Mt Piper Power Station Extension

ENVIRONMENTAL ASSESSMENT

CHAPTER 13 – WASTE MANAGEMENT

- September 2009

Contents

13. Waste Management

The Director-General's requirements:

The Environmental Assessment must include identification of the major waste streams to be generated by the proposal (including waste from water treatment and coal ash) and measures for its management and disposal including options for recycling and reuse where reasonable and feasible.

13.1 Introduction

The extension of the Mt Piper Power Station has the potential to generate moderate quantities of liquid and non-liquid wastes. The key waste streams identified include:

- Excavated material;
- Demolition waste (building and structural materials, and road pavement);
- Construction waste (packaging material, scrap metal, formwork, pallets, plastic wrapping and cardboard);
- By-products of electricity generation such as flyash and furnace ash (for coal generation) and gaseous emissions (for both coal and gas); and
- General waste from operation of the new plant (trade waste, wastewater, packaging materials and office wastes).

Detail on each of these waste streams is provided below.

13.2 Statutory Framework for Waste Management

The main legislation and guidelines that govern the management of waste for the proposal are:

- *Avoidance and Resource Recovery Act, 2001*;
- *Protection of the Environment Operations Act, 1997*;
- *Protection of the Environment Operations (Waste) Regulation, 1996*;
- *NSW Waste Reduction and Purchasing Policy* (WRAPP) (EPA, 1999);
- *Lithgow Solid Waste Management Plan;*
- *Environmental Guidelines: Assessment, Classification and Management of Non-Liquid and Liquid Waste* (EPA, 1999); and
- *Contaminated Land Management Act, 1997*.

The principles of waste avoidance, waste reduction, waste re-use or waste recycling would be adopted during the construction and operation phases of Mt Piper Power Station Extension in

accordance with the following legislation and policies that provide the statutory framework for waste management in NSW.

13.2.1 Waste Avoidance and Resource Recovery Act, 2001

The objectives of the *Waste Avoidance and Resource Recovery Act, 2001* (WARR Act) are to encourage the most efficient use of resources, to reduce environmental harm, and to provide for the continual reduction in waste generation in line with the principles of Ecologically Sustainable Development (ESD). To meet the objectives of the Act, waste management options are considered against a hierarchy, comprising:

- Avoiding unnecessary resource consumption;
- Recovering resources through the re-use and recycling of waste; and
- Disposal (as a last resort).

The Act sets the framework for waste management and planning, based on the following objectives:

- To provide for the continual reduction in waste generation;
- To minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the re-use and recycling of waste;
- To ensure that industry shares with the community the responsibilities for reducing and dealing with waste;
- To ensure the efficient funding of waste and resource management, planning and programs and service delivery; and
- To achieve integrated waste and resource management, planning and programs and service delivery on a State-wide basis to assist in the achievement of the objectives of the *Protection of the Environment Operations Act, 1997*.

13.2.2 Protection of the Environment Operations Act, 1997

The *Protection of the Environment Operations Act, 1997* (POEO Act) incorporates the major regulatory and enforcement provisions of the former *Waste Minimisation and Management Act, 1995* (WMM Act). In effect, the POEO Act merges pollution control approvals and pollution control licences into a single process, or one Environment Protection Licence (EPL). EPLs are required for development or activities listed in Schedule 1 of the POEO Act and would incorporate provisions relating to water pollution, noise pollution, air pollution and waste management.

The need for an EPL under the POEO Act was considered with regard to waste, either as waste activity or the site as a waste facility. The following conclusions were reached:

- Waste activities - The proposed development will not generate or store hazardous waste, industrial waste or Group A waste as defined in the POEO Act and is therefore not considered a waste activity; and
- Waste facilities - The term 'waste facility' is defined in the dictionary of the POEO Act to mean "…any premises used for the storage, treatment, reprocessing, sorting or disposal of waste (except as provided by the regulations)". The proposed development is not characterised as a class of waste facility listed in Schedule 1 of the POEO Act.

On the basis of this, a licence would not be required under Schedule 1 of the POEO Act.

