



## Appendices



## Appendix 1: Water Licence Report 03-04

***MACQUARIE GENERATION  
WATER MANAGEMENT LICENCE  
  
ANNUAL MONITORING AND  
COMPLIANCE REPORT  
  
YEAR ENDING 30<sup>TH</sup> JUNE 2004***

**MACQUARIE GENERATION - DLWC WATER MANAGEMENT LICENCE**

**ANNUAL MONITORING AND COMPLIANCE REPORT**

**FOR YEAR ENDING 30<sup>TH</sup> JUNE 2004**

PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_

MAL ROTHE  
ENVIRONMENT OFFICER  
BAYSWATER POWER STATION

REVIEWED BY \_\_\_\_\_ DATE \_\_\_\_\_

ERROL BURTON  
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BAYSWATER POWER STATION

APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

JOHN NEELY  
MANAGER  
BAYSWATER POWER STATION

## **MACQUARIE GENERATION - DLWC WATER MANAGEMENT LICENCE**

### **ANNUAL MONITORING AND COMPLIANCE REPORT**

#### **FOR YEAR ENDING 30<sup>TH</sup> JUNE 2004**

This report details the results obtained from monitoring associated with activities carried out under the Water Management Licence issued to Macquarie Generation by the Department of Land and Water Conservation on behalf of the Water Administration Ministerial Corporation on 11<sup>th</sup> December 2000.

The report is required under Clauses 8.8 and 8.9 of the Licence, which states;

- 8.8 Macquarie Generation must, within 60 days of the commencement of each new financial year (commencing 2001/2002), submit *an Annual Monitoring and Compliance Report*.
- 8.9 The report must contain, but need not be limited to the following:
- (a) an overview of Macquarie Generation's water management and supply activities associated with the water sources and water management works included in Schedule 2;
  - (b) an updated scale map depicting the location of all water sources, water management works, bulk water supply infrastructure (eg pipelines and canals), sampling sites and gauging stations and the monitoring program at each site (to be tabulated or described separately);
  - (c) a brief description of the methodologies used to collect and analyse samples and measure stream flows with detailed procedures (eg sampling method and frequency, analytical methods, quality assurance and control system) to be provided as a separate appendix to the report;
  - (d) the presentation of all monitoring data, including interpretation and trend analysis of that data, to demonstrate the extent of compliance with the requirements of this Licence, for each financial year commencing the year after the issue of this licence; and
  - (e) a summary of all non-compliance events associated with the requirements of this licence, for each financial year commencing from the issue of this licence.

## **1. WATER MANAGEMENT AND SUPPLY ACTIVITIES DATA**

This portion of the report satisfies Clause 8.9 (a) of the Licence. It also partially satisfies Clause 8.9 (c) with regard to methodology of streamflow measurement

### **1.1 Liddell Cooling Water Dam**

Outputs:

Bayswater CW Make-up	3,972 ML
Hunter River Salinity Trading Scheme	0 ML
Forced Evaporation	15,998 ML
Natural Evaporation	<u>10,015 ML</u>
	29,985 ML

Input:

Water Input to Liddell Dam	*1	32,102 ML
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\*1 This volume is a combination of Supplementary (Off-allocation) water pumped directly from the Hunter River, transfers from Macquarie Generation's Plashett Dam, cooling tower blowdown from Bayswater and the Net Natural Flow. See 1.2 and 1.3 below.

The Net Natural Flow is the net water movement that can be attributed to a combination of natural evaporation, seepage and natural inflows.

Monthly levels and capacities of the Liddell Cooling Water Dam are shown in Appendix A. As detailed in Appendix A the level in the Liddell Cooling Water Dam rose by 2,117 ML over the period. This is also reflected in the difference between the output and input figures above.

A diagram showing a water balance flowsheet for the Macquarie Generation water management system including Lake Liddell is also shown in appendix A.

Methodology of measurement of extraction and input volumes is outlined in Appendix C.

### **1.2 Plashett Dam**

Plashett Dam is used to supply water when Macquarie Generation's high security, Barnard or supplementary entitlements are not being pumped from the Hunter River.

During the period outflows from Plashett Dam, exceeded inflows, resulting in a decrease of 8,700 ML in the storage level over the year.

A diagram showing a water balance flow sheet for the Macquarie Generation water management system including Plashett Dam is also shown in Appendix A.

Methodology of measurement of extraction and input volumes is outlined in Appendix C.

### **1.3 Domestic Water Dam**

The Domestic Water Dam stores all water used for domestic water purposes at both Bayswater and Liddell Power stations. During the year inputs to the dam exceeded usage by 419 ML resulting in a net increase in the water held in the dam.

#### **1.4 Bayswater Cooling Water Make Up Dam**

The Bayswater Cooling Water Make Up Dam stores water ready for use as a make up to the four Bayswater hyperbolic cooling towers. During the year inputs from the Hunter River and Lake Liddell balanced the usage from forced evaporation from the towers and natural evaporation from the dam.

#### **1.5 Low Pressure Pumping Station Weir and Pumping Station**

A total of 51,087 ML of water was extracted from the Hunter River in the period July 2003 to June 2004. This was made up of the following classifications:-

Major Water Utility	40,322 ML
High Security	50 ML
Low Security	984 ML
Off-allocation	9,731 ML
Total	51,087 ML

Extraction volumes are measured directly by flow measurement instrumentation.

#### **1.6 Barnard Scheme**

A total of 3,320 ML of water was extracted from the Barnard River during the period. At the end of the period this amount was being held in Glenbawn Dam

## **2. WATER QUALITY AND ENVIRONMENTAL MONITORING DATA**

This portion of the report satisfies Clauses 8.9 (c) & (d) of the licence.

### **2.1 Methodologies**

Appendix C contains a description of the methods and procedures used to collect and analyse samples. Samples are collected and analysed in accordance with established Australian Standards (AS) and American Public Health Association (APHA) Standard Methods for the Examination of Water and Wastewater.

### **2.2 Biological Monitoring**

Schedule 4 of the Licence provides for Biological Monitoring including full algal identification and monthly counting whenever algae are visually apparent in Freshwater Reservoir Storage's.

Routine daily inspections of the four Freshwater Storage's (ie Lake Liddell, Plashett Dam, Freshwater Dam, CW Make Up Dam) have indicated no instances of algal blooms.

### **2.3 Lake Liddell Monitoring**

Monthly Lake Liddell water quality monitoring results are shown in Appendix A. The results show a consistent water quality over the year with an average of 2093  $\mu$ S/cm. All individual monthly results are within 2 standard deviations of the average.

### **2.4 Groundwater Monitoring**

Appendix C shows the results obtained from Groundwater monitoring carried out on the following locations :-

- down slope of Bayswater Pikes Gully Ash Storage Dam (GM2D7),
- down slope of Lime Softening Plant Sludge Lagoons (GM1D7),

- down slope of Lake Liddell (GM1D15) and
- down slope of Brine Concentrator Decant Basin (GM1D10).

Samples were not obtained from the Ravensworth Void Ash Disposal Site as underground heat does not permit samples to be taken. Information from Narama and from our own monitoring is that there is no water flow from the void area into their adjoining open cut.

Individual analyte charts showing the analysis carried out since the issue of the licence are also included and these are compared against the guidelines for irrigation and livestock water quality from “*Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000*” published by the Australian and New Zealand Environment and Conservation Council and the Agriculture and Resource Management Council of Australia and New Zealand. It should be noted that in each case the charts are based on total analyte values.

The results show that Copper, Chromium, Lead, Zinc and Arsenic for the 4 monitoring sites are well below the trigger values for short term (<20 years) use in irrigation water (IrrSTV), long term (<100 years) use in irrigation water (IrrLTV) and for livestock drinking water (L’stockTV). It is also shown that on average, Selenium is below the IrrSTV, IrrLTV and the L’stockTV. Many of the results for Selenium are below the analytical LOR and are therefore expressed as half the LOR (ie 0.01 mg/l). The results for Aluminium indicate that all values were below the IrrSTV and below the IrrLTV and L’stockTV up until January 2004. Iron shows a similar level and rise at this time. Given that all other elements show a relatively consistent level and that these two are the only elements to show a rise at the time, it is problematic to suggest a cause at this stage. Both Manganese and Nickel results show that the groundwater is suitable for short term irrigation and livestock use, but not suitable for long term irrigation use.

The down gradient land that would be affected by any of the sites monitored are classified Class IV or VI grazing or Class VII timber cover and is not suitable for cultivation. It should also be noted that this land forms part of Macquarie Generation holdings.

The tabulated results in Appendix C indicate the total and filtered results for each analyte. Although only limited data is available the results indicate that Iron (Fe) and Aluminium (Al) are predominantly insoluble species while Copper (Cu), Chromium (Cr), Lead (Pb), Zinc (Zn) and Nickel (Ni) are predominantly soluble. Insufficient data is available to attempt to classify Manganese(Mn), Arsenic (As) and Selenium (Se).

## **2.5 Streamflow Monitoring**

### **2.5.1 Bayswater Creek**

Appendix B details water quality and quantity data on discharges made from Lake Liddell into Bayswater Creek under the conditions of the Hunter River Salinity Trading Scheme. A total of zero megalitres was discharged during the year.

### **2.5.2 Hunter River**

Appendix D details the Hunter River water conductivity and flow data, upstream and downstream of the confluence of Bayswater Creek and the Hunter River, as required in Schedule 4. This data is collected and assembled by the DLWC.

The data shows typical river behaviour with flow dependant on rainfall and conductivity falling on increasing river flow following an initial high conductivity as salt is washed into the river.

