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Mt Piper Power Station Brine Conditioned Flyash Co-placement Extension Water Management and Monitoring Plan

Delta Electricity Western

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A Statement of Environmental Effects (SEE) was prepared for extension of the Mount Piper Power Station brine co-placement project area (Connell Wagner, 2007a) due to space limitations in the currently approved area and to allow for increased brine production resulting from the approved upgrade of the power station from 1,320 MW to 1,500 MW (Connell Wagner, 2005). In accordance with the requirements of the Development Consent, the Water Management Plan (WMP) for the existing brine co-placement area has been updated to include the expanded area. The updated WMP includes:

- a water monitoring program for surface and groundwater monitoring at the ash disposal site and receiving waters;
- the requirements for an annual environmental monitoring report;
- strategies for reduction of brine production, and
- requirements for an update of the groundwater modelling, based upon the monitoring data.

The updated WMP contains a water cycle management plan that describes how surface runoff will be managed to prevent contamination of groundwater and surface water from the brine conditioned ash placement area. A contingency plan is also described in the event that monitoring suggests surface or groundwater contamination may be occurring.

1. Introduction

Mount Piper Power Station obtained development approval from the Department of Urban Affairs and Planning (DUAP) on 3rd April, 2000 for the co-placement of brine conditioned flyash in the existing ash placement area. The existing brine/ash placement, as described in the PPI (1999) Statement of Environmental Effects (SEE), allows brine produced in the treatment of the cooling tower blowdown and other waste waters, to be disposed on site with acceptable environmental effects.

A Water Management Plan (WMP) was prepared, as required under Clause 43 of Schedule 2 attached to the original brine conditioned ash co-placement consent (see Attachment 2). This plan, and storage of brine conditioned ash within the ash placement area, has been in operation since November, 2000.

In 2006, the Department of Planning approved an application to upgrade the nominal capacity of the power station from 1,320 MW to 1,500 MW on 3rd June, 2006 (Attachment 3). This was described in a SEE for the project (Connell Wagner PPI, 2005).

Due to space limitations in the currently approved area and to provide for increased brine production due to the upgrade, Delta Electricity proposes to extend the existing brine and ash co-placement area at Mount Piper Power Station. The environmental effects of the proposal were examined in a SEE (Connell Wagner, 2007a) which was submitted in support of an application to modify the ash disposal area. The modification was approved by the Department of Planning on 23rd March 2008 (Attachment 4). The area involved is shown in Figure 1.

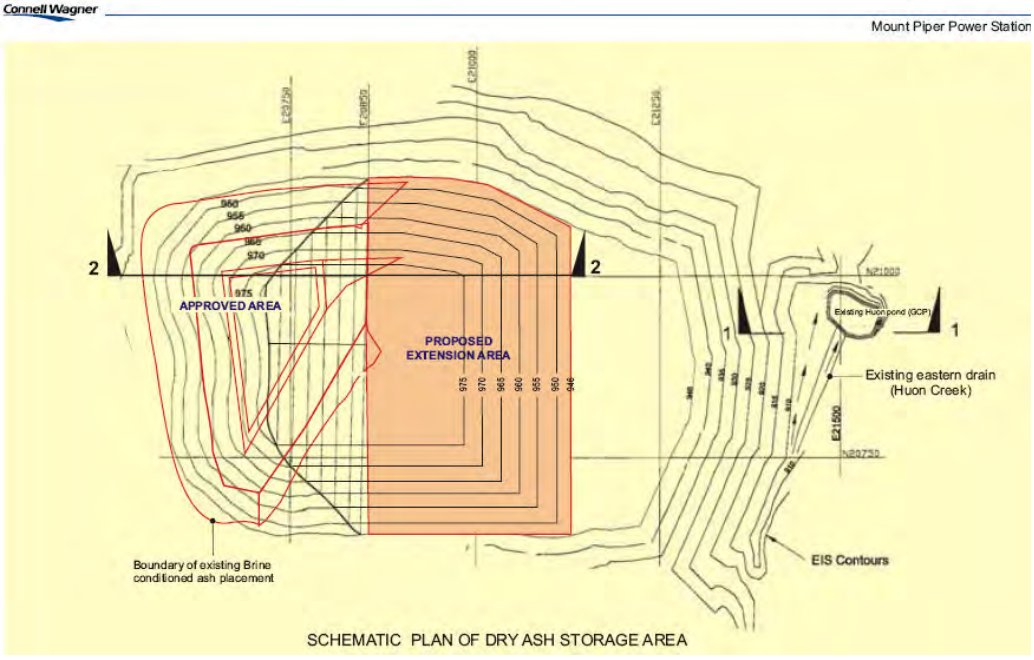

Figure 1. Existing and Approved Extension to the Brine Conditioned Ash Placement Area

The extension shown in Figure 1 will provide adequate volume for placement of brine conditioned ash for the remaining life of the ash placement facility. The existing and proposed extension areas are also overlayed on Figure 5 to show the relation between the monitoring points and the two areas.

The development consent for the extension required that the existing Water Management and Monitoring Plan (WMP) be updated and approved by the Director-General prior to undertaking extension of the brine conditioned ash placement area. The update must include details of:

- the increased catchment area;
- extension of drains, and
- the additional detention pond and/or storage areas.

This WMP addresses the water cycle management on the site, including strategies for reduction of brine production. It also includes a water monitoring program for surface and groundwater monitoring at the ash disposal site and receiving waters. The requirement for an annual environmental monitoring report is also included in the WMP.

Should the water quality monitoring indicate significant effects of the brine placement, groundwater modelling would be undertaken and the report is required to be an update of the modelling presented in the Connell Wagner (2007) SEE. The model is required to be calibrated using the water quality monitoring data.

The WMP for the extended brine placement area was updated by modifying the original Water Management and Monitoring Plan (PPI 2000), as required by the 2007 SEE and the 2008 approval conditions. The aim of the WMP is to minimise the effect of the placement of brine conditioned ash on local natural waters. It outlines the existing water quality, describes surface water and groundwater management strategies and documents the surface water and groundwater monitoring programs. Contingency plans in the event of runoff or leachate having an effect upon natural surface water or groundwater quality are also presented.

It is expected that the WMP will be integrated with the Repository Site Management Plan for the brine conditioned ash area (BBS, 2007). The site is administered by Bilfinger Berger Services Pty Ltd (BBS) for the power station. The Mount Piper Environment Section will be responsible for monitoring and will request Bilfinger Berger Services to implement the contingency plan, if required.

2. Current Water Cycle Management and Water Quality

2.1 Water Cycle Management

The Mount Piper Power Station and ash storage area are located within the catchment of Neubecks Creek, a tributary of the Coxs River, which is a Sub-catchment of the Warragamba Catchment. Water cycle management practices in the Mount Piper Power Station ash placement area direct surface runoff from the external batters away from the deposited ash into drains and clean water collection ponds (Figure 2). External runoff is also directed to the Eastern Drain (called Huon Creek), which flows into settling ponds or the local Huon Mine void called the Groundwater Collection Basin (GCB).

Surface water management of runoff from within the existing brine conditioned ash and proposed extension placement areas are outlined in Figure 2. The normal water conditioned ash runoff is directed to dirty water storage ponds, runoff from the brine area to the brine dirty water ponds and clean water diversion to a detention pond. Details of the existing brine runoff system and proposed brine dam are also shown in Figure 2. Collected water will only be used for dust suppression within the ash and brine placement area.

2.2 Surface Water Quality

Surface water in the nearby Neubecks Creek is characterised by elevated concentrations of sulphate, iron and manganese. This reflects the nature of the local geology, which includes out-cropping coal seams, some of which have been mined in this area (Connell Wagner, 2007b). Attachment 1 provides a summary of the existing surface and groundwater quality in and near the ash disposal area.

Water quality in Neubecks Creek is relatively poor and variable due to catchment inputs and stream flows. The median stream flow is only about 3.7 ML/day.

2.3 Groundwater Quality

Groundwater management is an essential part of the water cycle management for the ash disposal area. Groundwater flows travel from west of the ash disposal area to the Eastern Drain, which enters the Huon mine void. Limited flow occurs between the mine void and Neubecks Creek (Merrick, 2007).

