would be the heavy industrial General Electric Frame 6B or an aero-derivative General Electric LM6000.

The EGTG would be air cooled, without the requirement of external water supplies for cooling. In the event that water injection is used for the reduction of NO_x, demineralised water from the EPS storage tanks would be used as a fuel diluent.

2.5 Environmental Controls

The new system of ash placement would require the clearing of approximately 20 hectares of land. EE's Biodiversity Management Plan would ensure that the clearing would be conducted in stages to minimise the visual and environmental effects on the area.

2.6 Access

Access to the EPS site would remain unchanged. Access routes to the expanded ash disposal area would need to be established.

2.7 Program of Works

Ash Disposal

The construction period for the ash disposal component is likely to last for up to 24 months, including land clearing and site preparation works, installation of storage facilities and infrastructure.

EGTG

Given the existing facilities at the site and the modular set-up of the EGTG, the construction period for the EGTG would be approximately 6 months. It is anticipated the EGTG installation works would be completed by mid 2006, given availability of suitable plant once approval is granted.

2.8 Outline of Construction Methods

Construction activities required for the project are likely to include the following:

- earthmoving;
- installation and diversion of services and infrastructure;
- construction of the ash disposal pit and storage facilities;
- installation of the EGTG;
- construction of access roads and transport to ash disposal facility; and
- construction vehicle movements.

2.9 Outline of Operations

Ash Disposal

Use of the existing ash disposal facility would continue until the new system is phased into service during 2008/09. During this time, the proposed ash disposal facility and 'dense phase' disposal method would need to be progressed from concept stage to detailed design.

The operations at the expanded ash disposal facility would remain much the same, however the dense phase disposal method would involve new storage facilities as well as a new plant and pump facility.

EGTG

The EGTG would be used to test the black start capability on one of the existing EPS coal fired units on a yearly basis.

The EGTG would also be used to test run, both loaded and unloaded, 12 times per year to maintain its operational condition. Routine testing would total approximately 20 hours per year.

In total, when combined with anticipated running time during shortfalls in supply of electricity, the generator would be expected to be operated for up to approximately 200 hours per year.

2.10 Interfaces

Each facility would require servicing infrastructure such as water, electricity, communications and sewage. The ash disposal facility may require a new access route around the periphery of the dam.

Advantages of locating the EGTG within the existing EPS core area include minimising the need for additional interfaces such as:

- site is close to terminal points for distillate fuel oil and demineralised water;
- site is accessible to underground electrical conduit to the EPS 11kV switchboard system;
- noise generated by the gas turbine would be contained by the earth bank to the east;
- rainwater run-off from the EGTG can be directed to the EPS existing contaminated water system;
- the site is already highly disturbed, comprising cleared and excavated areas within the existing power station construction works; and
- temporary maintenance facilities presently occupy the site.



2.11 Decommissioning

EPS has an expected life beyond 2030. Both the proposed ash disposal facility and EGTG would continue operations for the life of the EPS. Decommissioning for each facility would therefore coincide with the decommissioning of the EPS.

3 STATUTORY PLANNING

3.1 Local Matters

The site is located with the Lake Macquarie City Council area where the relevant environmental planning instrument is *Lake Macquarie Local Environmental Plan 2004* (LEP 2004).

The objective of LEP 2004 is:

'to achieve development of land to which this plan applies that is in accordance with the principles of ecologically sustainable development by:

- (a) promoting balanced development of that land, and*
- (b) implementing the Lifestyle 2020 Strategy adopted by the Council on 27 March 2000'.*

3.1.1 Definition of the Development

The proposed development comprises a *utility installation* under LEP 2004, defined as:

'a building or work used for a public utility undertaking, but does not include a building designed wholly or principally as administrative or business premises or as a showroom'.

A *public utility undertaking* is defined under LEP 2004 as:

'any of the following undertakings carried on or permitted or suffered to be carried on by or by authority of any government department or under the authority of or in pursuance of any Commonwealth or State Act:

- (a) railway, road transport, water transport, air transport, wharf or river undertakings,*
- (b) undertakings for the supply of water, hydraulic power, electricity or gas or the provision of sewerage or drainage services,*

and a reference to a person carrying on a public utility undertaking includes a reference to a council, electricity supply authority, Government department, corporation, firm or authority carrying on the undertaking'.