### **3. COMPLIANCE**

Clause 8.9 (e) provides for the reporting of non-compliance events associated with the requirements of this licence.

All conditions of the licence have been complied with.

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**APPENDICES**

- A Lake Liddell Monitoring Results and System Water Balance
- B Hunter River Salinity Trading Scheme Discharges
- C Groundwater Monitoring Results
- D Methods and Procedures
- E Hunter River Flow and Conductivity Data
- F Scale Map of Bayswater/Liddell Site Facilities.
- G Scale Maps of Barnard Scheme Facilities

**Liddell Cooling Pond Dam Monitoring Results.**

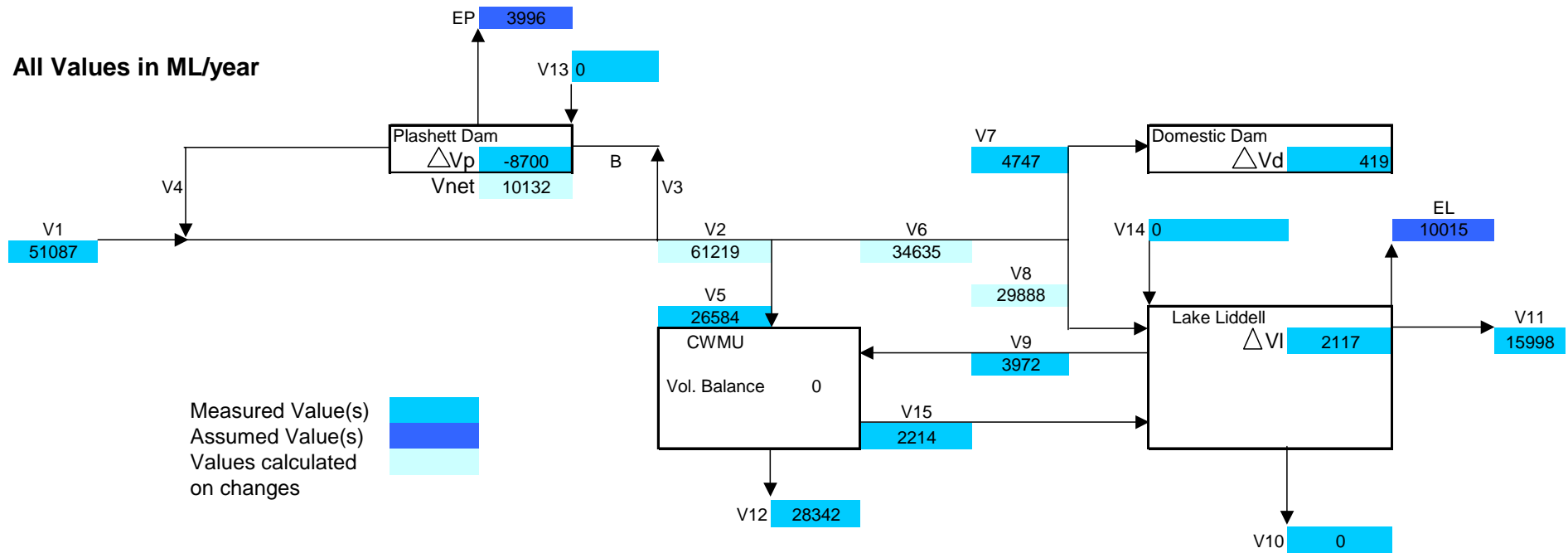
***Water Quality Monitoring Results***

<b>Month</b>	<b>Date of Test</b>	<b>Conductivity uS/cm</b>	<b>Temperature °C</b>
July 03	16/7/03	2120	15.4
August 03	20/8/03	2100	15.9
September 03	10/9/03	2040	16.9
October 03	8/10/03	2100	18.6
November 03	5/11/03	2060	21.8
December 03	17/12/03	2060	24.0
January 04	7/1/04	2080	26.6
February 04	41/2/04	2080	27.7
March 04	3/3/04	2090	25.4
April 04	14/4/04	2140	23.8
May 04	5/5/04	2120	20.6
June 04	2/6/04	2120	17.5

***Levels and Capacities***

<b>Month</b>	<b>Capacity ML</b>	<b>Level Feet</b>
July 03	134,671	-
August 03	139,154	422.00
September 03	140,665	422.45
October 03	141,098	422.60
November 03	142,075	422.90
December 03	142,511	423.00
January 04	144,478	423.60
February 04	139,154	422.00
March 04	139,154	422.00
April 04	140,449	422.40
May 04	138,509	421.80
June 04	135,732	421.00

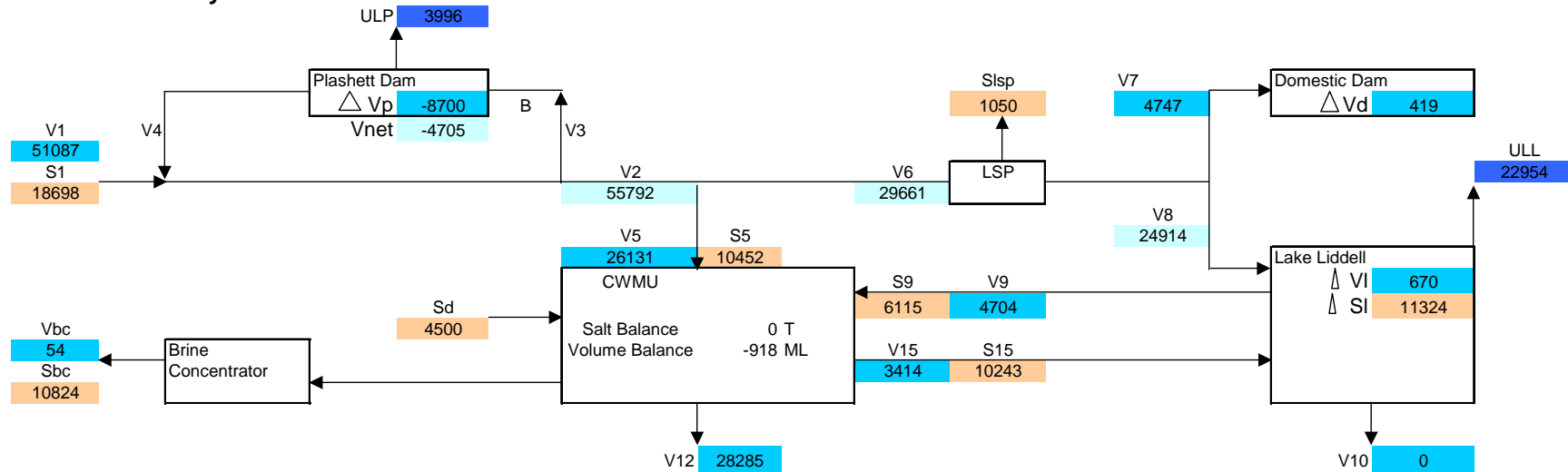
Figure 1: Macquarie Generation Water Balance Flowsheet



**Legend**

- |              |  |     |   |
|--------------|--|-----|---|
| EL           | Natural evaporation from Lake Liddell              | V6  | Sum of flows into Lake Liddell and Domestic dam     |
| EP           | Natural evaporation from Plashett Dam              | V7  | Net Flow into Domestic Water dam                    |
| $\Delta V_p$ | Volume Change in Plashett Reservoir                | V8  | Net Flow into Lake liddell                          |
| $\Delta V_l$ | Volume Change in Liddell Reservoir                 | V9  | Cooling Water Makeup to Bayswater from Lake Liddell |
| $\Delta V_d$ | Volume Change in Domestic Water Reservoir          | V10 | Hunter River Salinity Trading Scheme                |
| Vnet         | Net balance of Plashett dam                        | V11 | Forced Evaporation from Lake Liddell                |
| V1           | Inflow from Hunter River                           | V12 | Forced Evaporation from Bayswater                   |
| V2           | Water flow downstream from Plashett inlet spillway | V13 | Runoff into Plashett dam                            |
| V3           | Inflow to Plashett Dam                             | V14 | Runoff into Lake Liddell                            |
| V4           | Outflow from Plashett Dam                          | V15 | Blowdown to Liddell from Bayswater                  |
| V5           | Cooling Water Makeup to Bayswater                  |     |   |

**Figure 2: Macquarie Generation Salt/Water Balance Flowsheet**  
All Values in ML/year



Salt Tonnage  
Measured Value(s)  
Assumed Value(s)  
Values calculated on changes

**Legend**

- ULP Unaccounted Losses from Plashett Reservoir
- ULL Unaccounted Losses from Lake Liddell
- $\Delta V_p$  Volume Change in Plashett Reservoir
- $\Delta V_l$  Volume Change in Liddell Reservoir
- $\Delta S_l$  Salt Change in Liddell Reservoir
- $\Delta V_d$  Volume Change in Domestic Water Reservoir
- Vnet Net balance of Plashett dam
- V1 Inflow from Hunter River
- S1 Salt Input from Hunter River
- V2 Water flow downstream from Plashett inlet spillway
- V3 Inflow to Plashett Dam
- V4 Outflow from Plashett Dam
- V5 Cooling Water Makeup to Bayswater from River/Plashett
- S5 Salt to CWMU from River/Plashett
- V6 Sum of flows into Lake Liddell and Domestic dam
- V7 Net Flow into Domestic Water dam
- V8 Net Flow into Lake Liddell
- V9 Cooling Water Makeup to Bayswater from Lake Liddell
- S9 Salt Input to CWMU from Lake Liddell
- V10 Hunter River Salinity Trading Scheme
- V11 Forced Evaporation from Lake Liddell
- V12 Forced Evaporation from Bayswater
- V15 Blowdown to Liddell from Bayswater
- S15 Salt Input to Lake Liddell from Bayswater
- Sbc Salt removed via Brine Concentrator
- Vbc Brine Concentrator Waste
- Sd Salt added to CW system via chemical dosing
- Sisp Salt Removed via Lime Softening Plant