The local groundwater is elevated in salts, mainly sulphate, and iron and manganese as well as some trace elements such as lead and zinc. The trace elements such as zinc and lead are due to local mineralisations originating from an old copper, lead and zinc open-cut mine to the north-west of the ash disposal site. The groundwater has low pH due to the presence of iron pyrites. Oxidation of the iron pyrites, by groundwater passing through the area, results in very high concentrations of iron and sulphate.

Poor water quality is also present in underground mine goaf areas to the south of the site. This has affected the water quality in the Groundwater Collection Basin in recent years (Connell Wagner, 2007b). The goaf areas are the underground mine areas where coal pillars between former mine headings have been partially mined and the roof allowed to collapse. The water quality is characterised by elevated concentrations of boron and sulphate as well as iron, manganese, nickel and zinc.

The groundwater concentrations of trace metals are much lower at background bores located away from the old mine area. Due to the localised nature of the various ore bodies and coal mines in the area, the groundwater water quality is highly variable between sampling bores. The relevant background bores are used to represent background conditions for comparison with the ash placement area down-gradient bores (see Attachment 1).

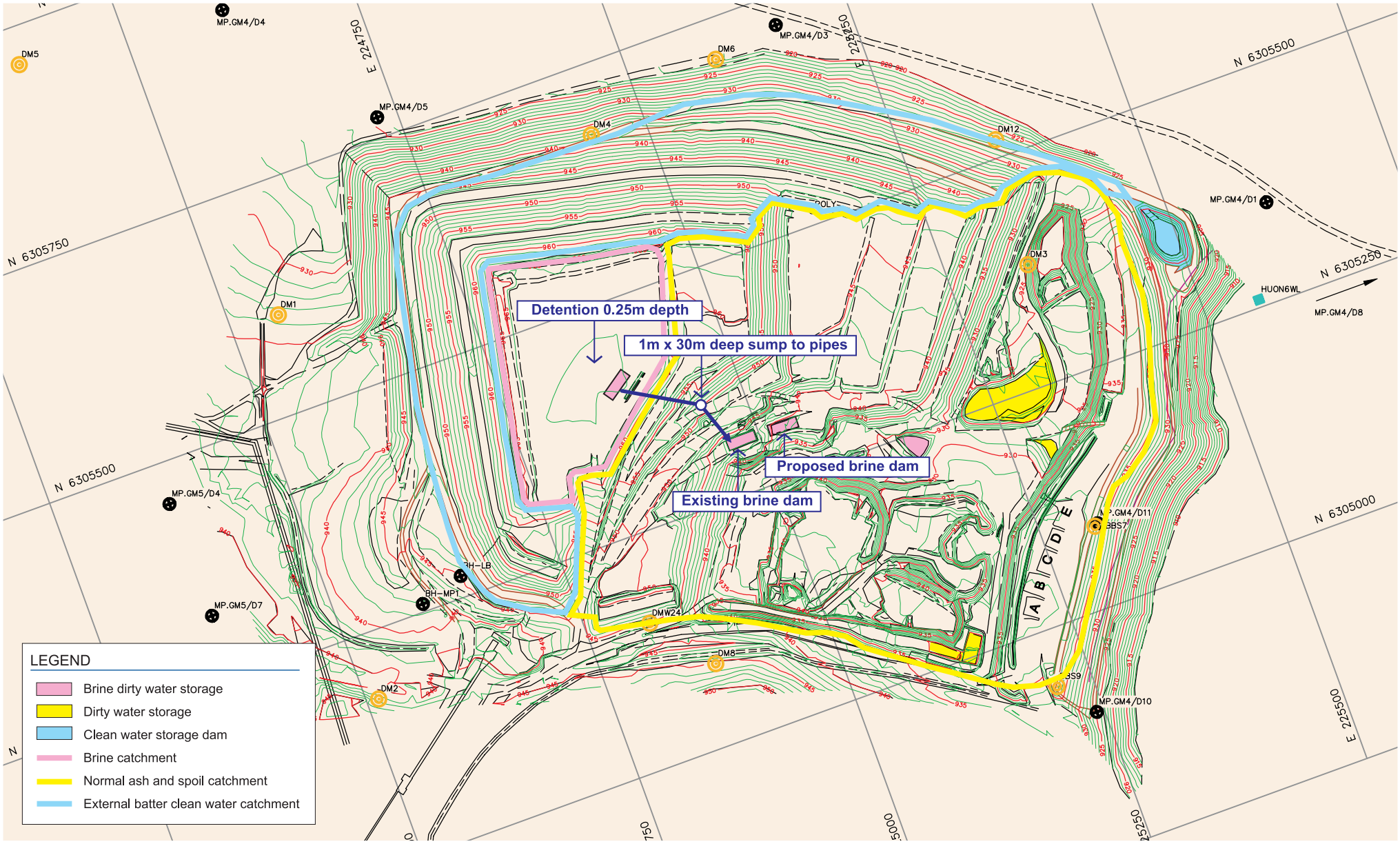

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Figure 2

Mt Piper Power Station Ash Placement Area Contours in April, 2008 with brine area, dirty water and Clean Water runoff ponds and Proposed Extension Area Brine Dam

3. Planned Extended Area Water Cycle Management

Management of surface runoff for the existing brine conditioned ash placement is described in the following section. A similar arrangement will be used for the extended area.

3.1 Existing Surface Runoff

The brine-conditioned flyash placement area is managed to control surface runoff to minimise contamination of the local groundwater and surface water. As can be seen in Figure 3, the brine conditioned flyash is placed in layers and the external batters are capped with one metre of normal flyash to prevent leaching of the brine by runoff into surface waters outside the placement area.

At the completion of a placement stage, the normal flyash capping is covered with spoil and revegetated, in accordance with the Bilfinger Berger Services Repository Site Management Plan (BBS, 2007). In this way, the brine conditioned ash deposit is segregated from the surrounding environment by an envelope of water conditioned ash and spoil capping, as originally approved for the ash placement proposal. The location of the ash disposal area is such that the risk of surface runoff entering natural water courses is minimal.

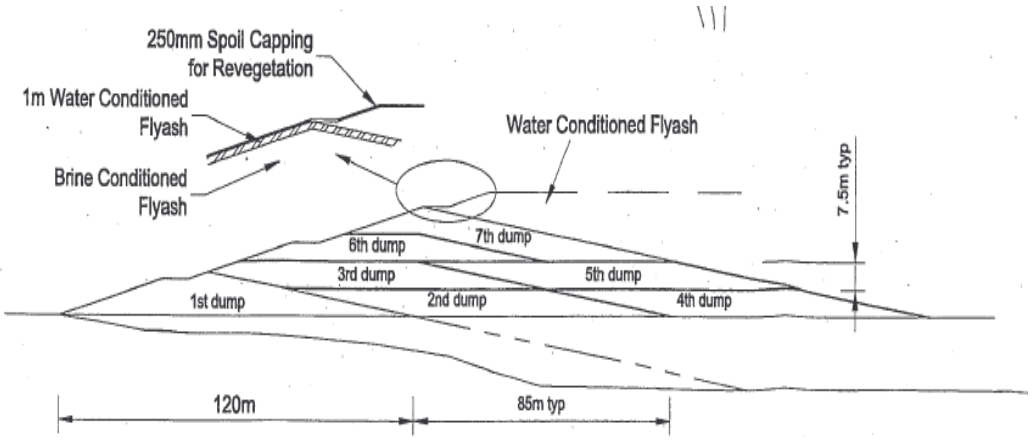

Figure 3. Schematic of Water Conditioned Ash External Batter Placement for Containment of Brine Conditioned Ash Placement (from PPI, 1999)

The annual "Long term average rainfall" measured at Lithgow is 870mm (Forster 1999). The brine/ash pilot field test showed that the majority of the rainfall is evaporated from the ash surface, resulting in an average of only 5% of the annual rainfall appearing as surface runoff.

Surface runoff from within the existing brine conditioned ash placement area is as shown in Figure 4. A surface slope of 2% directs the rainfall runoff to a wide detention pond in the centre of the deposit, which has a maximum depth of 0.25m. Water collected in this pond is directed to a 30m long, 1m deep sump which then directs water to the lined 300m^3 Brine Dam. Inspections of the system are undertaken daily to ensure its integrity during the placement period. A variety of other components are checked during these inspections as detailed in the BBS Ash Placement Area Daily Inspection Sheet (Attachment 5).