Eraring Energy is an electricity supply authority authorised under the *Energy Services Corporations Act 1995* (ESC Act) with the following principal functions:

- (a) to establish, maintain and operate facilities for the generation of electricity and other forms of energy, and*
- (b) to supply electricity and other forms of energy to other persons and bodies*

As an electricity generator, under the ESC Act, Eraring Energy may also:

- (a) provide facilities or services that are ancillary or incidental to its principal functions, and*
- (b) conduct any business (whether or not related to its principal functions) that it considers will further its objectives.*

The proposed EPS upgrade project involving expansion of the ash disposal facility and the installation of an emergency gas turbine generator fall within the bounds of facilities which are

either part of, or ancillary to, the principal functions of Eraring Energy and are therefore adequately defined as a *utility installation*.

3.1.2 Permissibility of the Development

Under the provisions of LEP 2004, the subject site is zoned part 4(1) – Industrial (Core) and part 7(2) Conservation (Secondary).

The objectives of the Industrial (Core) zone are to:

- (a) provide land for a wide range of employment-generating industries, including manufacturing, processing, assembly, storage and distribution uses, and*
- (b) provide land for a range of industrial uses that, because of their nature, require large areas of land or separation from more intensive forms of employment generating industries, and*
- (c) ensure that industries are designed and located so as not to cause unacceptable environmental harm or adversely affect the amenity of the environment, including residential neighbourhoods, and*
- (d) provide for sustainable water cycle management.*

The objectives of the Conservation (Secondary) zone are to:

- (a) protect, conserve and enhance land that is environmentally important, and*
- (b) protect, manage and enhance corridors to facilitate species movement, dispersal and interchange of genetic material, and*
- (c) enable development where it can be demonstrated that the development will not compromise the ecological, hydrological, scenic or scientific attributes of the land or adjacent land in Zone 7 (1), and*
- (d) ensure that development proposals result in rehabilitation and conservation of environmentally important land, and*
- (e) provide for sustainable water cycle management.*

Within the Industrial (Core) zone and the Conservation (Secondary) zone, utility installations are permissible with Council consent.

Clause 10 of LEP 2004 relates to development by public authorities and states that:

Despite other provisions of this plan, the following are allowed on land to which this plan applies without consent:

- (a) the use of existing buildings of the Crown by the Crown, and*
- (b) activities specified in Schedule 10.*

Schedule 10 to the LEP includes development for the purpose of public utility undertakings, being water, sewerage, drainage, electricity or gas undertakings, including:

- (a) development of any description at or below the surface of the ground,*
- (b) the installation of any plant inside a building or the installation or erection within the premises of a generating station or substation established before the appointed day of any plant or other structures or erections required in connection with the station or substation,*
- (c) the installation or erection of any plant or other structures or erections by way of addition to, or replacement or extension of, plant or structures or erections already installed or erected, including the installation in an electrical transmission line of substations, feeder-pillars or transformer housing, but not including the erection of overhead lines for the supply of electricity or pipes above the surface of the ground for the supply of water, or the installation of substations, feeder-pillars or transformer housing of stone, concrete or brickworks,*
- (d) the provision of overhead service lines in pursuance of any statutory power to provide a supply of electricity,*
- (e) the erection of service reservoirs on land acquired or in the process of being acquired for the purpose before the appointed day, provided reasonable notice of the proposed erection is given to the Council,*
- (f) routine maintenance and emergency works,*
- (g) any other development, except:*
 - (i) the erection of buildings, the installation or erection of plant or other structures or erections and the reconstruction or alteration of buildings, so as materially to affect their design or external appearance, or*
 - (ii) the formation or alteration of any means of access to a road.*

The proposal falls within the definition of development under Schedule 10 and is therefore permissible without Council consent.

3.2 Regional Matters

The Regional Environmental Plan (REP) applying to the subject site is Hunter REP 1989.

The aims of Hunter REP 1989 are:

- (a) to promote the balanced development of the region, the improvement of its urban and rural environments and the orderly and economic development and optimum use of its land and other resources, consistent with conservation of natural and man made features and so as to meet the needs and aspirations of the community,*
- (b) to co-ordinate activities related to development in the region so there is optimum social and economic benefit to the community, and*
- (c) to continue a regional planning process that will serve as a framework for identifying priorities for further investigations to be carried out by the Department and other agencies.*

The Minister is required to give consideration to the content of the background report and the objectives, policies and principles contained in REP 1989 in the assessment of the proposed upgrade works. Whilst many of these are not directly relevant to the specific development proposed, the proposal is considered to be generally in line with the provisions of the plan as they relate to economic development and environmental protection in the region.

3.3 State Matters

There are two state environmental planning policies (SEPPs) of specific relevance to the proposal.