**APPENDIX B**

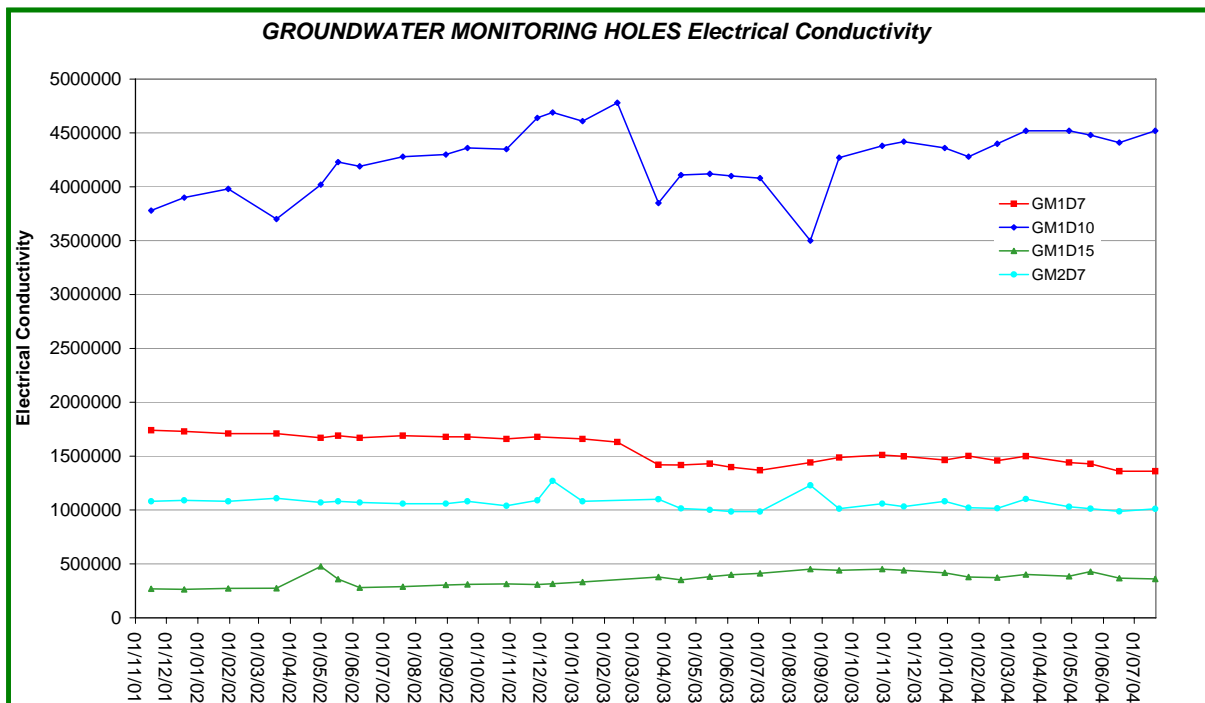
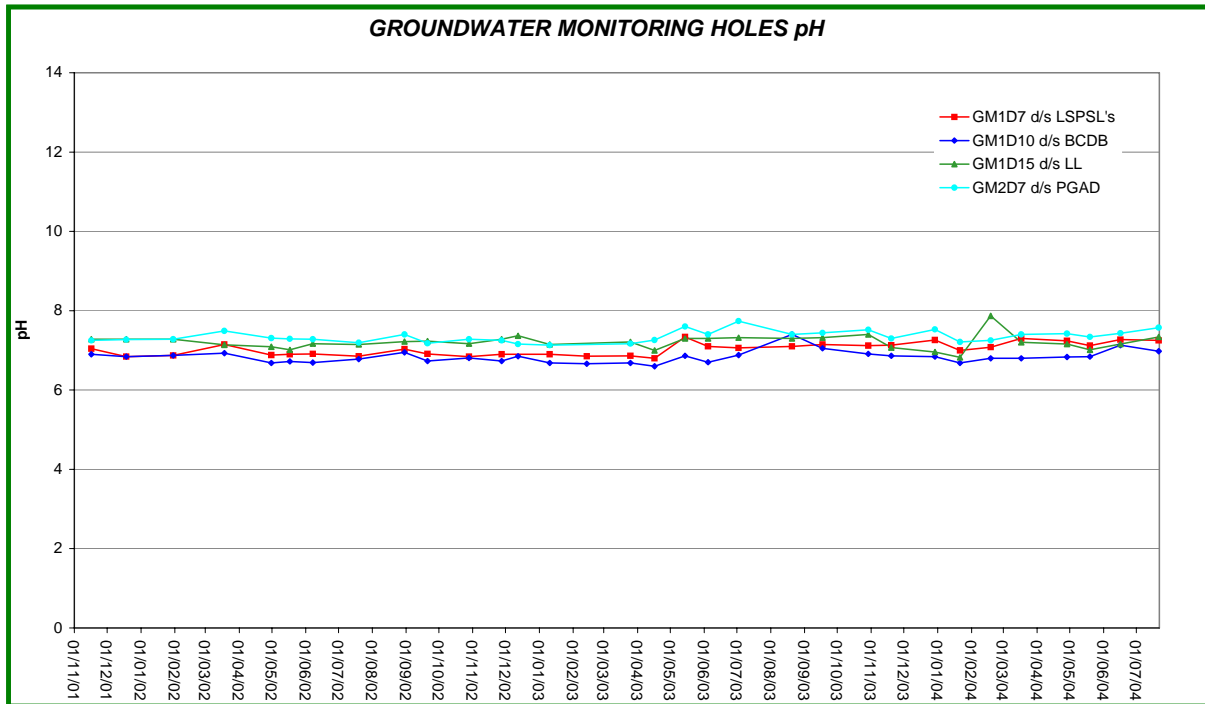
**Hunter River Salinity Trading Scheme Discharges**

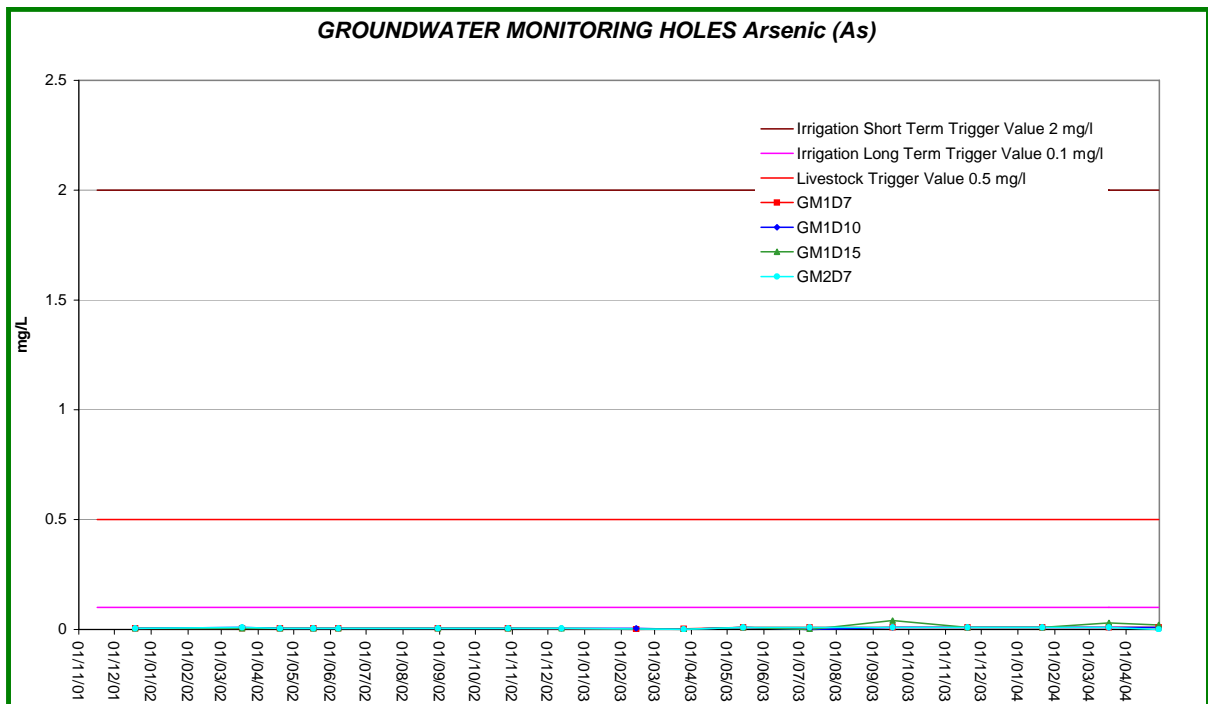
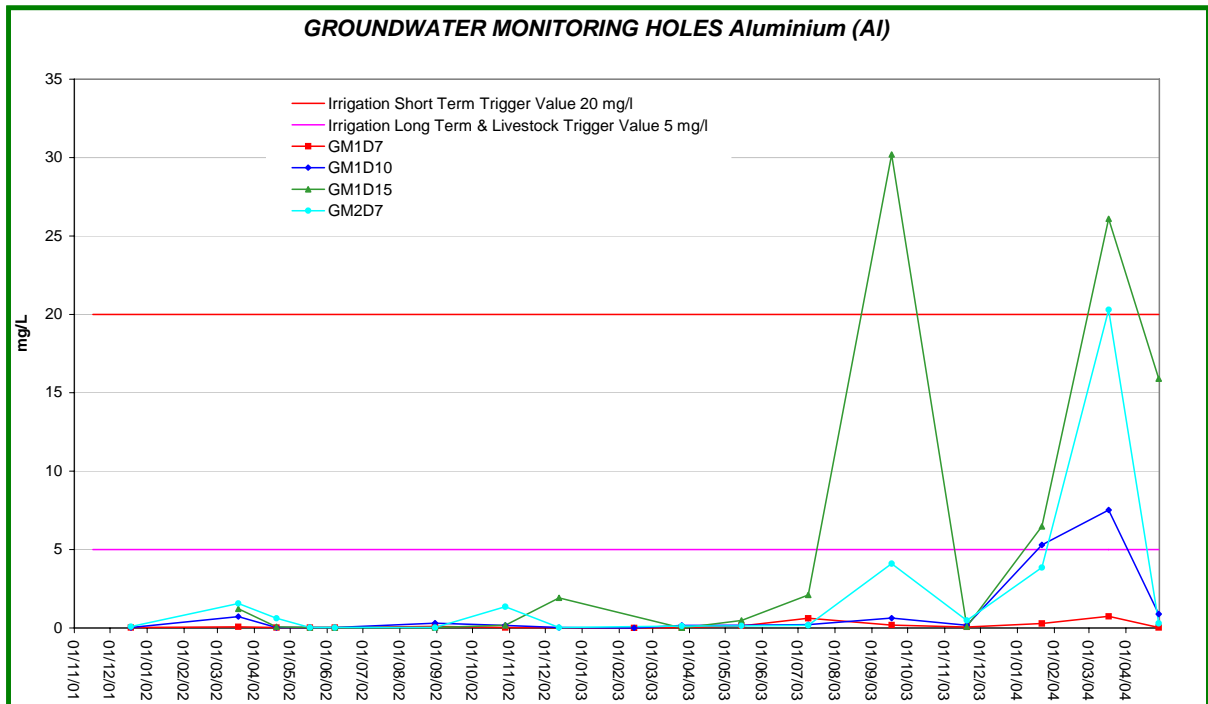
- 1. Discharge from Lake Liddell to Bayswater Creek under conditions of the Hunter River Salinity Trading Scheme.**