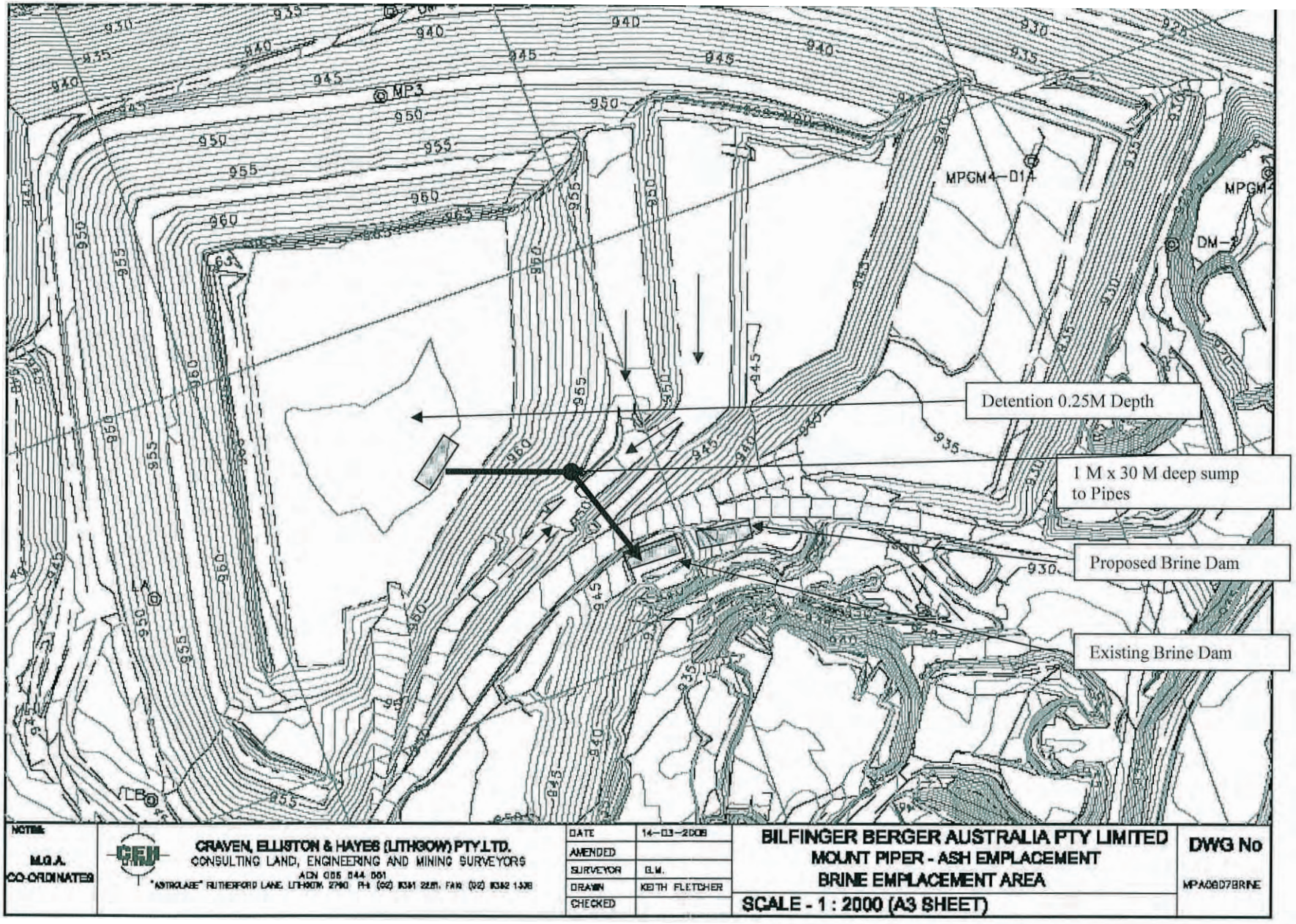

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Figure 4

Existing Brine Conditioned Ash Placement Area Rainfall Runoff System

The lined Brine Dam was sized at 300m^3 to collect 1 in 10 year storm events from individual ash placement stage areas. This was estimated based upon the 90th percentile of 100 years of monthly rainfall data and taking 5% of surface runoff from the area of the placement. Storm intensity runoff calculation showed that the original pond size was conservative so the larger size was used.

Water collected in the dam is reused for dust suppression by spraying onto the ash/brine area. In this way the size of the pond can be kept to a minimum. The dam will be kept empty as far as possible to reduce the possibility of an overflow. In the unlikely event that the dam was to overflow, the water would drain to the dirty water storage dams where it could be pumped back to the brine placement area. The contingency plans in Section 5 would then be adopted with regards to increased monitoring frequency for the detection of seepage, and the treatment of any confirmed contaminated water in the Groundwater Collection Basin.

3.2 Extended Area Surface Runoff

The design of the extended brine conditioned ash placement area drainage system, to manage external and internal runoff, will be similar to that used for the existing area. The existing detention pond will be extended into the expanded area as required, maintaining a similar configuration to that shown in Figure 4. The 30m long, 1m deep sump for collection of runoff will be moved as required. Water from the sump will be directed to the existing lined Brine Dam as well as an additional Brine Dam in the extended area. As the configuration for extended area will be similar to that for the existing placement, the size of the second Brine Dam will also be 300m^3, as depicted in Figure 4.

The design of the drainage system will be suited to the extended placement area and the planned design is expected to be similar to that shown in Figure 4.

3.3 Surface Runoff at Completion of Brine Placement

Once placement of brine conditioned ash ceases, the area will be covered with normal ash and the Brine Dam will be decommissioned. All areas will be rehabilitated and free draining. Runoff from the rehabilitated areas will be diverted to the main site drainage system for clean runoff (Figure 2).

3.4 Groundwater

Protection of natural groundwater is an essential part of the water cycle management. Measures outlined in this management plan seek to minimise the impact that the ash disposal area could have on local groundwater and in turn surface water.

The location of the ash disposal area was chosen to minimise the formation of leachates and its infiltration into the local groundwater. Groundwater modelling carried out for the original 1989 ash disposal EIS (ECNSW, 1989) indicated that a sub-surface drain, constructed of mine spoil, to prevent the deposited ash from coming in contact with the groundwater in the mine void would achieve this aim. The brine conditioned flyash proposal has the brine conditioned ash deposit placed on top of the ash deposit, some 37m above the water table.

Brine-conditioned flyash will not come into contact with the local groundwater table. The water table is predicted to rise by about 2m as a result of ash placement. The local groundwater should therefore be some 35 m below the brine conditioned ash disposal area (Merrick and Tammetta, 1999 and Merrick, 2007).

As the compacted flyash has a low porosity, only very small amounts of leachate are predicted to be formed as a result of rainfall infiltration into the brine conditioned ash deposit. The brine in ash field trial (Forster, 1999) found that the rainfall infiltration was only about 5 mm per year, equivalent to less than 1% of the annual average rainfall. Recent contaminant transport modelling (MERRICK, 2007) has indicated that the leachate produced from the extended brine conditioned ash area is not expected to

have a significant effect on water quality in the Eastern Drain, the Groundwater Collection Basin or Neubecks Creek.

4. Water Monitoring Program

Water quality monitoring provides important feedback for water cycle management in the ash disposal area. The monitoring program has been designed to supply sufficient information to give an accurate picture of the state of the water cycle management so that decisions can be made as to whether changes in local water quality are due to the placement of brine conditioned ash or other activities within the area. The aim is to identify water quality changes at an early stage so the causes can be investigated. In the event that changes are expected to be due to the brine co-placement, decisions can be made regarding corrective actions.

The original April, 2000 Development Approval conditions No. 40 and 41 (Attachment 2) and the recent approval to modify the development (Attachment 4) requires the Department of Planning to consult with the DECC, Department of Water and Energy (DWE), Sydney Catchment Authority (SCA) and Lithgow Council regarding proposed changes to the existing groundwater and surface water monitoring program, before approval of an updated Water Quality Management Plan (WQMP) can be granted.

4.1 Water Quality Guidelines

The local guidelines used are the pre-placement 90th percentile or the ANZECC (2000) guidelines for protection of freshwater (see Connell Wagner, 2007b and Attachment 1). It should be noted that modelling indicates that significant increases of salts and trace metals are not expected in the long-term, so changes in concentrations due to the brine conditioned ash placement are unlikely.