3.3.1 SEPP 2005 (Major Projects)

State Environmental Planning Policy (Major Projects) 2005 (SEPP 2005) was gazetted on 25 May 2005 and amended on 1 August 2005. It replaces all existing provisions related to former 'state significant development' in planning instruments, directions and declarations.

The primary aim of SEPP 2005 is:

to identify development of economic, social or environmental significance to the State or regions of the State so as to provide a consistent and comprehensive assessment and decision making process for that development.

Schedule 1 of the SEPP identifies classes of development which are classified as major development. This includes development for the purpose of an electricity generation facility that:

(a) has a capital investment value of more than \$30 million for gas or coal-fired generation, or co-generation, or bioenergy, bio-fuels, waste gas, bio-digestion or waste to energy generation, or hydro or wave power generation, or solar power generation, or wind generation

The proposed EPS upgrade project constitutes a major project under clause 24 of Schedule 1 to SEPP 2005 as it involves:

- a capital investment of more than \$30 million. The proposed development is anticipated to involve a capital investment of over \$40 million; and,
- is for the purposes of coal-fired and gas electricity generation.

Therefore, under the provisions of clause 24 in Schedule 1 to SEPP 2005, the proposed development meets the classification of major development, with the Minister being the approval authority.

3.3.2 SEPP 14 – Coastal Wetlands

SEPP 14 has the primary aim of protecting coastal wetlands in the environmental and economic interests of the State. A heritage study undertaken by HLA in May 2004 indicates that a wetland listed under SEPP 14 is located on the EPS site, being Eraring Wetland, otherwise known as 'Muddy Lake'.

In relation to listed wetlands, SEPP 14 requires that development for the purposes of clearing, levees, draining or filling is only permitted with the consent of the local Council and the concurrence of the Director. The SEPP also requires that the Director of the National Parks and Wildlife Service be consulted in relation to an application for these forms of development on affected land.

Eraring Wetland is located in the far west of the site and consideration will be given to the siting of the proposed new ash disposal facility such that potential impacts on the wetland are minimised in accordance with the aims of SEPP 14.

3.4 Commonwealth Matters

The Environment Protection and Biodiversity Conservation (EPBC) Act 1999 came into effect in July 2000 and requires the approval of the Commonwealth Minister for the Environment and Heritage for actions that may have a significant impact on matters of National Environmental Significance (NES). Approval from the Commonwealth is in addition to any approvals under NSW legislation.

Approval under the EPBC Act is triggered by a proposal which has the potential to have a significant impact on a matter of NES or by a proposal which has the potential to have a significant impact on the environment which involves the Commonwealth. The EPBC Act lists eight matters of NES which must be addressed when assessing the impact of a proposal.

Based upon preliminary assessment, the proposal is not expected to impact on matters of NES, and as a consequence the EPBC Act is not triggered and referral to, and approval from, the Commonwealth Minister for Environment and Heritage is not required.

3.5 Other Authorisations Required

The subject site benefits from an existing environment protection licence (EPL) issued under the *Protection of the Environment Operations Act 1997* (POEO Act) (Ref. No. 1429) for electricity generation and all other activities carried out at the premises. A variation to this licence under Section 58 of the POEO Act may be required to reflect the expanded ash dam and black start/peaking generator.

Preliminary assessment of indigenous and non-indigenous heritage on and around the site indicates that it is unlikely that permits under the *National Parks and Wildlife Act 1974* or the *Heritage Act 1977* would be required.

4 PHYSICAL AND POLLUTION EFFECTS

4.1 Introduction

Air emissions from Eraring Power Station are continuously monitored, and cooling water discharged from the plant is monitored monthly as required by the EPL. This information has been used to identify baseline conditions.

4.2 Air Quality

Discharges to air are monitored continually at the EPS and EE monitors and reports gaseous emissions to the Department of Environment and Conservation (DEC) on a yearly basis. Monitoring results show the EPS operates well below the emission guidelines set by the DEC. To control the emission of particles produced by the burning of coal, EE has installed a state-of-the-art fabric filter plant, which removes 99.89% of particles (or ash), collecting up to 2,500 tonnes of ash/day.

Further actions to reduce air emissions include the use of coal with a low sulphur content and low NO_x dual register burners, which minimise the amount of SO_x and NO_x emissions respectively. Combined, these controls make Eraring Power Station one of the cleanest coal-fired power stations in Australia.

Under the EPL, EE undertakes monitoring at 4 sites within the EPS for air emissions and discharges to air, and 3 sites located within the vicinity of the site for ambient air quality monitoring. Limits are imposed so that for each monitoring point, the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified.