13.2.3 NSW Waste Reduction and Purchasing Policy (WRAPP)

In 1999, the NSW EPA adopted the *NSW Waste Reduction and Purchasing Policy* (WRAPP). The aim of WRAPP is to ensure that all NSW Government agencies contribute to the achievement of the State's aim to reduce waste to landfill. WRAPP requires that all state government agencies and state owned corporations develop and implement Waste Reduction and Purchasing Plans aimed at reducing waste in the following four areas:

- Paper products (general office paper, magazines, newspaper, cardboard, packaging);
- Office equipment (toner cartridges and printer ribbons);
- Vegetation material (tree clippings, leaves and prunings); and
- Construction and demolition material (concrete, excavated rocks and earth and drainage materials).

Waste Reduction and Purchasing Plans must also give priority to purchasing materials with recycled content. As part of WRAPP, Delta Electricity is required to report to DECCW every two years on the progress of their Waste Reduction and Purchasing Plan.

13.2.4 Lithgow Solid Waste Management Plan

In response to calls from the NSW Government to achieve significant reductions in solid waste sent to landfill, local Councils are obliged to establish a plan for waste minimisation. The main objective of the plans was to allow individual Councils to achieve waste reductions through their regulatory functions of development consent and building approvals.

Lithgow Council has produced a Solid Waste Management Plan (SWMP) which provides Waste Management Guidelines adopting the waste management hierarchy of minimisation, recycling, resource recovery and disposal. The aim of the strategy is to review the current solid waste management practices and explore the possibilities in technology associated with waste management that may be adaptable to the current and future waste management strategy.

The recommendations of the SWMP that are particularly relevant to this proposal include:

- Council purchase land at Blackmans Flat for a central waste facility that will implement best management strategy for the separation and disposal of the residual waste;
- Council encourage existing industries to minimise their waste generation and to practise waste recycling wherever possible;

13.3 Potential Wastes Generated from Proposal

The two distinct construction and operational phases of the proposal would generate different amounts and types of wastes according to the activity undertaken. A summary of the expected waste streams generated from either phase is outlined below. The majority of waste generated from the proposal would be in the form of non-liquid waste ie. excavated material and general waste products during construction and the by-products of electricity generation during operation. Waste quantities provided are estimates based on industry practice and existing guidelines.

13.3.1 Construction Excavated Material

One of the first stages in the construction process would be to level the site. Small quantities of soil would be excavated to enable the foundations for the new structures to be laid. The walkover survey conducted as part of the geology, soils and groundwater survey did not identify any visible signs of contamination and as such, it is expected that all excavated material would be suitable for re-use. Hence, wherever possible, the excavated material would be re-used on site and any excess material would be disposed of to a licensed landfill.

13.3.2 Construction Green Waste

A small amount of green waste would be generated by clearing. Typically, this vegetation would comprise of exotic grasses and weeds, however, some native species may also be removed. The extent of clearing would increase if the live coal storage area is positioned on the western side of the power station access road rather than the eastern side.

13.3.3 Construction and Demolition

It is anticipated that approximately large amounts of general building waste such as timber, masonry, scrap metal, packaging materials and plastics would be generated during the construction period. In addition, a small quantity of waste (sewage and domestic rubbish) would be generated from the construction compound. Where possible, waste products would be reused or recycled.

13.3.4 Operational Waste

Waste generated from the operation of the Mt Piper Power Station Extension would primarily comprise of the by-products of electricity generation. The following wastes are likely to be generated:

- Sewage and other wastewater such as washdown water;
- Flyash and furnace ash (coal option only);
- Gaseous and particulate matter from the burning of coal or gas;
- Used oils, tyres, rags, packaging, oil drums and discarded components associated with on-site vehicle maintenance;
- Clean up materials used in accordance with emergency response procedures for accidental spillages; and
- Paper and associated stationery waste associated with office activity.