4.2 Groundwater

The groundwater monitoring bores, shown in Figure 5, have been used to monitor effects of the existing brine conditioned placement area. Due to the placement of water conditioned ash, the pre-brine conditioned ash bores MP3, B901 and B904 have been capped before being covered by ash. The background bore MP1 has been dry since brine conditioned ash placement began but is uncapped because it is monitored each quarter for water content. The more recent bores MPGM4/D12, D13 and D14 have also been capped before being covered by ash and recently bores D10 and D11 have been capped and covered with mine spoil. Therefore, changes in water quality in the seepage detection bores and the Groundwater Collection Basin will continue to be used to monitor the effects of brine conditioned ash placement in the ash placement area. In addition, vibrating wire piezometers (which only monitor water level) have been placed around the location of the covered bore D14 (see Figure 5) to provide early warning of increasing groundwater elevation and therefore possible brine leachates from the extended brine placement area. Where a significant increase in groundwater elevation is detected by a vibrating wire piezometer, a bore will be drilled through the ash. Free water in the bore will be analysed for water quality and ash core samples collected and analysed for moisture and salts in leachate tests. However, due to the water conditioned ash placement, there is no possibility of installing more groundwater monitoring bores inside the ash placement area.

It is proposed that, as well as installing additional vibrating wire piezometers in the expanded brine placement area (see Section 4.2.2), the water quality in the Groundwater Collection Basin and the existing monitoring bores outside the ash placement area, shown in Figure 5, will be used to monitor the extended brine conditioned placement area. The vibrating wire piezometers, Groundwater Collection Basin and remaining bores are sufficient for monitoring purposes.

If, for some reason, expansion of the existing groundwater and surface water monitoring programs becomes necessary, it will be undertaken with consultation and in accordance with reasonable requirements of DOP, in consultation with DECC, DWE, SCA and Lithgow Council. To avoid any confusion, it should be noted that Attachment 2 refers to the DLWC and that DWE replaces any reference to the former DLWC.

Extensive groundwater monitoring has been ongoing on at least a quarterly basis around the ash disposal site since 1985 to characterise the water quality and hydraulic characteristics of the area. The locations of the bores were selected according to the ANZECC (1995) principles of up-gradient and down-gradient bores. The bores were placed inside and adjacent to the ash disposal area for early warning of leachates originating from the ash/brine deposit. In addition , bores have been established further away to allow detection of groundwater movements toward the Groundwater Collection Basin and Neubecks Creek and to monitor background conditions. The location of the bores are shown in Figure 5.

The existing groundwater monitoring program will be continued under the WMP with sampling undertaken every three months at all of the groundwater monitoring boreholes . The parameters monitored in the bores are: water depth before bailing (to Australian Height Datum, AHD), conductivity (calibrated YSI meter), pH, sulphate, chloride and trace elements listed in Attachment 1 that are relevant to the ANZECC (2000) guidelines. As discussed in attachment 1, groundwater bore MPGM4/D5 (Figure 5) is used as the background bore due to its consistent results.

Bores are bailed 24 hours before sampling and if the bore has high recharge it is bailed a minimum of three times the bore volume.

All water quality analyses are undertaken in accordance with DECC approved methods (EPA 2004). Detection limits are set so that accurate measurements can be obtained at a level relevant to specific guidelines. In some cases, this may be as low as 1/10th the guideline concentration.

The results from the sampling, including core samples as required, will be presented in the annual Environmental Monitoring Report (EMR), as set out in the following section describing Data Management and Assessment.

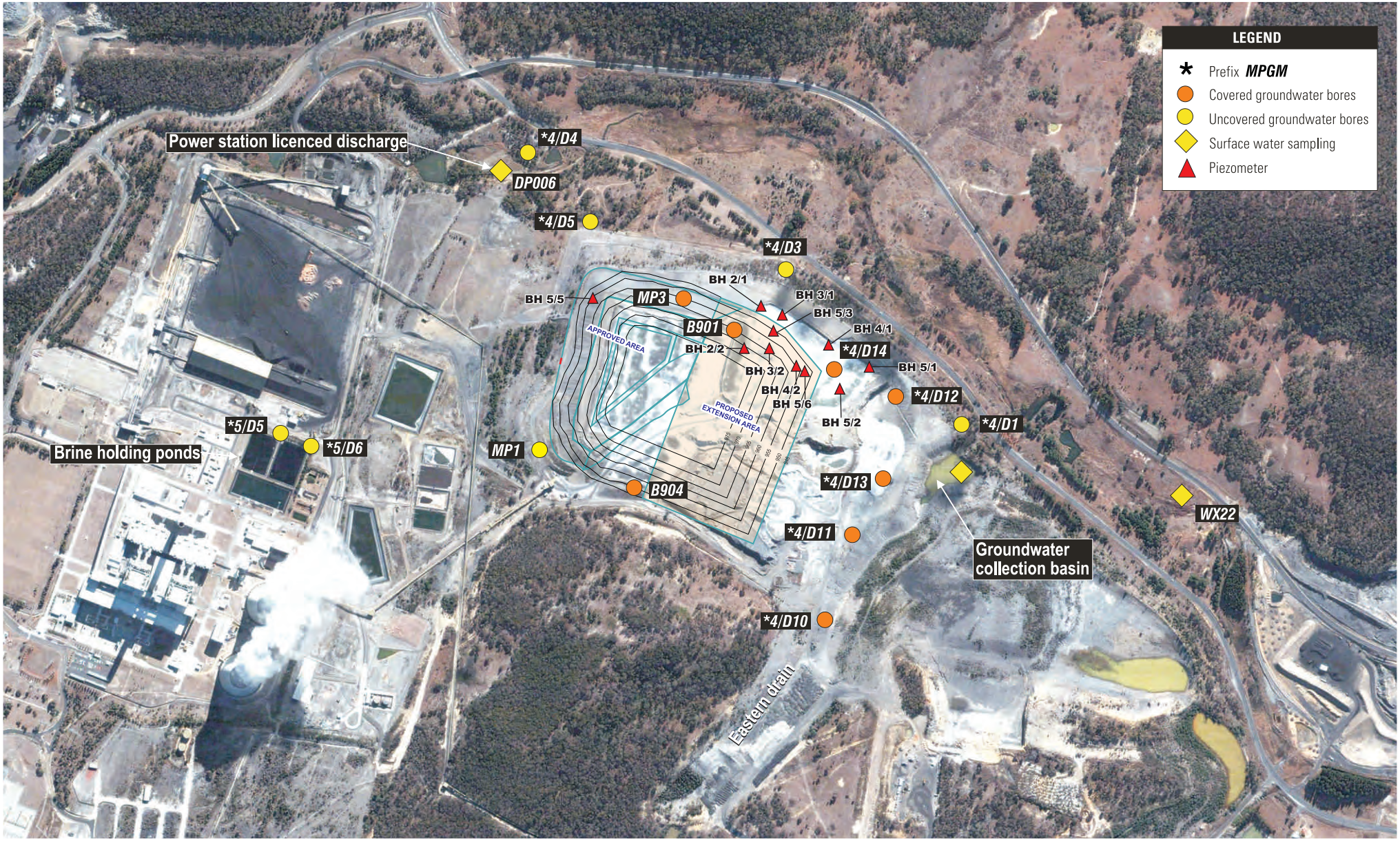

Figure 5

Mount Piper Power Station Ash and Brine Co-placement Area Groundwater and Surface Water Quality Monitoring Sites

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4.2.1 Data Management and Assessment

As the data is received from the laboratory it is compared with the existing data base for outliers and exceedence of guideline concentrations. A trace element outlier is defined using the ANZECC (2000) procedure, which is if a data point is equal to, or greater than, three times the standard deviation of the database away from the database mean. If this occurs, the laboratory is requested to repeat the test. If the outlier is above the guideline concentration, an investigation is undertaken to determine if the result is real or due to sample contamination. Such data is not deleted from the database until an investigation of the likely causes of the outlier can recommend that it be deleted.

The water quality data is graphed over time to show trends at the background and receiving water groundwater and surface water monitoring sites. Chloride is used as a tracer for brine leachates because the local area is highly mineralised and it is difficult to distinguish the origin of other trace elements,. The chloride concentration provides an early warning of leaching from the brine conditioned ash deposit. Chloride is also unlikely to undergo chemical alteration in the groundwater.