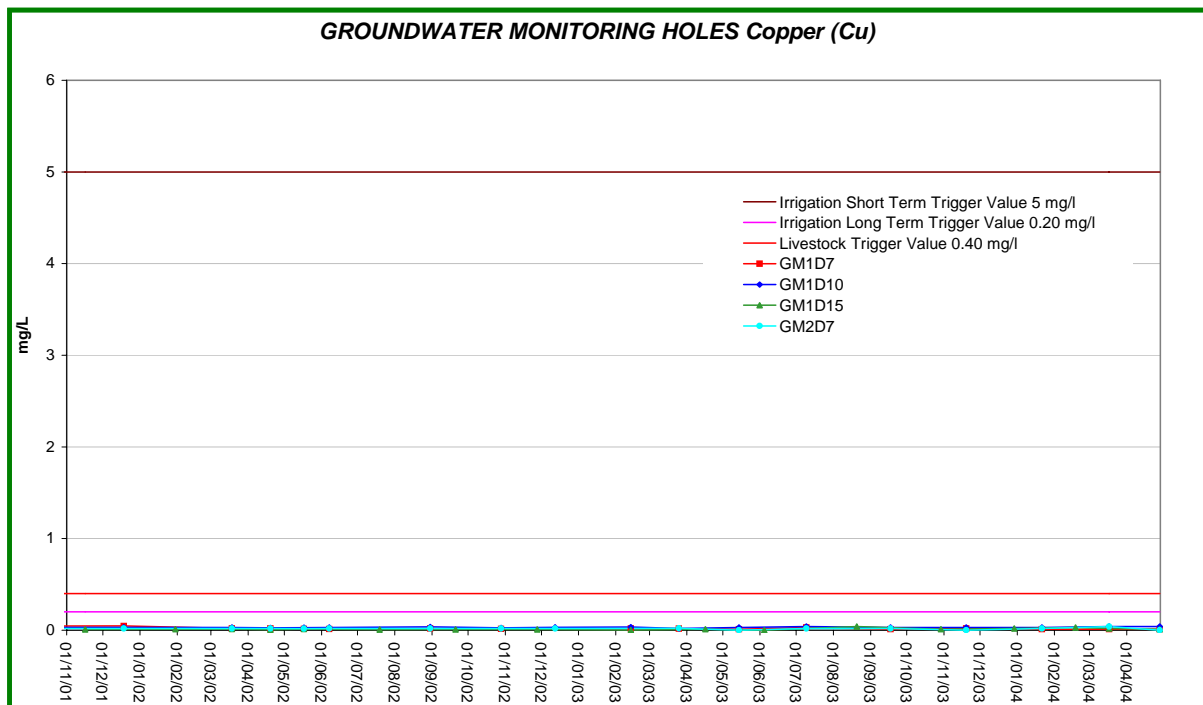
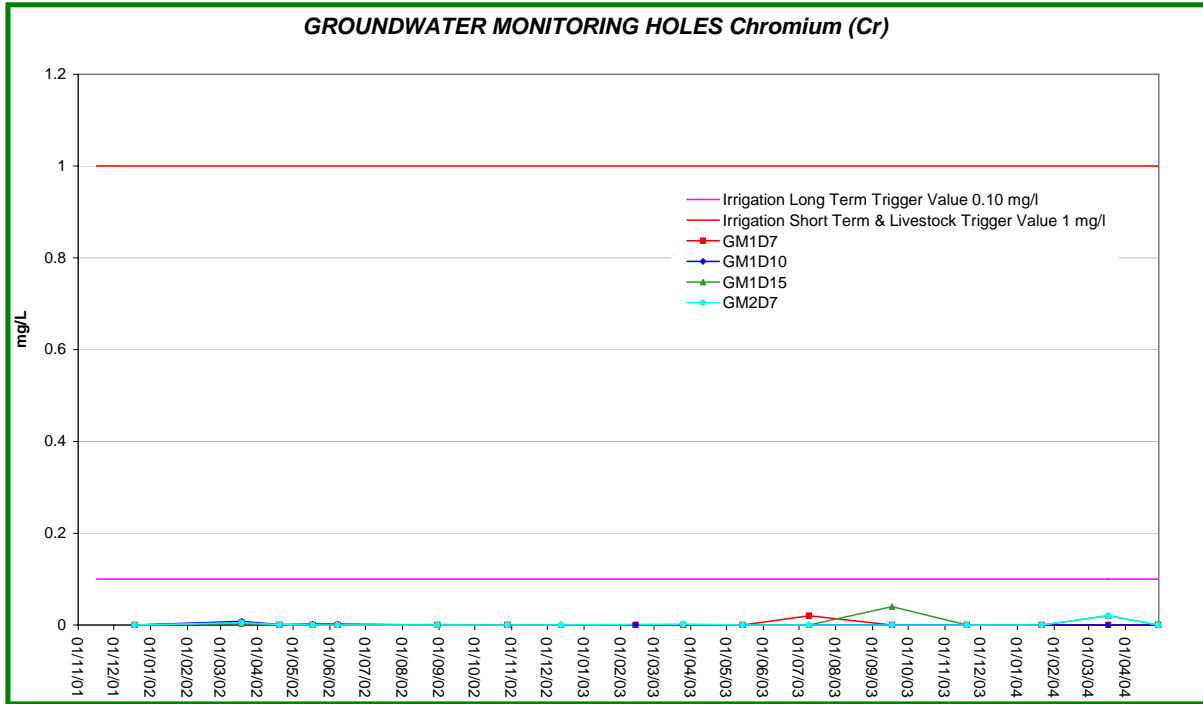
<b>Day of Discharge</b>	<b>Volume ML/Day</b>	<b>Conductivity US/M</b>
<b>No discharge during year</b>		