13.4 Waste Management

Strategies and management measures that would be implemented to achieve minimal waste generation and responsible disposal for the construction and operational phases of the proposal would be developed within Waste Management Sub-plans or similar reports prepared as part of the Environmental Management Plans prepared for the project. The measures within the relevant plans would ensure the incorporation of the principles of avoid, re-use, recycle embodied in the WARR Act.

A Waste Management Sub-plan would be developed for the construction phase of the proposal for incorporation in the Construction Environmental Management Plan (CEMP). The plan would be prepared in accordance with the legislation and guidelines outlined above. The sub-plan would detail any procedures for the management of construction wastes from the site. In addition, the plan would contain an inventory of all waste types anticipated and the preferred options for re-use, recycling or disposal, and would seek to ensure that all waste generation and its fate is recorded such that waste minimisation can be achieved.

Waste management would be a component of the Operational EMP for the operational phase of the facility. It would ensure that initiatives for the sustainable management of waste are given consideration.

The Director-General's requirements specifically referenced waste from water treatment and coal ash and measures for management and disposal including options for recycling.

As described in Chapters 3 and 5 wastewater generated on site would be treated and recycled in the operation of the plant, thereby minimising the requirements for the use of raw water. Waste generated from the treatment in the Reverse Osmosis and Brine Concentrator plants would be used to condition flyash from the plant (for the coal option) and placed in the proposed new ash placement area.

The options for future ash placement from the existing plant and for the extension project (for coal generation) are subject to a separate study and approval process. Approval will sought under Part 3A of EP&A Act for Concept Plan approval for future dry ash storage facilities for the existing Mt Piper Power Station and for the proposed Mt Piper Extension project.

The Concept Plan provides for project approval for two areas (Lamberts North & Lamberts South) adjacent to the existing dry ash storage repository which will reach capacity around 2015. Both these areas are currently open-cut coal mines. These areas are located next to the existing ash placement areas and, if the application for ash placement were approved, these areas would provide space for the continued placement of ash from the existing power station and the new coal fired plant option. The Concept Plan will also seek concept approval for two additional areas which are further away and have yet to be mined.

Ash from power generation activities can be beneficially reused for cement making or horticultural purposes, soil stabilisation, engineered fill and road bases, aggregates and geopolymers, and zeolite production, subject to the quality of the ash produced. This is discussed in **Table 13.1**. Currently Delta sells approximately 200,000 tonnes per year of fly ash to the cement industry.

Delta will continue to investigate the reuse of the ash by-product of its power generating activities in each of the potential reuse areas. Through a process of supporting research and participating in market research and development, Delta has been working to stimulate interest in this co-product. Delta is a member on the board of the Ash Development Association of Australia (ADAA) and the Cooperative Research Centre for Coal in Sustainable Development (CCSD). The ADAA strive to market ash for a broad range of uses and the CCSD focussed on strengthening the collaborative links between industry, research organisations and government agencies.

Table 13.1 Re-use opportunities for ash

Reuse	Opportunities
Cement	Dry un-conditioned ash can be used in cement. Australian Standards for premix concrete allow for up to 40% of Portland cement to be replaced with fly ash .Delta currently on sells 18% or 200,000 tonnes of flash each year to the cement industry.
Horticulture	Owning to the dominance of silt sized particles and porous nature of the components in fly ash, addition of the fly ash to soils may help to increase the water holding capacity and modify the permeability of otherwise unfavourable soils. Recent regulatory restrictions on the use of fly ash in horticultural applications have seen a significant drop in horticultural opportunities.
Soil stabilisation, engineered road fills and road bases.	Fly ash may also be added to otherwise well-sorted (poorly graded) sandy soils to fill void spaces increasing the overall density and aiding in compaction. In some cases the self cementing properties of the ash may actually help to bind the soils. Such stabilisation increases the capacity of the soil to support roads (Road Base) and maintain the soils stability for the lifetime of the structure. The fly ash and soil may be compacted into layers (structured fills), or in a mixture of fly ash soil water and Portland cement for flow able fills. Delta actively supports programs to test the properties of fly ash in these areas.
Aggregates and geopolymers	Coarse (Gravel sized) and fine (sand sized) aggregates for concrete and other applications can be produced, from fly ash, by partially or completely melting the ash. Alternatively, aggregates can be produced by binding ash particles into larger masses with a cementing agent. Delta in concert with the ADAA is actively researching both applications and methods for this process.
Zeolites	The abundant aluminosilicate glass component of the fly ash provides a potential raw material for zeolite synthesis. Zeolites are used in control release fertilisers, soil conditioners and ion exchange media, detergent builders, pesticide carriers and animal dietary supplements. There is little research being done in this area due to the high inherent costs and the location of 'normal' fertiliser production facilities.
Backfilling and landfill	A number of reviews and trials have been carried out by Delta to measure the effectiveness of fly ash in open cut voids and as a pumped medium in underground mine workings. Results of these trials are positive and Delta feels that these properties will lead to greater usage in the future.
Bottom Ash Use	Bottom ash can be used as part of stability berms and other site stability structures to minimise the need to use naturally extracted materials. Ongoing reviews and research into this type of application for large dams and civil structures is ongoing through the ADAA. Delta continues to review opportunities to use bottom ash within site works and with third parties to minimise demand on natural resources and in an attempt to extend the life of any development resulting from this application.