If concentrations increase above background and approach the relevant local guidelines and it can be reasonably expected to due the brine placement area, when the local mineralisations and background conditions are taken into account, the contingency plan, described in the following sections will be implemented.

4.2.2 Seepage Monitoring

In addition to groundwater bores, vibrating wire piezometers (VWP) have been installed within the ash disposal area to detect rainfall infiltration and seepage, if any, from the brine conditioned flyash deposit. The first VWP will be installed in the extended area after placement of the first layer is completed. The VWP will be sunk to a suitable depth to indicate whether there is seepage from the brine conditioned flyash placement. If the VWP's indicate that seepage is occurring, the sampling frequency of the outside bores will be increased, as required, to provide feedback for management of the brine conditioned flyash placement area. The VWPs will be monitored regularly and leachates analysed for the presence of salts, such as conductivity measurements.

4.2.3 Groundwater Model Verification

The DA conditions (Attachment 4) require that the next Groundwater Modelling Report is to be an update the groundwater modelling presented in the Mount Piper Power Station Extension of Brine Conditioned Ash Placement Area - Statement of Environmental Effects (dated June 2007). The report is also required to use the results and analyses from the water quality monitoring to calibrate the groundwater contaminant transport model.

The contaminant transport modelling undertaken for extension of the existing brine conditioned ash placement area SEE was calibrated using the current water level and water quality database. In order to calibrate the model for the extended area, it will be re-run once sufficient data has been collected after brine conditioned flyash placement has started in the extended area.

The time required to collect sufficient data to do this is uncertain. Modelling suggests it is in the order of 40 years, which is after the life of ash placement. However, calibration could be undertaken once the leachate plume (as indicated by chloride concentrations) reaches the sub-surface drain, below the placed ash, on the bottom of the mine void, or when some significant change in water quality has occurred that may indicate leachates originating from the brine conditioned ash area have reached the groundwater.

4.3 Surface Water

Surface water quality monitoring involves the water quality at the Mt Piper Power Station licensed discharge point (LDP006), in Neubecks Creek at the stream gauging station, site WX22 and the GCB.

The sampling sites are shown in Figure 5. Stream flows are recorded at WX22 by DWE and provided to Mt Piper Power Station when requested. The WX22 site in Neubecks Creek is located downstream of the ash and brine co-placement areas for monitoring of water quality changes relative to the upstream site at LDP006.

Surface water quality monitoring is currently undertaken on a three monthly basis, except at WX22 which has been monthly since October, 2007, and consistent with the requirements of the original April, 2000 Development Consent. This sampling frequency will be maintained at the surface water quality monitoring sites. Characteristics measured and methods used, such as conductivity (calibrated YSI meter), will be consistent with those used for the groundwater bores (see Section 4.2 and Attachment 1). Data management and assessment will continue to be the same as for groundwater data management.

5. Contingency Plans

In the unlikely event that the brine runoff collection dam was to overflow, the water would drain to the dirty water storage dams where it could be pumped back to the brine placement area. The following contingency plans would then be adopted.

In the event that monitoring indicates the contaminant concentrations in the Groundwater Collection Basin void or Neubecks Creek have increased, and are approaching the relevant locally derived ANZECC guideline concentrations, the monitoring results will be examined to determine if:

- the increase can reasonably be expected to be due the brine placement area, when the local mineralisations and background conditions are taken into account, and
- there has been a significant and consistent exceedence of the relevant locally derived ANZECC guideline concentration for any of the water quality characteristics.

Should the review of the data suggest the increase is potentially caused by the brine/ash deposit, the following actions/risk assessments will be undertaken:

- The Groundwater Collection Basin , Neubecks Creek and all the groundwater bores will be re-sampled, as soon as the increase is evident, to determine if the increase is real and to determine the cause. The frequency of sampling will be increased to monthly until the matter is resolved;
- The runoff Brine Dam liner will be re-checked for leaks. Any leaks that are detected will be repaired;
- The integrity of the surface runoff collection systems in the brine conditioned ash placement area, which are regularly checked, will be inspected to ensure runoff has not bypassed the detention pond, sump and dam and repaired, if necessary, as part of site maintenance activities;
- The rate of seepage of leachates from the co-placement area will be regularly monitoring by the vibrating wire piezometers installed in each stage of the brine conditioned ash placement area. The piezometers would be expected to detect seepage well before it reached the mine spoil below;
- If the water quality in the Groundwater Collection Basin is shown to have the potential to affect the water quality in Neubecks Creek, it will be pumped out and sprayed on the ash placement area. Leachates in the vibrating wire piezometers will be checked to determine if this is the cause of changes to the water quality in the Groundwater Collection Basin;
- A groundwater investigation, including modelling, will be undertaken to determine if the cause of the water quality change in the Groundwater Collection Basin is due to brine leachate from the ash/brine deposit;
- The placement of brine conditioned flyash will be temporarily suspended pending the outcome of the above investigations. The brine storage ponds have the capacity to store 40ML of brine. Therefore there is ample time to undertake an investigation (predicted annual brine production is 8 to 16 ML).
- Should the source of contaminant concentrations be identified as the brine/ash deposits, an investigation will be carried out to determine how to overcome the problem;
- The relevant stakeholders (SCA, DWE, Lithgow City Council and DECC) will be notified and involved in discussions on actions needed to rectify the situation. The Department of Planning will be provided with evidence of this consultation process and details of any increase in contaminants and the remediation measures undertaken;
- Once an acceptable solution is devised and approved, co-placement would then recommence, following approval by the relevant Authorities.

Approval for the discharge of brine via the Wollongong sewage treatment plant was previously granted by DUAP, as a contingency to the on site brine/ash placement. Ocean disposal involves trucking the brine to the sewage plant where it is mixed with sewage to give a dilution of about 300 to 1, giving a total dilution of 20,000 times once the sewage and brine are diluted in the 'mixing zone' of the ocean outfall.

In the unlikely event that the above situation was to occur when there was inadequate capacity in brine storage ponds, additional temporary storage could be arranged on site or surplus brine could be transported to Wollongong for ocean disposal.

Should leaks be detected from the brine storage ponds, through regular monitoring of the adjacent bores (shown in Figure 5) or as a result of special investigations, the storage of the brine could be transferred to another pond at the Power Station while the defective liner is repaired. Construction of a temporary storage area could also be considered if the adjacent ponds were not suitable for storage.

6. Brine Management Strategies

As far as is practicable, Mount Piper Power station is operated so that the production, handling and storage of the brine is minimised and its management is carried out in a responsible manner.

Several strategies for minimising brine production at Mt Piper Power Station have been investigated. The most effective method is to use a greater proportion of the Fish River water supply allocation and to reduce the use of the more saline Coxs River supply. This has limited brine production, even when the power station was operated at near full capacity. The current prolonged drought has limited access to the Fish River water supply and increased the salinity of the Coxs River supply, so the volume of brine production has increased in recent years. The extended area of brine conditioned ash placement has taken this effect into account for future co-placement requirements.

Other brine reduction strategies being used include recycling of plant wastewater and using cooling tower water to condition ash. The option to discharge brine via at the Wollongong sewage treatment is available as a contingency plan in the event that on site disposal of brine conditioned flyash is interrupted or suspended.

The handling of brine at the site is carried out to prevent any release into the surrounding environment. Brine conditioning of the flyash occurs within the paved power station area, away from the ash disposal area, to prevent any brine or brine contaminated material entering natural waterways. The fly ash conditioning plant area is protected by drainage systems that collects and pumps drainage water to settling basins from where the water is recycled for appropriate uses. The brine conditioned flyash is transported to the designated disposal area by conveyor.

The pump to transport the brine to the ash conditioning plant is located adjacent to the brine holding ponds, and any drainage from the pump area is directed back to the brine ponds. The pipeline is fully welded HDPE and ABS pipe, located above ground to ensure that the possibility of an undetected leak is minimised.

The site layout ensures that any spill of brine is intercepted at the earliest point. The drainage system is backed up by the Mt Piper Final Holding Pond, so that in the unlikely event of leaked brine, it can be collected and pumped back to the water treatment plant.