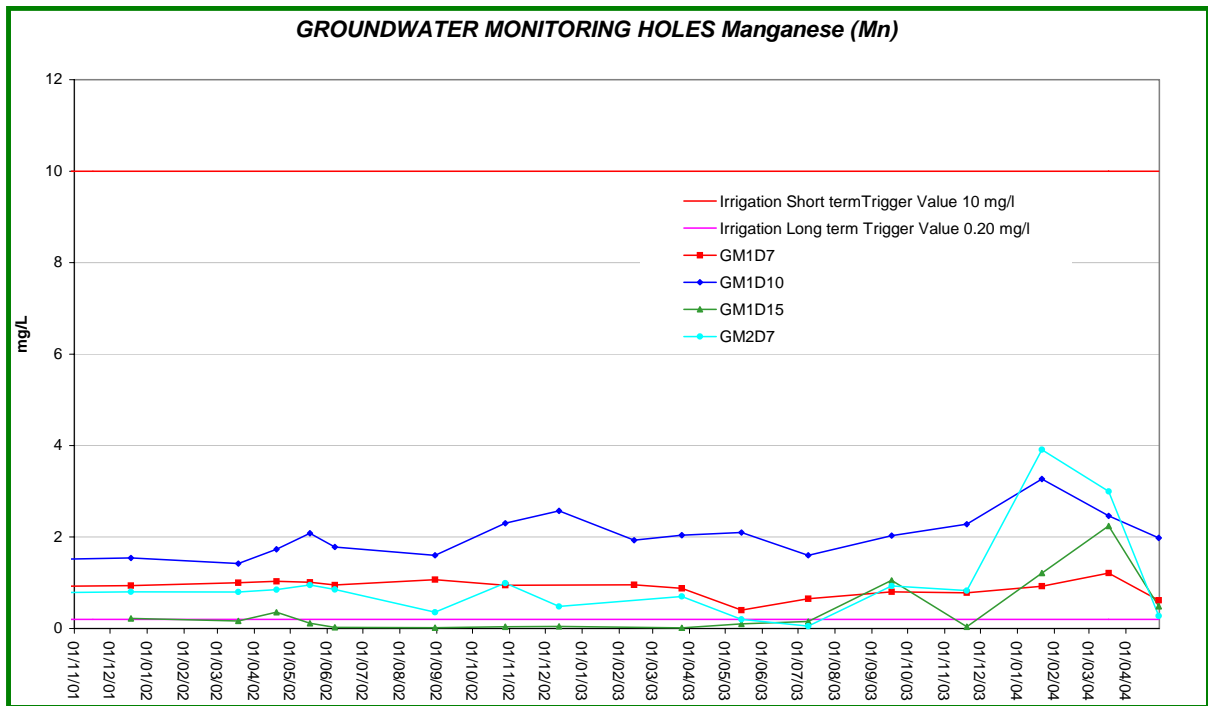
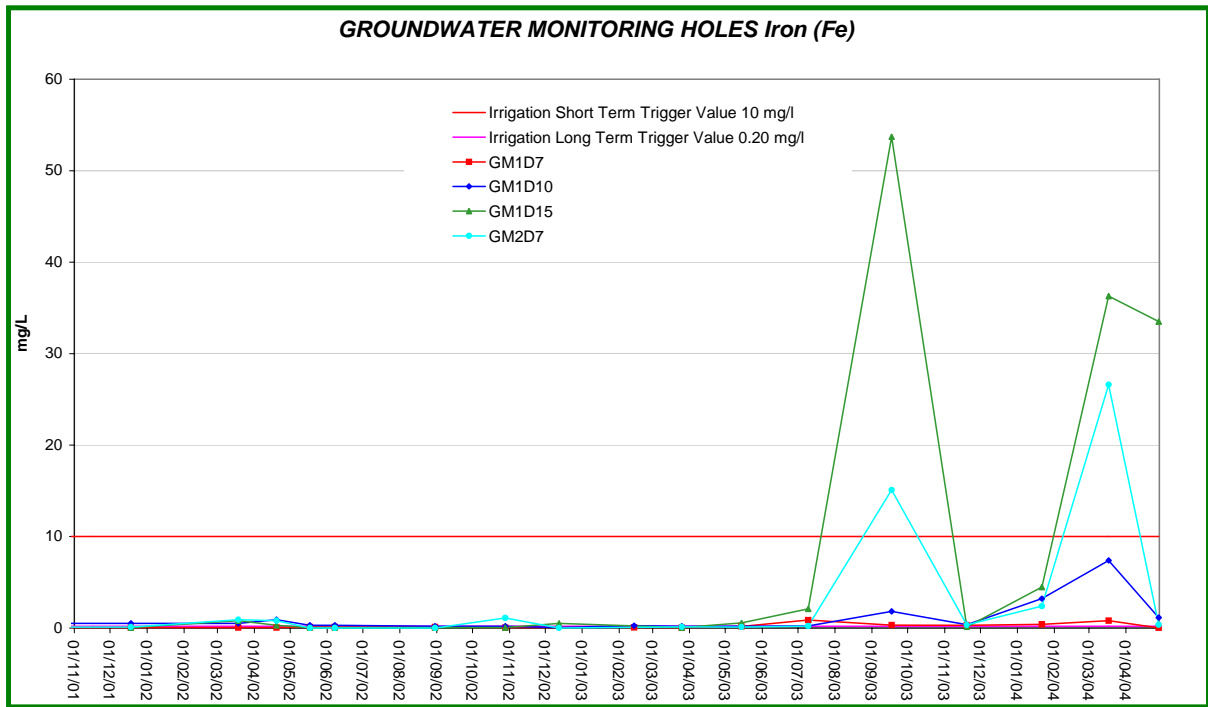
Note:- Data is based on actual date of discharge as distinct from the reporting of discharge under the Salinity Trading Scheme which is based on block dates.

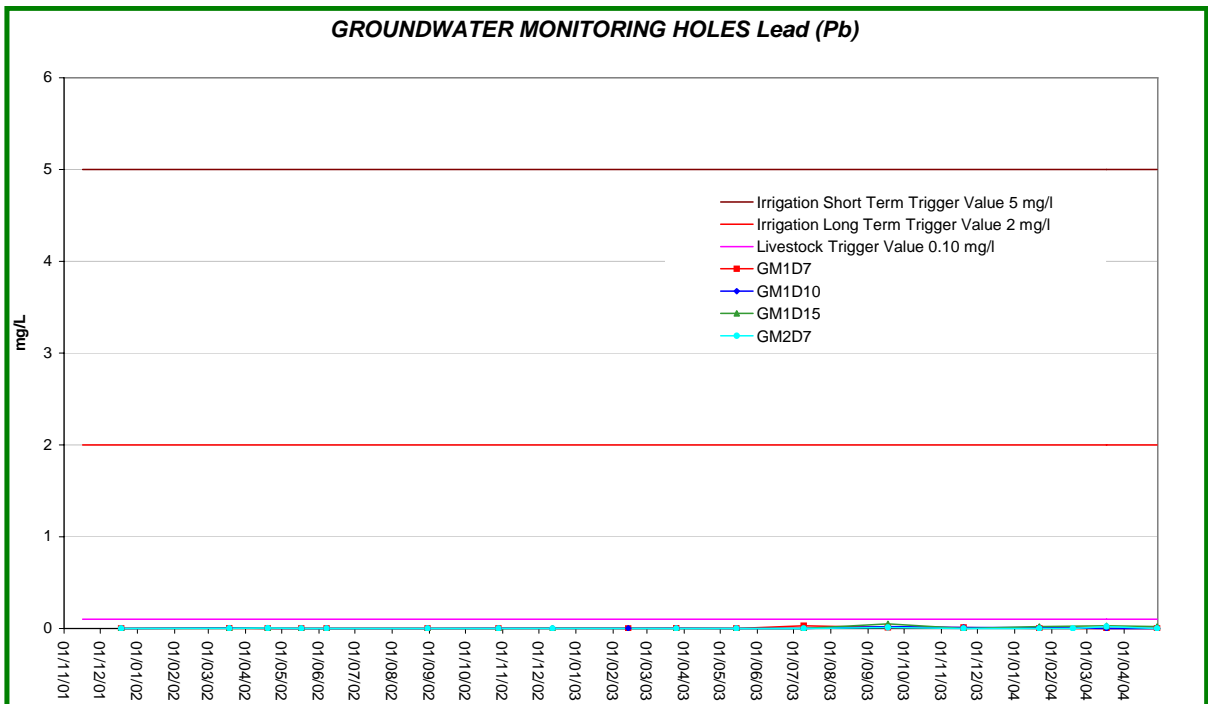
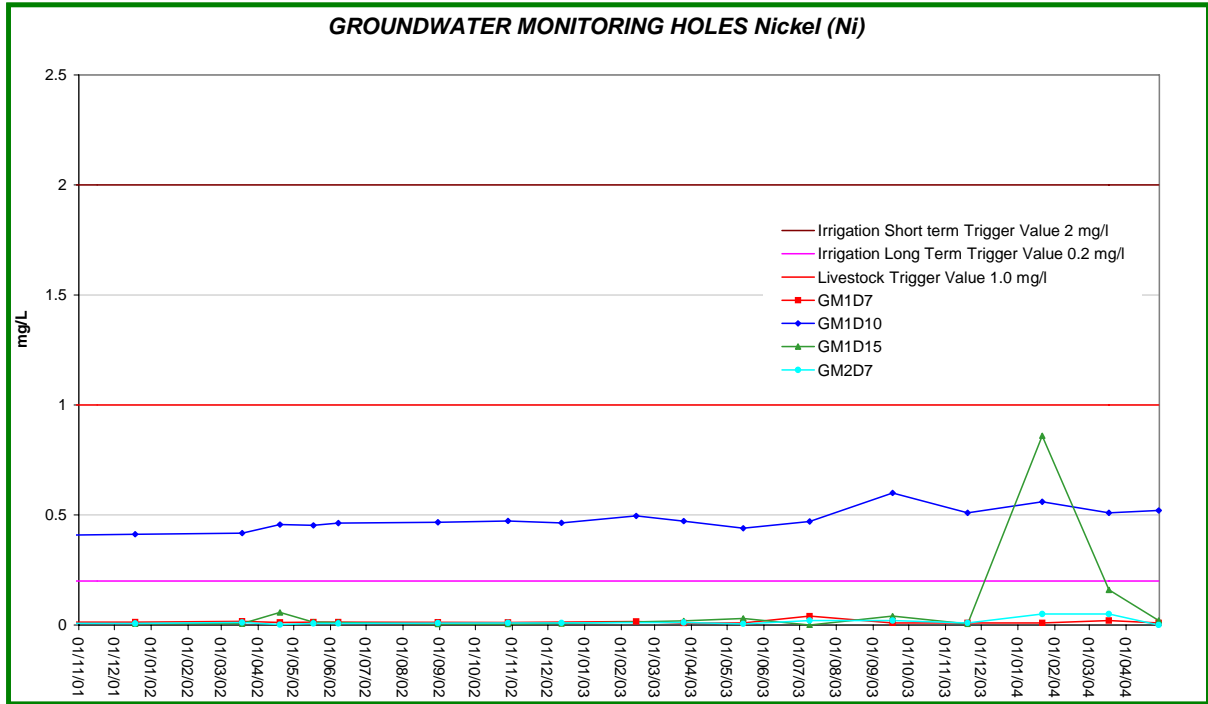
Groundwater Monitoring Results