13.5 Mitigation Measures

Mitigation measures for wastes generated by the proposal are discussed below.

13.5.1 Construction Materials

- Ensure the correct quantities are ordered and delivered to the site;
- Investigate the use of recycled materials, including concrete, roadbase, asphalt and other construction materials;
- Collect and transport existing road pavement material to crushing and recycling plants. Some material could be crushed on-site if practicable for reuse;
- Reuse asphalt by transferring to batching plants or use as a base course layer for access roads;
- Collect and transport steel scraps and other metals to a recycling facility or reuse where suitable; and
- Reuse clean excavated material on-site where suitable.

13.5.2 Contaminated Soils and Hazardous Materials

- Identify unsuitable / contaminated material (if found) and dispose of it in accordance relevant NSW legislation; and
- Collect empty oil and fuel drums in suitably designated areas and arrange for a licensed waste contractor to remove them.

13.5.3 Green Wastes

- Chip native vegetation cleared during construction and reuse as mulched material for revegetation;
- Remove and bag all noxious weeds and exotic plant species to be disposed of at a licensed landfill facility; and
- Transfer green waste not reused on-site to a green waste facility.

13.5.4 Paper / Cardboard / Packaging

- Develop strategies to encourage reduction and recycling for plastics, paper and packaging products.

13.5.5 Sewage and Water

- Provide portable toilet facilities during construction phase, which would be regularly maintained and ensure wastes are disposed of by a licensed waste contractor in accordance with Council and DECCW requirements or provide access to the existing sewerage system installed for Mt Piper PS;

- The treatment and disposal of wastewater during operations were discussed in detail Chapters 3 and 5. For both coal and gas options wastewater from plant operations and domestic water use will be recycled, in keeping with Delta's existing "zero water discharge" policy.

13.5.6 By-Products of Electricity Generation

- Collect and transport flyash and furnace ash to the ash storage area. Details of the proposed storage of ash were addressed in Chapter 3 and reuse opportunities discussed earlier in this chapter;
- Regularly inspect baghouse filters and replace when required, to ensure particulate matter is being trapped in the filters and maintain gaseous emissions to the levels required in the new EPL and as required in the POEO Regulation.

13.5.7 Domestic Solid Wastes

- Provide recycling facilities to encourage the separation and recycling of all paper, aluminium, glass, and plastic products used during construction and operation; and
- Collect and dispose of all domestic waste at a licensed facility.

13.6 Conclusions

Waste management arrangements would be put in place during the construction phase of the Mt Piper Power Station Extension to maximise the reduction, recycling, and reuse of waste materials. This would be achieved through the implementation of a Waste Management Sub-plan (WMP) during construction. The WMP would be developed and implemented in accordance with the requirements of relevant waste management legislation and policies and incorporated into the Construction EMP for the site.

Waste management requirements for the operational phase would be incorporated into the Operational EMP.