The brine storage ponds are double lined to minimise the risk of leaks and local groundwater contamination. Groundwater bores have been installed adjacent to the ponds and are monitored quarterly to provide early warning of leaks in the outer liner. The groundwater is monitored for pH, chloride, sulphate, conductivity and total dissolved solids. In addition, trace metals are sampled quarterly to confirm the local guidelines are not exceeded.

During storage of the brine in the holding ponds, some solids settle as the settled material cannot be slurried with the brine for mixing with the fly ash. The material is periodically excavated as required and transported to the ash storage area in sealed trucks, where it is deposited in the brine conditioned ash placement area. The brine sludge is spread in thin layers and covered by a layer of brine conditioned fly ash in the manner described in the “Mount Piper Power Station Brine Conditioned Flyash Co-placement - Statement of Environmental Effects” (PPI 1999). These solids will continue to be spread in a thin layer in the designated brine conditioned flyash disposal area as necessary.

7. References

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Attachment 1

Table 1. Existing Surface and Groundwater Quality in and Near the Ash Disposal Area

Element	Ash Disposal Area		Background **	Neubecks Creek ***	ANZECC (2000) Guidelines #	
(mg/L)	B901 and MPGM4/D12	GCB	MPGM4/D5	WX22	Groundwater	Freshwater
Al	14.05	-	-	-		0.055
Ag	0.001	0.00067	0.001	<0.001	0.00005	0.00005
ALK	68	132	42	54		
As	0.008	0.001	0.001	0.001	0.024	0.024
B	1.84	0.790	0.151	0.049	0.37	0.370
Ba	0.022	0.025	0.022	0.026	0.7	0.7+++
Be	0.002	0.001	0.001	0.001	0.100	0.100
Cd	0.016	0.001	0.001	0.001	0.002	0.001
Cl	28	38	27	19	350	350+
COND (uS/cm)	1370	1499	1117	316	2600^	2200
Cr	0.001	0.001	0.003	0.001	0.005	0.001
Cu	0.011	0.001	0.002	0.001	0.005	0.0025
F	2.37	0.095	0.175	0.246	1.5	1.5+++
Fe-filtered	13.12	0.163	56.3	0.089	**0.664**	0.3+++
Hg	0.000113	0.000120	<0.00012	0.00017	0.00006	0.00006
Mn-filtered	7.47	4.29	8.41	0.575	**5.704**	1.900
Mo	0.002	0.003	0.003	0.003	0.01	0.01+
NFR	99	-	-			10.0
Ni	1.483	0.356	0.083	0.013	**0.5509**	0.017
Pb	0.003	0.001	0.004	0.001	0.005	0.005
pH	6.2	7.3	6.0	7.1	6.5-8.0	6.5-8.0
Se	0.002	0.001	0.001	0.001	0.005	0.005
SO4	753	762	586	90	1000	1000++
TDS	1232	1216	910	220	2000	1500^
Zn	1.050	0.077	0.085	0.061	**0.908**	**0.116**

* average of bores B901and MPGM4/D12 in ash placement area

** bore MPGM4/D5 upgradient of ash disposal area and between ash disposal area and Neubecks Creek

^ 2000 mg/L TDS/0.77 for groundwater; 0.68 x 2200 uS/cm low land river conductivity protection of aquatic life

ANZECC (2000) guidelines for protection of freshwaters, livestock, irrigation water or drinking water. Local guideline based upon 90th percentile (**shown in bold**) – see text.
Cadmium, Chromium, Copper, lead, nickel and zinc adjusted for effects of hardness: Current Ca, Mg in GCB 147, 113 mg/L: in Neubecks Creek 19.7, 11.8 mg/L, respectively
Note: Chromium is for CrVI only and not adjusted for hardness

\+ Irrigation water moderately tolerant crops; irrigation. Note: Molybdenum drinking is 0.05 mg/L

++ Livestock

+++ Drinking water

Attachment 2

Modification of the Mt Piper Power Station Development Consent to allow
Brine Conditioned Ash Placement in the Ash Placement Area, 3rd April, 2000

NOTICE OF AMENDMENT OF A DEVELOPMENT CONSENT GRANTED UNDER SECTION 101 OF THE UNAMENDED ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 PURSUANT TO SECTION 96(2) OF THE AMENDED ACT.

I, the Minister for Urban Affairs and Planning, pursuant to Section 96(2) of the amended Environmental Planning and Assessment Act 1979, modify the development consent referred to in Schedule 1 in the manner set out in Schedule 2 (S90/01696).

Andrew Refshauge MP
Deputy Premier
Minister for Urban Affairs and Planning
Minister for Aboriginal Affairs
Minister for Housing

Sydney, 3 April 2000

ABBREVIATIONS AND INTERPRETATION

The Director-General	Director-General of the Department of Urban Affairs and Planning
The Council	Lithgow City Council
The Applicant	Delta Electricity
DLWC	Department of Land and Water Conservation
EPA	New South Wales Environment Protection Authority
SCA	Sydney Catchment Authority
The Site	Mount Piper Power Station
Relevant Authority	EPA, DLWC or SCA

SCHEDULE 1

Development consent granted by the Minister for Planning and Environment on 1 April 1982, in respect of a development application made by the Applicant, the Electricity Commission of New South Wales, to the Greater Lithgow City Council for construction and operation of a power station known as the Mount Piper Power Station, as modified on 18 March 1991 and 21 June 1996 and 18 January 1999.

SCHEDULE 2

Delete Condition 34 of the development consent.

Renumber Condition 38 as Condition 49.

Insert the following Conditions 38 to 48, inclusive.

38) The Applicant shall carry out modifications to the development generally in accordance with the Statement of Environmental Effects (SEE) dated August 1999, prepared by Environmental Services, Pacific Power International for Delta Electricity, and as modified by the following conditions. Any alteration, variation or extension of the development shall require the further consent of the Minister for Urban Affairs and Planning.

39) The Applicant shall, prior to the first placement of brine-conditioned flyash, apply to the EPA for a modification to the EPA licence for the Site. The licence modification shall address conditions for the continued on-site storage of brine, the placement of brine-conditioned flyash, and any reasonable requirements of the EPA.

WATER MONITORING PROGRAMS

40) The Applicant shall, at least one month prior to the first placement of brine-conditioned flyash, consult with the EPA, DLWC and SCA to establish the requirements for Water Monitoring Programs for groundwater and surface water. The Water Monitoring Programs shall:

(i) be based on the monitoring programs presented in the Statement of Environmental Effects for this modification;
(ii) include water quality testing at a minimum frequency of every three months;
(iii) be at the expense of the Applicant.

41) The Applicant shall expand the groundwater and surface water monitoring programs, including, if so required, the establishment of additional groundwater monitoring bores and surface water sampling points, in accordance with any reasonable requirements of the EPA, DLWC or SCA.

42) The Applicant shall, prior to the construction or operation of any monitoring bore on or in the vicinity of the development, consult with DLWC regarding the licensing of any bore on or in the vicinity of the development, under the provisions of the *Water Act 1912*.

WATER MANAGEMENT PLAN

43) At least one month prior to the placement of brine-conditioned flyash, or within such further period as the Director-General may agree, the Applicant shall prepare and submit for the approval of the EPA, the Sydney Catchment Authority, DLWC, Council, and the Director-General, a Water Management Plan (WMP) which shall include, but not be limited to:

a) Details of the monitoring programs for surface water and groundwater required under conditions 40 and 41.
b) Details of measures to be employed to control surface water run-off from the site.

c) Contingency plans for the mitigation of environmental impacts should run-off or leachate from the site be found to be negatively impacting on natural surface water or groundwater.
d) Brine management objectives and strategies, with specific reference to measures aimed at reducing the volume of brine produced at the Mount Piper Power Station.

ENVIRONMENTAL MONITORING REPORT

44) The Applicant shall provide to the Director-General, EPA, DLWC SCA and Council, an Environmental Monitoring Report (EMR) on a yearly basis, with the first EMR to be submitted no later than six months after the first placement of brine-conditioned flyash on-site. The Applicant shall agree to Council making the Environmental Monitoring Reports available on request for public inspection.