The operation of the ash disposal facility is not expected to generate any additional air emissions than the existing facility. The EGTG would operate for up to approximately 200 hours per year. Expected emissions would be of a similar type to the emissions emitted from the EPS but at a significantly lower level and would include NO_x, SO_x, particulates, CH₄, etc. Given the low hours of operation of the EGTG, the air quality controls that EE has in place, and the limits set by the DEC, the impact on air quality is expected to be minimal.

The EPS currently operates below the emission limits set by the DEC and is considered to be an "Australian leader" for air emission controls. It is anticipated that additional air emissions generated by the EGTG would fall within the DEC's existing emission limit requirements.

Temporary air quality impacts are expected during the construction period. These impacts would predominantly come from emissions associated with earthworks and some increased construction traffic. Mitigation measures, such as dust suppression activities would be instigated to minimise emissions during the construction phase.

An Air Quality Impact Assessment (AQIA) would be conducted as part of the environmental assessment to determine the exact nature of impacts and would include modelling of emissions.

4.3 Water

Discharges to water are monitored continually at the EPS and EE monitors and reports details of the discharge to the DEC on a yearly basis.

Process water is treated on site and released at an outlet which drains to Dora Creek. The outlet is continually monitored and equipped with alarms that sound when the temperature exceeds the 35°C limit imposed by the DEC. The water temperature of Lake Macquarie near the outlet has been monitored for many years, and has been found to naturally fluctuate between 13°C and 30°C. These monitoring results also indicate that the cooling water outlet has not affected the background temperature of the lake since the power station began operating in 1981.

EE analyses the results from 10 discharge and monitoring sites around the facility as well as in Lake Macquarie for emergency discharge, effluent quality and volume, discharge to waters and ambient water monitoring. Limits are imposed so that for each monitoring point, the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified. In addition to temperature and pH, monitoring limits have been set for the following:

- Copper;
- Iron;
- Selenium;
- Cadmium;
- Lead;
- Manganese;
- Nitrate + nitrite (oxidised nitrogen);
- Zinc;
- Phosphorus (total) + Reactive Phosphorus; and
- Total suspended solids.

For the discharge points located within Lake Macquarie monitoring at these points includes:

- Dissolved Oxygen;
- Temperature;
- Salinity;
- Water clarity; and
- Zooplankton.

Additionally, EE operates a 'world first' effluent reuse program at the EPS. The power station receives over 5 million litres of treated sewage effluent from the nearby Dora Creek sewage treatment plant every day. This effluent is further purified at Eraring, and is used to meet 95% of the power station's water needs. The remaining 5% of water is used for drinking and amenities, and is supplied by the domestic water supply. In 2002/2003, EPS reused 990 million litres of recycled effluent, which would otherwise have been pumped into the Pacific Ocean. Additionally, if the effluent was not used, those 990 million litres of water would need to be obtained from the community water supply, reducing the amount available for other users.

During the construction phase, the potential exists for temporary impacts to water quality as a result of earthworks and some increased construction traffic.

4.4 Soil and Stability

A desktop study of the geology, soils and contaminated land within the study area was undertaken. In general, the soils of the Lake Macquarie area are poor in fertility and have moderate to high erosion hazards. The subsoils of the area are highly erodible and do not readily support groundcover vegetation.

Soil erosion in the Lake Macquarie area is an ongoing problem generated through land clearing, soil disturbance, and earthworks associated with development. Extreme events, such as drought, bushfires and floods have also increased soil erosion.

The soil type at the EPS is predominantly Doyalson, which is characterised by high erosion hazard and very low fertility. The geology of the site is of the Narrabeen Group, comprising conglomerate, pebbly sandstone, grey green and grey siltstone and claystone.

The Land Management Plan for the site ensures activities undertaken do not increase erosion potential at the site.

The total area of land in Lake Macquarie affected by potential ASS is estimated to be 7,602 hectares, with the area of Dora Creek/Eraring considered to be high for the occurrence of potential ASS (SOE, 2004). Sites within the vicinity of the EPS are known to be affected by ASS.

Potential impacts to the geology, soils and potential ASS from the proposed upgrade works would include:

- temporary impacts during construction works including earthworks and site preparation;
- impacts associated with construction of the access road to the ash disposal facility;
- impacts associated with construction of the ash disposal storage area and pit.

These potential impacts are able to be managed using proven safeguards and practices. Mitigation measures would be outlined to minimise the construction and operation impacts.

4.5 Noise and Vibration

Existing background noise levels at the site vary in nature and degree, however there is no requirement under the EPL to monitor noise emissions from the site. A vegetative buffer is located around the perimeter of the site.