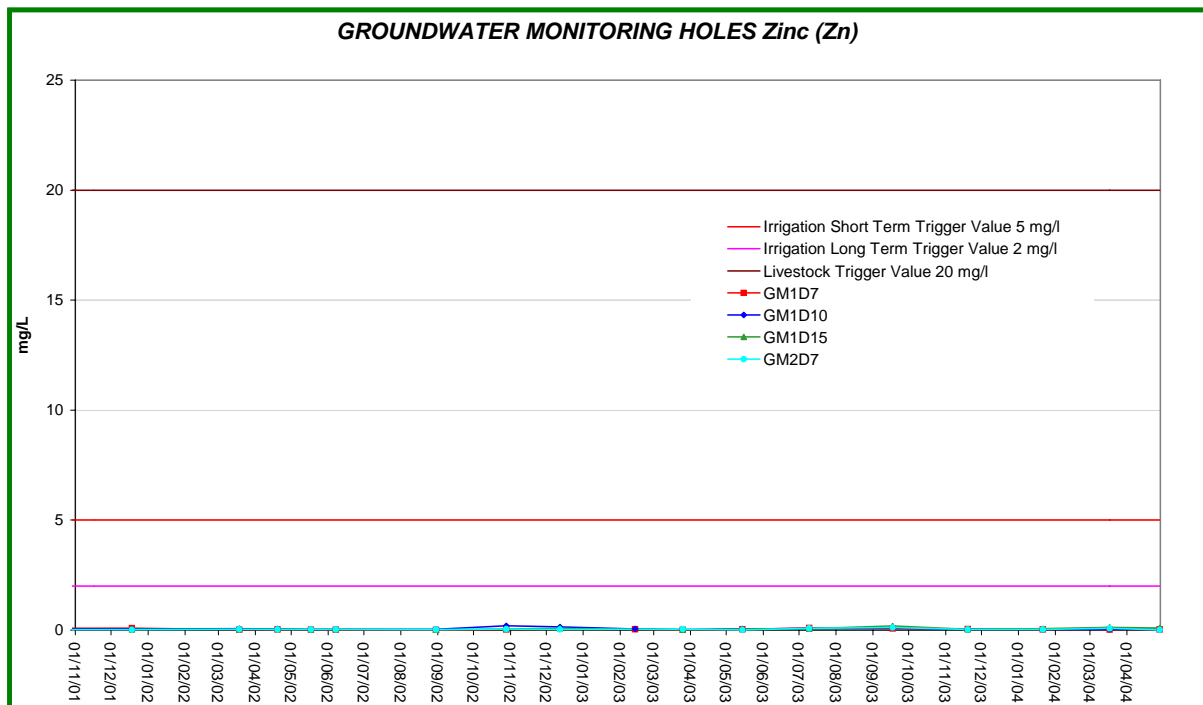
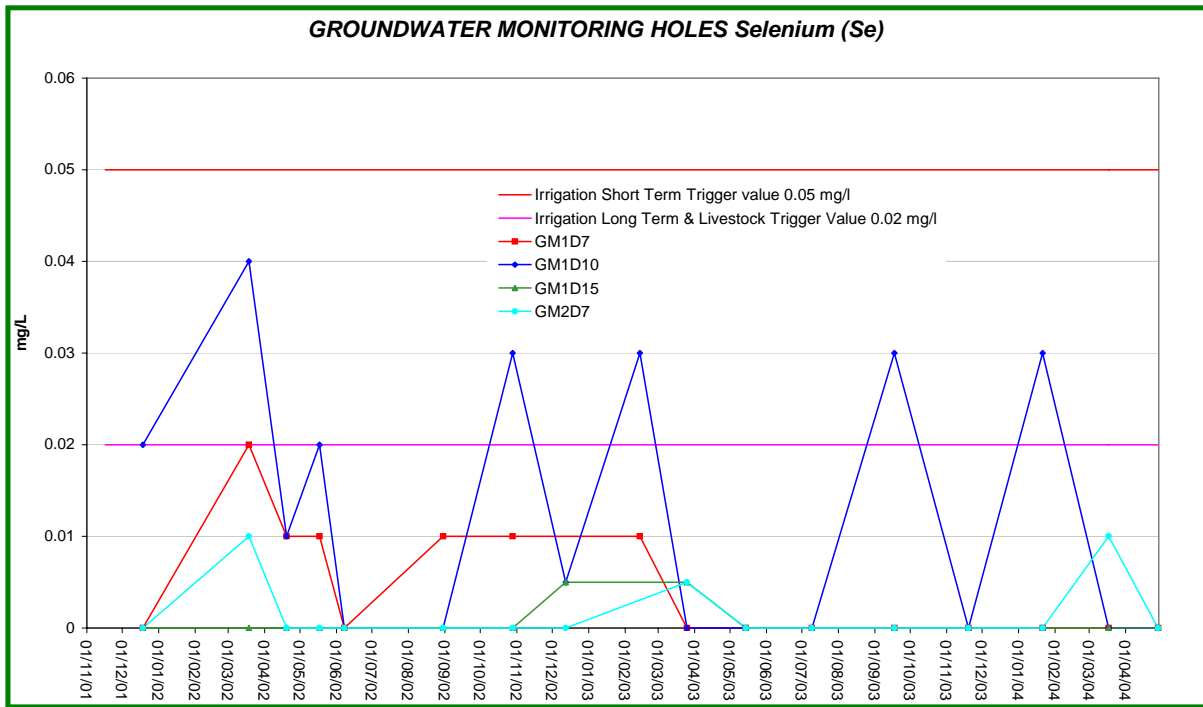












*Macquarie Generation DLWC Water Management Licence  
Annual Monitoring and Compliance Report ending 30<sup>th</sup> June 2004*

<b>BAYSWATER (GM1) GROUND WATER MONITORING</b>																							
Note: Less than detection limit values are indicated as zero or in red.																							
Location: BWGM1/D7 Downstream LSP Lagoons																							
SAMPLE	pH	EC	Fe		Cu		Cr		Mn		Pb		Al		Zn		As		Se		Ni		COMMENTS
			Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	
DATE		uS/m	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
16-Nov-01	7.0	1740000																					
18-Dec-01	6.8	1730000	0		0.047			0		0.939		0		0		0.085		0		0.000		0.013	
30-Jan-02	6.9	1710000																					
18-Mar-02	7.2	1710000	0		0.019			0.005		1		0.002		0.08		0.02		0		0.02		0.017	
30-Apr-02	6.9	1670000	0		0.02			0		1.03		0.001		0		0.03		0		0.01		0.011	
17-May-02	6.9	1690000	0.1		0.015			0		1.01		0		0		0.019		0		0.01		0.013	
07-Jun-02	6.9	1670000	0.1		0.013			0		0.949		0		0		0.017		0		0.000		0.013	
19-Jul-02	6.9	1690000																					
30-Aug-02	7.0	1680000	0.1		0.018			0		1.07		0		0.1		0.01		0		0.01		0.012	
20-Sep-02	6.9	1680000																					
28-Oct-02	6.8	1660000	0		0.014			0		0.945		0		0		0.023		0		0.01		0.011	
27-Nov-02	6.9	1680000																					
12-Dec-02																							
10-Jan-03	6.9	1660000																					
13-Feb-03	6.9	1630000	0.06		0.019			0		0.954		0.001		0.005		0.036		0.001		0.01		0.016	
25-Mar-03	6.9	1420000	0.05		0.017			0		0.879		0.003		0		0.01		0.003		0		0.009	
16-Apr-03	6.8	1418000																					
14-May-03	7.3	1430000	0.17		0			0		0.4		0		0.13		0.037		0		0		0.01	
04-Jun-03	7.1	1398000																					
02-Jul-03	7.1	1370000	0.87		0.03			0.02		0.65		0.03		0.62		0.096		0		0		0.04	
20-Aug-03	7.1	1440000																					
17-Sep-03	7.2	1487000	0.32		0			0		0.802		0.01		0.19		0.072		0		0		0.01	
29-Oct-03	7.1	1510000																					
19-Nov-03	7.1	1498000	0.29		0.02			0		0.781		0.01		0.06		0.041		0		0		0.01	
29-Dec-03	7.3	1464000																					
21-Jan-04	7.0	1502500	0.41		0			0		0.924		0		0.28		0.025		0		0		0.01	
18-Feb-04	7.1	1459000																					
17-Mar-04	7.3	1500000	0.8		0			0		1.21		0		0.74		0.02		0		0		0.02	
28-Apr-04	7.2	1440000	0	0	0	0.02		0	0	0.615	0.591	0	0	0.02	0	0.029	0.026	0	0	0	0	0.01 0.01	
19-May-04	7.1	1428000	0.18		0			0		0.26		0		0.04		0.02		0		0		0.01	
16-Jun-04	7.3	1360000																					
21-Jul-04	7.3	1360000	0.12	0	0	0		0	0	0.453	0.359	0	0	0.08	0.02	0.016	0.02	0	0	0	0	0	