45) The Environmental Monitoring Report shall include, but not be limited to:

(a) a summary and discussion of all available results and analyses from Water Monitoring Programs;
(b) a discussion of the aims of the Water Management Plan and to what degree these aims have been attained in the context of results and analyses of the Water Monitoring Programs;
(c) actions taken, or intended to be taken, if any, to mitigate any adverse environmental impacts; and to meet the reasonable requirements of the Director-General, EPA, DLWC, Sydney Catchment Authority or Council.

GROUNDWATER MODELLING

46) The Director-General, EPA, DLWC, SCA or Council may, based on the results and analyses presented in the Environmental Monitoring Report, or any other information that may be reasonably interpreted as indicating significant impacts on the groundwater quality in the vicinity of the Site as a result of the placement of brine-conditioned flyash, request the preparation of a Groundwater Modelling Report.

47) The Groundwater Modelling Report shall be an update of the groundwater modelling presented in the Statement of Environmental Effects for this modification and will employ the results and analyses of the Water Monitoring Programs to calibrate the groundwater contaminant transport model. The Groundwater Modelling Report shall be prepared by a qualified person approved by the Director-General or relevant Authority.

48) The Applicant shall comply with any reasonable requirement of the Director-General, DLWC, EPA, SCA or Council with regard to the content or scope of the Groundwater Modelling Report, or actions to be taken in response to the results of the report.

Attachment 3

Modification of the Development Consent to Increase the Capacity of Mt Piper Power Station
3rd June, 2006

Modification Approval

Section 96(2) of the *Environmental Planning and Assessment Act 1979*

I, the Minister for Planning, pursuant to section 96(2) of the *Environmental Planning and Assessment Act 1979*, modify the development consent referred to in Schedule 1 in the manner set out in Schedule 2.

Frank Sartor MP
Minister for Planning

Sydney 3 June 2006 File No: S90/01696

SCHEDULE 1

Development consent:	granted by the Minister for Planning and Environment on 1 April 1982.
In respect of:	Lot 1 DP 325532, Lot 1 DP 400022, Lot 15 DP 626299, Part Lot 191 DP 629212, Lot 2 DP 702619, Lots 362 and 366 DP 740604, Part Lot 10 and Lots 18, 59, 260 and 261 DP 751636, Part Lot 1 DP 803655, Lots 1-7 and Part Lot 13 DP 804929, Lot 1 DP 813288, Lot 1 DP 816420, Lots 40, 41 and 46-52 DP 827626, Lot 1 DP 829065, Lot 21 DP 832446 and Lot 1 DP 920999.
For the following:	The construction and operation of a power station known as the Mount Piper Power Station
Modification Application:	Modification of the development consent to increase the capacity of the power station in two phases: • initially operating the power station at a capacity factor of up to 90%, to generate up to a nominal capacity of 1400 megawatts; and • undertaking equipment upgrade works or replacements to provide a nominal capacity of 1500 megawatts when operating at a capacity factor of up to 90%.

SCHEDULE 2

The development consent is modified by:

1) inserting the following immediately after existing condition 49:

Expansion and Upgrade of the Power Station

50. The Applicant is permitted to upgrade and expand the development in two stages:
    a) stage 1 being the operation of the development at a capacity factor of up to 90%, to generate up to a nominal capacity of 1400 megawatts; and
    b) stage 2 being the implementation of equipment upgrade works or replacements to provide a nominal capacity of 1500 megawatts when operating at a capacity factor of up to 90%.

51. Expansion and upgrade of the development, as defined under condition 50 of this consent shall be undertaken generally in accordance with *Statement of Environmental Effects: Mount Piper Power Station Units 1 and 2 Upgrade*, prepared by Connell Wagner PPI and dated December 2005.

Air Quality Impacts

52. The Applicant shall design, construct, commission, operate and maintain the expanded and upgraded development to ensure that the concentration of each pollutant listed in Table 1 does not exceed the maximum allowable discharge concentration for that pollutant when measured at discharge monitoring point 11 and 12 (as defined under the Environment Protection Licence (No. 766) for the site). For the purpose of monitoring and determining compliance with this condition, "dioxins and furans" shall be polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF), presented as 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD) equivalent and calculated in accordance with the procedures included in Part 4, clause 29 of the *Protection of the Environment Operations (Clean Air) Regulation 2002.*

Table 1 – Maximum Allowable Discharge Concentration Limits (Air)

Pollutant	Maximum Allowable Discharge Concentration Limit	Reference Conditions
Nitrogen dioxide (NO_x) or nitric oxide (NO) or both	1500 mgm^{-3}	dry, 273K, 101.3 kPa, 7% O_2
Sulfuric acid mist (H_2SO_4) or sulfur trioxide (SO_3), or both, as (SO_3)	100 mgm^{-3}	dry, 273K, 101.3 kPa, 7% O_2
Solid particles	50 mgm^{-3}	dry, 273K, 101.3 kPa, 7% O_2
Total fluoride	50 mgm^{-3}	dry, 273K, 101.3 kPa, 7% O_2
Chlorine	200 mgm^{-3}	dry, 273K, 101.3 kPa, 7% O_2
Hydrogen chloride	100 mgm^{-3}	dry, 273K, 101.3 kPa, 7% O_2
Total of Sb, As, Cd, Pb, Hg, Be, Cr, Co, Mn, Ni, Se, Sn and V	1 mgm^{-3}	dry, 273K, 101.3 kPa, 7% O_2
Cadmium	0.2 mgm^{-3}	dry, 273K, 101.3 kPa, 7% O_2
Mercury	0.2 mgm^{-3}	dry, 273K, 101.3 kPa, 7% O_2
Dioxins and furans	0.1 ngm^{-3}	I-TEQ, dry, 273K, 101.3 kPa, 11% O_2
Total volatile organic compounds	40 mgm^{-3} (as VOC) or 125 mgm^{-3} (as CO)	dry, 273K, 101.3 kPa, 7% O_2

53. The Applicant shall determine the pollutant concentrations and emission parameters specified in Table 2 below, at discharge monitoring points 11 and 12 (as defined under the Environment Protection Licence (No. 766) for the site), and employing the sampling

and analysis method specified. Monitoring shall be undertaken at the frequency specified in the Table.

Table 2 –Pollutant and Parameter Monitoring (Air)

Pollutant/ Parameter	Units of Measure	Frequency	Method
Nitrogen oxides	gm^{-3}	continuously	CEM-2
Sulfur dioxide	mgm^{-3}		CEM-2
Solid particles	mgm^{-3}	quarterly during the first 12 months following commissioning of Stage 1 and Stage 2, then annually or as otherwise specified by Environment Protection Licence conditions thereafter	TM-15
Sulfuric acid mist and sulfur trioxide (as SO_3)	mgm^{-3}		TM-3
Chlorine	mgm^{-3}		TM-7 & TM-8
Total fluoride	mgm^{-3}		TM-9
Hydrogen chloride	mgm^{-3}		TM-7 & TM-8
Total of Sb, As, Cd, Pb, Hg, Be, Cr, Co, Mn, Ni, Se, Sn and V	mgm^{-3}		TM-12, TM-13 & TM-14
Cadmium	mgm^{-3}		
Mercury	mgm^{-3}		TM-12, TM-13 & TM-14
Copper	mgm^{-3}		TM-12, TM-13 & TM-14
Dioxins and furans	ngm^{-3}		TM-18
Carbon dioxide	%		TM-24
Oxygen	%		CEM-3
Dry gas density	kgm^{-3}		TM-23
Moisture content	%		TM-22
Molecular weight of stack gases	$gmol^{-1}$		TM-23
Temperature	°C		TM-2
Velocity	ms^{-1}		TM-2
Volumetric flowrate	m^3s^{-1}		TM-2

54. Notwithstanding conditions 52 and 53, nothing in this consent relieves the Applicant from the requirement to comply with the Environment Protection Licence for the site issued under the *Protection of the Environment Operations Act 1997.* In the event that the Environment Protection Licence for the site is modified from time to time to be inconsistent with or more stringent than the requirements of this consent, the requirements of the Licence shall prevail over this consent to the extent of any such inconsistency.