Localised noise disturbance may result during construction activities, however this is anticipated to occur over relatively short durations. Due to the vegetative buffer and distance of the site from the nearest residential receivers, it is anticipated that these disturbances would have a minimal impact.

It is not anticipated that either the proposed ash dam or EGTG would increase operational noise and vibration levels to impact on nearby sensitive receivers.

5 BIOLOGICAL EFFECTS

5.1 Introduction

In 2004 HLA was commissioned by EE to undertake a biodiversity survey of the operational lands of the EPS. Previous surveys had taken place in 1999 by Biosis Research and in 1994 by Kevin Mills and Associates. The 2004 survey aimed to increase the knowledge of the distribution of significant species to allow for the effective management of the natural environment. Results of the survey are summarised below.

A Land Management Plan for the site covers issues such as biodiversity, bushfire control, weed control, and pest management

An additional biodiversity survey is currently being undertaken for the site of the proposed ash disposal area.

5.2 Fauna

The results of the fauna survey detected 71 vertebrate species, which included 42 bird, 22 mammal, 4 frog and 2 reptile species. This was considered to be a low recording of diversity, compared to Biosis (1999), and was explained as a result of the survey taking place in winter, when frog and reptile activity is low and many migratory bird species are absent.

5.3 Flora

A total of 214 species of vascular plant species were identified during the survey, of which 62 species had not been previously recorded within the study area. Of the 62 additional species recorded, 55 are native species. The total number of species recorded within the study area, including those listed in Biosis (1999), is 299. This excludes species identified to genus level only, however it includes exotic species and species utilised in site rehabilitation works.

5.4 Biodiversity

The clearing of Lake Macquarie's vegetation began during the 1860s. Since that time, the rate of clearing has averaged approximately 182 hectares per year. Just over 60% (or 39,253 hectares) of land within the Lake Macquarie LGA has native vegetation coverage. The EPS is located adjacent to Myuna Bay, which includes land protected by the National Parks Estate.

Thirty six wetlands within the Lake Macquarie LGA are covered by State Environmental Planning Policy No. 14 (SEPP No.14), occupying approximately 775 hectares. The EPS is situated on a small section of the foreshore of Lake Macquarie. Eraring Wetland forms part of the EPS site and is gazetted under State Environmental Planning Policy No.14 – SEPP No.14. The wetlands have been affected by ongoing regional development and the inlet canal, which feeds into the EPS.

A comprehensive survey of the EPS was undertaken in June 2005 to gather information on the location and extent of various weed species at the site. Weed species identified at the EPS include severe infestation of Lantana, Bitou Bush, Blackberry, Wild Tobacco, Balloon Vine, Crofton Weed, Pampas Grass, Dodder, Morning Glory, Small leaved privet, Castor Oil Tree, and Wild Watsonia.

In September 2004, a comprehensive survey of the EPS was undertaken to gather information on the location of dens, warrens, and sightings of animals. Vertebrate pest animal species identified at the EPS include Wild Dogs, European Red Foxes, Feral Cats, Feral European Rabbits and Hares, Indian Myna Birds, and potentially, Feral Pigs. Feral animal management and control on EPS operational lands is necessary to mitigate the impacts species are having on the environment and site functionality.

Pest control activities are undertaken at the EPS in accordance with the Land Management Plan and NSW guidelines.

It is not anticipated that the proposed Ash Dam and EGTG would have an effect on the populations of pests and weed species. The management and eradication of these species would continue as part of the requirements outlined in the Land Management Policy.

5.5 Threatened Species, Communities and Habitat

Threatened fauna species recorded within the study area are listed in **Table 5.1**. No threatened bird species were recorded, however, the Powerful Owl has previously been detected within the study area.

Table 5.1: Threatened vertebrate species recorded within study area.

Scientific Name	Common Name	Status TSC
Mormopterus norfolkensis	Eastern Little Mastiff-bat	Vulnerable
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable
Miniopterus australis	Little Bent-wing Bat	Vulnerable
Miniopterus schreibersii	Common Bent-wing Bat	Vulnerable
Myotis macropus	Large-footed Mouse-eared Bat	Vulnerable
Petaurus norfolcensis	Squirrel Glider	Vulnerable

Plant species recorded in terms of significance, with respect to threatened species status or recognition as a ROTAP (Briggs and Leigh 1996) species, are listed in **Table 5.2**.

Table 5.2: Significant plant species recorded within study area.