*Macquarie Generation DLWC Water Management Licence  
Annual Monitoring and Compliance Report ending 30<sup>th</sup> June 2004*

<b>BAYSWATER (GM1) GROUND WATER MONITORING</b>																							
Note: Less than detection limit values are indicated as zero.																							
Location: BWGM1/D10 200 metres downstream BC Decant Basin																							
SAMPLE	pH	EC	Fe		Cu		Cr		Mn		Pb		Al		Zn		As		Se		Ni		COMMENTS
			Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	Total	Filt'd	
DATE		uS/m	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
16-Nov-01	6.9	3780000																					
18-Dec-01	6.8	3900000	0.5		0.031			0.000		1.54		0.001		0		0.053		0		0.02		0.412	
30-Jan-02	6.9	3980000																					
18-Mar-02	6.9	3700000	0.5		0.03			0.008		1.42		0.005		0.73		0.06		0.01		0.04		0.418	
19-Apr-02	6.7	4020000	0.9		0.025			0.001		1.73		0.002		0		0.05		0		0.01		0.456	
17-May-02	6.7	4230000	0.3		0.028			0.002		2.08		0.001		0		0.028		0		0.02		0.453	
07-Jun-02	6.7	4190000	0.3		0.03			0.002		1.78		0.001		0		0.037		0		0		0.463	
19-Jul-02	6.8	4280000																					
30-Aug-02	7.0	4300000	0.2		0.036			0		1.6		0		0.31		0.033		0		0		0.467	
20-Sep-02	6.7	4360000																					
28-Oct-02	6.8	4350000	0.2		0.026			0		2.3		0.003		0.16		0.194		0		0.03		0.473	
27-Nov-02	6.7	4640000																					
12-Dec-02	6.9	4690000	0.05		0.031			5E-04		2.57		0.003		0.025		0.14		0.005		0.005		0.464	
10-Jan-03	6.7	4610000																					
13-Feb-03	6.7	4780000	0.26		0.033			5E-04		1.93		0.002		0.005		0.051		0.005		0.03		0.496	
25-Mar-03	6.7	3850000	0.2		0.02			0		2.04		0.002		0.16		0.025		0		0		0.472	
16-Apr-03	6.6	4110000																					
14-May-03	6.9	4120000	0.19		0.03			0		2.1		0		0.17		0.046		0		0		0.44	
04-Jun-03	6.7	4100000																					
09-Jul-03	6.9	4080000	0.24		0.04			0		1.6		0		0.21		0.081		0		0		0.47	
20-Aug-03	7.4	3500000																					
17-Sep-03	7.1	4270000	1.82		0.03			0		2.03		0.02		0.63		0.097		0		0.03		0.6	
29-Oct-03	6.9	4380000																					
19-Nov-03	6.9	4420000	0.35		0.03			0		2.28		0.01		0.17		0.039		0		0		0.51	
29-Dec-03	6.8	4360000																					
21-Jan-04	6.7	4280000	3.21		0.03			0		3.27		0.01		5.29		0		0		0.03		0.56	
18-Feb-04	6.8	4400000																					
17-Mar-04	6.8	4520000	7.39		0.04			0		2.46		0		7.52		0.031		0		0		0.51	
28-Apr-04	6.8	4520000	1.15	0	0.04	0.03		0	0	1.98	1.87	0	0	0.89	0.000	0	0.000	0	0	0	0	0.52	0.49
19-May-04	6.8	4480000	1.36		0.04			0		2.57		0		0.09		0		0		0.02		0.49	
16-Jun-04	7.1	4410000																					
21-Jul-04	7.0	4520000	0.34	0	0	0	0.02	0	2.41	2.47	0	0.02	0.27	0	0	0	0	0	0	0	0	0.41	0.41

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<b>BAYSWATER (GM1) GROUND WATER MONITORING</b>																							
Note: Less than detection limit values are indicated as zero.																							
Location: BWGM1/D15 downstream of Lake Liddell, left abutment																							
SAMPLE DATE	pH	EC uS/m	Fe		Cu		Cr		Mn		Pb		Al		Zn		As		Se		Ni		COMMENTS
			Total mg/l	Filt'd mg/l	Total mg/l	Filt'd mg/l	Total mg/l	Filt'd mg/l	Total mg/l	Filt'd mg/l	Total mg/l	Filt'd mg/l	Total mg/l	Filt'd mg/l	Total mg/l	Filt'd mg/l	Total mg/l	Filt'd mg/l	Total mg/l	Filt'd mg/l	Total mg/l	Filt'd mg/l	
30-Nov-01	7.3	269000																					
18-Dec-01	7.3	264000	0.00		0.008		0		0.219		0.0000				0.025		0.000		0.000		0.006		
30-Jan-02	7.3	272000																					
18-Mar-02	7.1	274000	0.80		0.010		0.003		0.164		0.002		1.22		0.036		0.000		0.000		0.006		
19-Apr-02	7.1	477000	0.30		0.012		0		0.353		0.002		0.07		0.040		0.000		0.000		0.057		
17-May-02	7.0	359000	0.00		0.004		0		0.115		0.0000		0		0.034		0.000		0.000		0.013		
07-Jun-02	7.2	280000	0.00		0.012		0		0.027		0.0000		0		0.034		0.000		0.000		0.011		
19-Jul-02	7.2	289000																					
30-Aug-02	7.2	304000	0.00		0.006		0.001		0.018		0.0000		0		0.012		0.000		0.000		0.004		
20-Sep-02	7.2	310000																					
28-Oct-02	7.2	313000	0.00		0.008		0		0.037		0.0000		0.17		0.052		0.000		0.000		0.004		
27-Nov-02	7.3	308000																					
12-Dec-02	7.4	316000	0.50		0.009		5E-04		0.047		0.0020		1.92		0.077		0.005		0.005		0.007		
10-Jan-03	7.2	332000																					
18-Mar-03	7.2	378000	0.05		0.003		5E-04		0.014		0.0005		0.005		0.006		0.001		0.005		0.018		
30-Apr-03	7.0	352000																					
14-May-03	7.3	381000	0.54		0.000		0		0.100		0.0000		0.48		0.053		0.000		0.000		0.03		
04-Jun-03	7.3	399000																					
09-Jul-03	7.3	413000	2.08		0.000		0		0.154		0.0000		2.11		0.063		0.000		0.000		0		
20-Aug-03	7.3	452000																					
17-Sep-03	7.3	440000	53.7		0.040		0.04		1.050		0.0500		30.2		0.182		0.040		0.000		0.04		
29-Oct-03	7.4	451000																					
19-Nov-03	7.1	441000	0.12		0.000		0		0.039		0.0000		0.09		0.035		0.000		0.000		0		
29-Dec-03	7.0	418000																					
21-Jan-04	6.8	377400	4.47		0.020		0		1.210		0.0200		6.48		0.060		0.000		0.000		0.86		
25-Feb-04	7.9	372000																					
17-Mar-04	7.2	401000	36.30		0.030		0.02		2.240		0.0300		26.1		0.119		0.030		0.000		0.16		
28-Apr-04	7.2	385000	33.50	0.00	0.020	0.000	0	0	0.486	0.000	0.0200	0.0000	15.9	0	0.094	0.000	0.020	0.000	0.000	0.000	0.02	0.000	
19-May-04	7.0	428000	28.60		0.000		0		0.360		0.0100		1.73		0.031		0.000		0.000		0.02		
16-Jun-04	7.2	368000																					
21-Jul-04	7.3	360000	7.17	0.00	0.000	0.000	0	0	0.134	0.002	0.0100	0.0000	7.72	0.02	0.023	0.011	0.000	0.000	0.000	0.000	0	0	

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BAYSWATER (GM2) GROUND WATER MONITORING																							
Note: Less than detection limit values are indicated as zero																							
Location: BWGM2D7 200 metres downstream of Pikes Gully Ash Dam																							
SAMPLE DATE	pH	EC uS/m	Fe Total mg/l	Filt'd mg/l	Cu Total mg/l	Filt'd mg/l	Cr Total mg/l	Filt'd mg/l	Mn Total mg/l	Filt'd mg/l	Pb Total mg/l	Filt'd mg/l	Al Total mg/l	Filt'd mg/l	Zn Total mg/l	Filt'd mg/l	As Total mg/l	Filt'd mg/l	Se Total mg/l	Filt'd mg/l	Ni Total mg/l	Filt'd mg/l	COMMENTS
21-Nov-01	7.25	1080000																					
18-Dec-01	7.27	1090000	0.1		0.02		0.0000		0.801		0		0.09		0.018		0		0.000		0.007		
30-Jan-02	7.28	1080000																					
18-Mar-02	7.49	1110000	0.9		0.018		0.005		0.8		0.003		1.57		0.035		0.01		0.010		0.011		
19-Apr-02	7.31	1070000	0.8		0.02		0.001		0.849		0.004		0.61		0.023		0		0.000		0.002		
17-May-02	7.29	1080000	0		0.016		0		0.949		0		0		0.023		0		0.000		0.007		
07-Jun-02	7.28	1070000	0		0.02		0		0.853		0		0		0.022		0		0.000		0.007		
19-Jul-02	7.19	1060000																					
30-Aug-02	7.4	1060000	0		0.018		0		0.353		0		0		0.024		0		0.000		0.009		
20-Sep-02	7.18	1080000																					
28-Oct-02	7.3	1040000	1.1		0.02		0		0.993		0		1.36		0.045		0		0.000		0.01		
27-Nov-02	7.3	1090000																					
12-Dec-02	7.2	1270000	0		0.018		0		0.482		0		0.025		0.029		0		0.000		0.01		
10-Jan-03	7.1	1080000																					
18-Mar-03	7.2	1100000	0.12		0.022		0.002		0.699		0		0.12		0.048		5E-04		0.005		0.011		
16-Apr-03	7.3	1015000																					
14-May-03	7.6	1002000	0.11		0		0		0.2		0		0.13		0.009		0		0.000		0		
04-Jun-03	7.4	986000																					
02-Jul-03	7.7	986000	0.21		0.02		0		0.051		0		0.17		0.077		0		0.000		0.02		
20-Aug-03	7.4	1230000																					
17-Sep-03	7.4	1013000	15.1		0.02		0		0.928		0.01		4.1		0.115		0		0.000		0.02		
29-Oct-03	7.5	1060000																					
19-Nov-03	7.3	1032000	0.34		0		0		0.829		0		0.48		0.029		0		0.000		0.01		
29-Dec-03	7.5	1080000																					
21-Jan-04	7.2	1021800	2.39		0.02		0		3.91		0		3.85		0		0		0.000		0.05		
18-Feb-04	7.3	1017000									0												
17-Mar-04	7.4	1102000	26.6		0.04		0.02		3		0.02		20.3		0.077		0		0.010		0.05		
28-Apr-04	7.4	1030000	0.36	0	0	0	0	0	0.274	0.001	0	0	0.29	0	0.009	0.01	0	0	0.000	0.000	0	0	
19-May-04	7.3	1013000	0.67		0		0		0.23		0		0.06		0.016		0		0.000		0		
16-Jun-04	7.4	988000																					
21-Jul-04	7.6	1010000	0.18	0	0	0	0.02	0	0.238	0.01	0.01	0	0.16	0.02	0.01	0.009	0	0	0.000	0.000	0	0	