Air Quality Performance Verification

55. Within 90 days of commissioning Stage 2 of the expanded and upgraded development, or as may be directed by the Director-General, and during a period in which the upgraded and expanded development is operating under design loads and normal operating conditions, the Applicant shall undertake a program to confirm the air emission performance of the development and update air quality modelling. The program shall include, but not necessarily be limited to:
    a) point source emission sampling and analysis subject to the requirements listed under condition 54;
    b) an update of the air quality impact assessment presented in *Statement of Environmental Effects: Mount Piper Power Station Units 1 and 2 Upgrade*, prepared by Connell Wagner PPI and dated December 2005, using actual air emission data collected under a). The assessment shall be undertaken strictly in accordance with the methods outlined in *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales* (DEC, 2005) and to meet the requirements of the DEC with respect to updating the air quality impact assessment;

c) a comparison of the results of the air quality impact assessment required under b) above, and the predicted air quality impacts detailed in *Statement of Environmental Effects: Mount Piper Power Station Units 1 and 2 Upgrade*, prepared by Connell Wagner PPI and dated December 2005; and

d) a comparison of the results of the air quality impact assessment required under b) above, and the impact assessment criteria detailed in *Approved Methods and Guidance for the Sampling and Analysis of Air Pollutants in New South Wales* (EPA, 2005).

A report providing the results of the program shall be submitted to the Director-General and the DEC with 28 days of completion of the testing required under a).

Construction Environmental Management

56. Prior to the commencement of construction of each Stage of the expanded and upgraded development, the Applicant shall prepare and implement a Construction Environmental Management Protocol to outline environmental management practices and procedures to be followed during the construction of the development. The Protocol(s) shall be prepared in accordance with *Guideline for the Preparation of Environmental Management Plans* (DIPNR 2004) and shall focus on the management of erosion and sedimentation, dust, heavy vehicle movements and noise during the construction works.

Attachment 4

Modification of the Development Consent for Extension of the Existing Brine and Ash Co-placement Area, April, 2008

NSW GOVERNMENT
Department of Planning

Contact: Swati Sharma
Phone: (02) 9228 6221
Fax: (02) 9228 6355
Email: swati.sharma@planning.nsw.gov.au

Our ref: S90/01696

Mr Stephen Saladine
Delta Electricity
350 Boulder Road
PORTLAND NSW 2847

Dear Mr Saladine

Expansion of the Existing Brine and Ash Co-placement Area, Mount Piper Power Station, Lithgow (MOD-77-9-2007-i)

On 23 March 2008, the Executive Director, Major Project Assessments Division of the Department, approved the Modification Application for the expansion of the existing brine and ash co-placement area of the Mount Piper Power Station. I have attached a copy of the Executive Director's approval for your information. The Executive Director's approval can also be viewed on the Department's website under "Notices of Determination" in the "Major Project Assessments" section.

If you are dissatisfied with this decision, section 96(6) of the *Environmental Planning and Assessment Act 1979*, gives you a right to appeal to the Land and Environment Court.

If you have any enquiries about the proposal, please contact Swati Sharma on 9228 6221 or via email at swati.sharma@planning.nsw.gov.au.

Yours sincerely

Scott Jeffries
Director
Major Infrastructure Assessments

28/03/08

Bridge St Office 23-33 Bridge St Sydney NSW 2000 GPO Box 39 Sydney NSW 2001
Telephone (02) 9228 6111 Facsimile (02) 9228 6191 DX 10181 Sydney Stock Exchange
Website www.planning.nsw.gov.au

Modification Approval

Section 96(2) of the *Environmental Planning and Assessment Act 1979*

I, the Executive Director, Major Project Assessments Division of the Department of Planning, in accordance with the Instrument of Delegation issued by the Minister for Planning, on 19 December 2007, pursuant to section 96(2) of the *Environmental Planning and Assessment Act 1979*, modify the development consent referred to in Schedule 1 in the manner set out in Schedule 2.

Chris Wilson
Executive Director
Major Project Assessments
As delegate for the Minister for Planning

Sydney 23 MARCH 2008 File No: S90/01696

SCHEDULE 1

Development consent:	granted by the Minister for Planning and Environment on 1 April 1982.
In respect of:	Lot 1 DP 325532, Lot 1 DP 400022, Lot 15 DP 626299, Part Lot 191 DP 629212, Lot 2 DP 702619, Lots 362 and 366 DP 740604, Part Lot 10 and Lots 18, 59, 260 and 261 DP 751636, Part Lot 1 DP 803655, Lots 1-7 and Part Lot 13 DP 804929, Lot 1 DP 813288, Lot 1 DP 816420, Lots 40, 41 and 46-52 DP 827626, Lot 1 DP 829065, Lot 21 DP 832446 and Lot 1 DP 920999.
For the following:	The construction and operation of a power station known as Mount Piper Power Station
Modification Application:	Modification of the development consent to extend the brine and ash co-placement area.

SCHEDULE 2

The development consent is modified by:

1) Inserting the following conditions immediately after Condition 38

Extension of the Existing Brine and Ash Co-placement Area

38 A Notwithstanding the provisions of Condition No. 38, the brine and ash co-placement area may be extended and shall be undertaken generally in accordance with the *Statement of Environmental Effects: Mount Piper Power Station Extension of Brine Conditioned Ash Placement Area*, prepared by Connell Wagner Pty Ltd and dated June 2007. This includes:

I. The extended area must lie within the existing ash placement area;
II. Co-placement activities in the proposed extended area must use existing facilities and methods;
III. The placement of brine conditioned ash may only occur between the levels of RL 946 metres (the end-point of the water conditioned ash layer) and RL 980 metres.

38 B The groundwater and surface water monitoring programs required by Condition No. 40 and 41 apply to the extension of the brine and ash co-placement area, permitted by Condition 38 A.

38 C The Applicant must update the Water Management Plan (WMP) required by Condition No. 43, and obtain the approval of the Director-General for the update, prior to undertaking any works permitted by Condition No. 38 A. In determining whether to grant approval, the Director-General must consult with the Department of Environment and Climate Change, the Sydney Catchment Authority, the Department of Water and Energy, and Council.

38 D The spray irrigation system of the ash disposal area must be automated to operate when conditions indicate the potential for dust movement to occur, with a manual override function, in order to reduce the likelihood of non-compliant dust emissions from the ash placement area. The implementation of the automated system must occur no later than 30 June 2008 or as otherwise agreed by the Director-General.

2) Replace Condition 47 with the following:

47 The Groundwater Modelling Report shall be an update of the groundwater modelling presented in the *Mount Piper Power Station Extension of Brine Conditioned Ash Placement Area - Statement of Environmental Effects* (dated June 2007). The report must also employ the results and analyses of the Water Monitoring Programs to calibrate the groundwater contaminant transport model. The Groundwater Modelling Report shall be prepared by a qualified person approved by the Director-General or relevant Authority.

Attachment 5:
Bilfinger Berger Services Ash Placement Area - Daily Inspection Record Sheet

ASH PLACEMENT AREA - DAILY INSPECTION RECORD SHEET

Site : MT PIPER

Date:

Inspected by:

Wind Speed, Direction and Temperature						
Wind speed	Nil	Light	Moderate	Strong	Reading	Comment
Windspeed meter reading (km/hr)						
Temperature reading (deg celcius)						
Wind direction						
Irrigation Rates						
Weather Conditions	>25° >20km/hr	15-24° <20km/hr	15° <20km/hr	Pump start time	Pump stop time	Total Irrigation Hrs
Sprinkler hours/day	10	8	6			
Rainfall (mm)						
On the Pad (mm)						
At the crib hut (mm)				Ref APA log		
On the western batter (mm)						
Water Usage (Pumps and meters)						
Pump	*Service area*	*Hours*		*Volume (L)*	*Comment*	
Return Water Pump Blue	NA pads					
Return Water Pump Yellow	Brine area					
HP Pump	Bottom ash & haul roads					
HP Pump at silo	To calculate APA use					
Water at the bins	Fly ash moisture content					
Water cart fill point	Gravity					
Water cart fill point	Pump					
Piezometer Readings						
BH2/1:		BH2/2:				
BH3/1:		BH3/2:				
BH4/1:		BH4/2:				
BH5/1:		BH5/2:				
Environmental conditions						
		OK (y/n)	Comment			
Bottom ash tipping area						
Emergency pad						
Working pad						
Perimeter drains in place & functioning						
Internal haul road drains						

Brine dam (s)		
Surface water drainage on pads		
Water seepage through bund wall (external perimeter)		
Presence of fugitive dust		
If dust present: how much?		
Which areas dusting up?		
Sprinkler operation		
Number of water carts operating		
Actions - Notes - General		