Scientific Name	Common	NSW Status	EPBC Status	ROTAP code
Genoplesium despectans ?	Sharp Midge Orchid	U		2K
Family: Fabaceae (Mimosoideae)				
Acacia bynoeana *	Tiny Wattle	E1	V	3VC-
Family: Myrtaceae				
Callistemon linearifolius *		V		2RCi
Family: Proteaceae				
Hakea bakeriana		U		
Family: Thymelaeaceae				
Tetratheca juncea	Black-eyed Susan	V	V	3VCa

* Recorded for first time during present survey.

Two of the species, *Acacia bynoeana* and *Callistemon linearifolius*, are protected by the provisions of the TSC Act, with *A. bynoeana* also protected by the provisions of the EPBC Act. Other regionally significant species recorded included *Bossiaea stephensonii*, at the northern limit of the species' southern population distributional limit. Also close to its distributional limit is *Pultenaea tuberculata*, said to occur between Lake Macquarie and Bermagui.

The conservation of biodiversity is a key component of EE's Land Management Policy.



6 RESOURCE IMPLICATIONS

6.1 Introduction

This section identifies the likely resources required/ impacts to resources of the proposed works.

6.2 Community

The proposed expansion to the ash disposal facility and the EGTG would require some use of public roads for the delivery of equipment and removal of waste, however this would be temporary and would be at a level that would not have a significant impact upon the local road network.

Any potential social and aesthetic impacts would be limited to the site and the immediate surroundings.

The proposed works would not result in a significant use of community resources in environmentally sensitive areas.

6.3 Natural

The proposed expansion to the ash disposal facility and the EGTG would require the use of water and fuel. Water use would be kept to a minimum and monitored in accordance with the conditions of the current EPL. Fuel would be required for the EGTG and would be delivered to the site in accordance with the existing delivery schedule.

6.4 Transportation

The site access is not located on a main road and is not considered to be in a sensitive location in relation to traffic and transport. Transport impacts would be minimal and limited to the site, with a temporary increase in traffic to the site during construction.

7 COMMUNITY EFFECTS

7.1 Introduction

Extensive tracts of land separate the power station from the local community, reducing visual impact and also keeping noise levels low at the buffer zone boundaries.

7.2 Socio-Economic

Lake Macquarie LGA had an estimated resident population of 187,803 in 2001, with a median age of 38.2 years (www.abs.gov.au, Lake Macquarie Community Profile 2003). The population density was 291.8 persons/km². Tables 7.1 – 7.5 provide a comparison of the key indicators of socio-economic factors affecting population characteristics of the Dora Creek/Eraring, Morisset Planning District and Lake Macquarie LGA.

Table 7.1: Comparison of Resident Population for Dora Creek/Eraring, Morisset and the Lake Macquarie LGA, 2001

Population	Dora Creek - Eraring	% of Pop'n	Morisset Planning District	% of Pop'n	Lake Macquarie	% of Pop'n
Total - all persons	1,271		19,160		177,619	
Aged 65 years and over	202	15.9	3,379	17.6	26,900	15.1
Children 0-4 yrs	85	6.7	1,199	6.3	11,494	6.5
Children 5-11 yrs	136	10.7	1,957	10.2	18,337	10.3
Youth 12-17 yrs	102	8.0	1,654	8.6	15,890	8.9
Youth 18-24 yrs	91	7.2	1,454	7.6	14,394	8.1
Adults 25-64		51.5		49.7		51.1

Table 7.2: Comparison of Employment Details for Dora Creek/Eraring, Morisset and the Lake Macquarie LGA, 2001

Employment Details	Dora Creek - Eraring	Morisset Planning District	Lake Macquarie
No. Persons Employed	434	6,787	70,111
% of Total Population Employed	3.4	3.5	3.9
Worked at home	24 (5.5%)	400 (5.9%)	2,618 (3.7%)
Unemployment Rate	10.7%	9.6%	9.5%
Unemployment Rate (15-24 yrs)	14.0%	17.3%	18.7%

Table 7.3: Comparison of Birthplace/ Background Details for Dora Creek/Eraring, Morisset and the Lake Macquarie LGA, 2001

Birthplace/ Background	Dora Creek - Eraring	% of Pop'n	Morisset Planning District	% of Pop'n	Lake Macquarie	% of Pop'n
Indigenous	33	2.6	386	1.9	3,409	1.9
Born Overseas – including at sea, not stated or classified	149	11.7	2,572	13.4	16,829	9.5
Born in Culturally and Linguistically Diverse Country	57	4.5	914	4.8	7,243	4.1

Table 7.4: Weekly individual income which is less than the average weekly earnings (\$700) for all NSW employees, (2001)

Location	No of Persons	% of Population
Dora Creek – Eraring	838	65.9
Morisset	11,517	60.1
Lake Macquarie	104,357	58.5

Table 7.5: Comparison of Education Details for Dora Creek/Eraring, Morisset and the Lake Macquarie LGA, 2001

Attending Education	Dora Creek - Eraring	% of Pop'n	Morisset Planning District	% of Pop'n	Lake Macquarie	% of Pop'n
Pre-school	20	1.6	285	1.5	3084	1.7
Infants/ Primary/ Secondary School	216	17.0	3176	16.6	30,616	17.2
Uni/ TAFE/ other Tertiary	49	3.9	1060	5.5	10,138	5.7
Holds Tertiary Qualification (includes Certificate, Diploma, Post Grad Degree etc)	342	26.9	5305	27.7	49,294	27.8

The above tables show that the Dora Creek-Eraring area and Morisset Planning District have population characteristics and a social profile which are comparable to the Lake Macquarie LGA in terms of education, employment, and population statistics. Accordingly, there are no exceptional socio- economic circumstances applying to the local community.

Tables 7.6 and 7.7 provide an overview of the socio-economic environment of the Lake Macquarie LGA.

Table 7.6: Qualification of Population aged 15 years and older in Lake Macquarie (2001)

Qualification	Number/Persons	Percentage
Postgraduate Degree	1,577	1.1
Graduate Diploma and Graduate Certificate	1,466	1.1
Bachelor Degree	8,983	6.4
Advanced Diploma and Diploma	7,982	5.7
Certificate	29,286	21.0
Not stated	14,691	10.5
Not applicable	75,432	54.1

Table 7.7: Unemployed Persons and Unemployment Rate in Lake Macquarie (2002)

	Unemployment	Unemployment Rate
Dec-01	8,814	9.9
Mar-02	8,244	9.6
Jun-02	8,120	9.6
Sep-02	7,273	8.7
Dec02	6,715	8.0
Labour Force Dec 02	84,172	

Source: Lake Macquarie 2003 Community Profile

The socio-economic impacts of the expanded ash disposal facility and EGTG relate to direct or indirect employment impacts and benefits. Construction of the ash disposal facility is predicted to take up to 12 months, and EE encourages the use of local contractors, where possible, for construction.

Once operational the EGTG and ash disposal facility would not require additional permanent employees at the site. Maintenance visits may be required.

7.3 Heritage and Cultural

7.3.1 Regional Context

There are 381 registered Aboriginal heritage sites in Lake Macquarie, including:

- shell middens;
- open sites (former camp sites whose archaeological material consists mainly of stone artefacts);
- rock shelters (containing art and midden);
- engravings;
- stone arrangements;
- ceremonial sites;
- carved and scarred trees;
- burials;
- quarry sites;
- axe-grinding grooves, and
- mythological sites.

There are 246 Non-Aboriginal heritage sites registered in the Lake Macquarie LGA. The National Trust register of sites contains 33 sites and areas of heritage significance in Lake Macquarie.

7.3.2 EPS Site

An internet search of the State Heritage Inventory and the Register of the National Estate conducted on August 16 2005, indicated that there are no known items of heritage significance on the EPS site listed by local government, state agencies or on the Register.

The NSW Heritage Office State Heritage Inventory forms, however has information on Eraring Wetland as a Heritage site. This site is also known locally as Muddy Lake. Eraring Wetland is gazetted under State Environmental Planning Policy No.14 – SEPP No.14 (No 879 & 880), however there is no listing for Eraring Wetland either as a cultural heritage item or a natural heritage item under the EPBC Act.

7.4 Land Use

7.4.1 Regional Context

There are a variety of land use types in Lake Macquarie including residential, recreational, commercial and industrial areas. The lake geographically divides the City. The eastern side of the lake consists of more densely populated older urban areas while the less densely populated western side consists of scattered communities some of which are rural and isolated. The Northlakes area is a mix of densely populated suburbs and small townships. Both the Westlakes and Northlakes areas have been subject to increasing development in recent years because they have large tracts of undeveloped land. The EPS is located within the area known as Westlakes.

Lake Macquarie has a population growth rate of 0.9%, with the population predicted to increase to 203,810 by 2021 (ABS 2001). To accommodate this growth, new development areas are being established, resulting in changes to land use and character. The major changes are:

- 'greenfield' bushland to residential, industrial and commercial uses;
- creation of smaller pockets of remnant vegetation areas;
- loss of bushland remnants to rural and agricultural uses;
- loss of natural drainage lines;
- encroachment of development on bushland and riparian zones; and
- stormwater discharge to bushland remnants.

The residential value of building activity in Lake Macquarie was \$123 million during 2003 and the commercial/industrial value was \$10 million. Residential development is a key pressure on land use within the City.

Lake Macquarie Council has been developing strategies to manage population and growth within the City such as Lifestyle 2020, Social Plan 2005 and Economic Development Strategy (2004-05), etc. These strategies detail the connections between planning, environmental management and social and economic development so that they are not viewed as separate elements but matters given equal weighting in Council decision-making.

7.4.2 EPS Site

Landuse at the EPS includes the infrastructure associated with electricity generation and ash disposal as well as ancillary works such as transport and service infrastructure and buffer zones.

Construction activities will have a temporary impact on the land use of the EPS. Construction of the expansion to the ash disposal facility will result in a direct impact on the existing land use of the area, and will require the clearing of vegetation for the expanded facility and the access

roads. Construction of the EGTG is expected to have only a minimal impact upon existing land uses.

A Land Management Plan for the site ensures that the principles of ecologically sustainable development (ESD) are integrated at the site. EE recognises that the environmental issues of importance to the sustainable use of the land for energy production are as follows:

- Conservation of biodiversity;
- Fire management;
- Pest management;
- Health of aquatic and marine environments;
- Soil conservation; and
- Indigenous and non-indigenous heritage management.

7.5 Transportation

Access to the EPS would remain unchanged; however an additional internal access route would be constructed to the proposed expanded ash disposal facility.

The main traffic increases will occur during the construction phase and would include:

- delivery of raw materials;
- vehicles associated with construction activities such as excavation;
- construction employee vehicles, etc

Minimal increases are expected to the existing operational traffic movements. These would include:

- deliveries of diesel for EGTG; and
- trucks transporting bottom and reclaimed ash (predicted to be similar to existing situation).

8 FINDINGS

The environmental assessment for the proposed ash disposal facility and EGTG would focus on the key impacts of the environmental factors addressed in Sections 4-7. This EASR has identified the key environmental issues as being:

- air quality; and
- flora and fauna.

8.1 Air Quality

The operation of the expanded ash disposal facility is not expected to generate further air emissions than the facility currently operating. Expected emissions from the EGTG would be of a similar nature to the emissions from the existing EPS, however of a much lower volume and would include NO_x, SO_x, particulates, CH₄, etc.

Temporary air quality impacts are expected during the construction period. These impacts would predominantly come from emissions associated with earthworks and some increased construction traffic.

An Air Quality Impact Assessment (AQIA) would be conducted as part of the environmental assessment to determine the nature and extent of impacts and would include modelling of emissions.

8.2 Flora and Fauna

Flora and fauna impacts would be associated with the construction of the expanded ash disposal facility, which would require the clearing of land. The high concentrate method of 'dense phase' disposal which has been selected minimises the amount of land required for ash disposal. A biodiversity study of the site is currently being undertaken to identify the species that would be affected by the clearing.

The Land Management Plan for the EPS would ensure that clearing is conducted in stages to minimise the visual and environmental effects of the works as well as reducing erosion potential.

An Ecological Assessment would be conducted as part of the environmental assessment to determine the nature and extent of impacts.

8.3 Other Environmental Issues

Additional environmental constraints have been identified, however the impacts resulting from the proposed expansion of the ash disposal facility and the EGTG are predicted to be minimal, and/or confined to the construction period. These constraints include:

- traffic and transport;
- noise and vibration;
- landscape and visual; and
- cultural heritage.

Each of these constraints would be discussed in the environmental assessment and appropriate mitigation measures would be identified in the Statement of Environmental Commitment to ensure impacts are minimised and properly managed.

8.4 Level of Assessment

This EASR has undertaken an initial appraisal of potential impacts associated with the proposed development, and has identified two key environmental issues being:

- air quality; and
- flora and fauna.

These two issues would be considered in detail in the environmental assessment to be undertaken, which would be determined by the Minister.

Similar to the principles of Part 2 of Schedule 3 of the EP&A Regulation (which does not apply to this project) that allow for alterations and additions to existing facilities to be exempted from the need to prepare a high level assessment if the proposed alterations and additions do not result in a significant increase in the environmental impacts of the total development compared with the existing or approved development, the preliminary scoping assessment has identified that a high level environmental assessment is not required for this project.

8.5 Approvals Process

As discussed in **Section 3.3.3**, the proposed upgrade to the EPS would be classified as 'major development' under SEPP 2005 and is therefore eligible for declaration by the Minister under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as a major project.

Approval would be required from the Minister and concept approval under section 75O of the EP&A Act would be sought.



Appendix A

Letter from the Treasurer of NSW