## **APPENDIX D**

### **Bayswater/Liddell Water Balance for 1 July 03 to 30 June 04**

The determination of an accurate water balance for the Bayswater/Liddell water supply infrastructure is limited by the available measured data. Data, which is not measured but has a significant impact on site water usage, includes local rainfall, natural evaporation and natural inflows.

Other sources of error in accounting for water movement can be attributed to the simplification of the water system as it is depicted in Figures 1 and 2 (See pages 7 and 8). There are eight significant water storages at the site. However only the three largest storages are included in the simplified assessment.

The storages that are omitted from the assessment are Bayswater's Ash Dam and Liddell Ash Dam. It is not possible to provide accurate details of the water volume or surface area of either LAD or BWAD. This is because water is continuously being displaced by large quantities of ash produced by the stations' boilers. Although these storages have not been included in the assessment, water losses from both would be accounted for in either the evaporation losses or assumed values in figure 1 or the unaccounted for losses in figure 2.

Two methodologies have been used to assess site water movements. The first is based on water movements alone. This method relies on flow measurements and accurate dam level measurements. In addition, the method relies on a formulated assessment of the water evaporated to cool Lake Liddell and Bayswater's cooling water. This may introduce additional errors. The amount of evaporative cooling is dependent on climatic conditions. The formula used to determine evaporative cooling assumes average climatic conditions.

Method 2 is based on the basic premise that a unique water balance can be obtained by:

- Ensuring the Bayswater Cooling Towers have a zero water and salt balance for the year.
- Adjusting the Bayswater cooling water make up blend ratio (Hunter River : L. Liddell) until Lake Liddell's water level changes and concentration changes match as close as possible measured values in Lake Liddell.
- Adjustments are also made to the unaccounted water losses in Plashett Dam and Lake Liddell until the salt and water balance is achieved. It is assumed the losses are primarily evaporative and no salt is unaccounted for. However, this is also a source of some error, as runoff into Lake Liddell and Plashett is known to contain salt.

#### **Method 1 – Fig. 1 (Page 7)**

Measured values:

Low Pressure Pumping Station flow ML/yr. Daily pumping records.

Operator Logs re daily water movements

Plashett Dam level change 1/7/03 to 30/6/04

Domestic Dam level change 1/7/03 to 30/6/04

Lake Liddell level change 1/7/03 to 30/6/04

NB All dam levels are recorded on a weekly basis.

Lime Softening Plant Throughput

Blowdown from Cooling Water System to Lake Liddell.

Daily Conductivity of CWMU Dam to determine Blend ratio River:Liddell

Calculated values:

Bayswater evaporation - .001615ML/MWhr

Liddell evaporation - .001713ML/MWhr

Natural evaporation – Assumed net evaporation of 1m/year. Equivalent volume change according to change in dam RL of 1m/year.

**Method 2 – Fig. 2 (Page 8)**

Measured values:

Low Pressure Pumping Station flow ML/yr

Plashett Dam level change 1/7/03 to 30/6/04

Domestic Dam level change 1/7/03 to 30/6/04

Lake Liddell level change 1/7/03 to 30/6/04

Total Dissolved Solids in Lake Liddell June'03 and July '04

Average Conductivity of Hunter River during the year

Total salt production from the Lime Softening Plant

Total Salt Production from the Brine Concentrator Plant

Total Salts added to Bayswater's CW system by chemical dosing

Calculated values:

Bayswater evaporation - .001615ML/MWhr

Liddell evaporation - .001713ML/MWhr

It can be seen from Fig. 2 that a water balance is not quite achieved in the cooling tower, is in error by - 919ML for the year and that Lake Liddell water volume increase was 670ML instead of the actual increase of 2100ML. The calculated salt increase of 11324Tonnes is slightly more than the measured increase of 10500Tonnes.

**Comparison of the Two Approaches**

The sum of the water balance errors in the CWMU system and Lake Liddell in Method 2 is 529ML (and –866 T of salt) compared with 0ML in Method 1.

Method 1 ensures a zero water balance in Lake Liddell, and a zero balance for the CWMU dam. Whereas with Method 2 a more iterative approach is adopted to achieve a salt and water balance with some compromise in the water and salt balance in both the Bayswater's CW system and Lake Liddell.

## Sampling and Analytical Methods and Procedures

### 1. Sampling

All sampling is carried out in accordance with Australian & New Zealand Standard 5667 Series.

### 2. Analytical Methods

All water analysis is carried out in accordance with APHA Standard Methods for the Examination of Water and Wastewater. These methods have been accredited by the National Association of Testing Authorities (NATA).

Analysis is carried out by Australian Laboratory Services (ALS). ALS are certified under Australian Standard AS/NZS ISO 9002:1994 (Certification No. 6112) and have NATA Certification as an Accredited Laboratory. The Accreditation Number for the Newcastle laboratory is 1663 and for the Sydney laboratory is 10918. ALS also holds corporate NATA accreditation number 825 for ISO 17025.

### *Analytical Methods & Detection Limits Surface, Process & Environmental Waters*

TEST PARAMETER	METHOD/TECHNIQUE	LOR
pH	APHA 20 <sup>th</sup> ed. 4500 H+	0.01 pH Unit
Electrical Conductivity	APHA 20 <sup>th</sup> ed. 2510 B	1 uS/cm
Total Iron (Fe)	APHA 20 <sup>th</sup> ed. 3120 / ICPAES	0.1 mg/L
Total Copper (Cu)	APHA 20 <sup>th</sup> ed. 3120 / ICPAES	0.01 mg/L
Aluminium (Al)	APHA 20 <sup>th</sup> ed. 3120 / ICPAES	0.1 mg/L
Chromium (Cr)	APHA 20 <sup>th</sup> ed. 3120 / ICPAES	0.01 mg/L
Manganese (Mn)	APHA 20 <sup>th</sup> ed. 3120 / ICPAES	0.01 mg/L
Nickel (Ni)	APHA 20 <sup>th</sup> ed. 3120 / ICPAES	0.01 mg/L
Lead (Pb)	APHA 20 <sup>th</sup> ed. 3120 / ICPAES	0.01 mg/L
Zinc (Zn)	APHA 20 <sup>th</sup> ed. 3120 / ICPAES	0.01 mg/L
Selenium (Se)	APHA 20 <sup>th</sup> ed. 3120 / ICPAES	0.01 mg/L
Arsenic (As)	APHA 20 <sup>th</sup> ed. 3120 / ICPAES	0.01 mg/L

The ALS laboratory maintains their QCS3 level of analytical quality control for all samples undertaken as part of this part.

The QCS3 schedule includes the following minimum standards;

#### Inorganics

- \* 1 x duplicate per 10 samples
- \* 1 x method blank per 20 samples
- \* 1 x post digestion matrix spike per 10 samples
- \* 1 x matrix spike per analytical lot (10) of samples; and
- \* 1 x matrix spike duplicate per analytical lot of samples

#### Organics

- \* 1 x method blank per lot
- \* 1 x single control sample, containing all target compounds, per analytical lot
- \* 1 x duplicate control sample, containing all target compounds, per analytical lot

- \* addition and analysis of surrogate compounds (where appropriate) to all samples.
- \* 1 x matrix spike per analytical lot
- \* 1 x matrix spike duplicate per analytical lot, and
- \* 2 x duplicate per analytical lot

These practices meet or exceed the requirements of current NEPM and ANZECC guidelines.

**ATTACHMENT E**

**HUNTER RIVER CONDUCTIVITY AND FLOW DATA**

GS 210125 Hunter River up-stream of Bayswater Ck confluence

GS 210126 Hunter River down-stream of Bayswater Ck confluence

GS 210083 Hunter River at Jerry's Plains

Date	GS210083		GS210125		GS210126	
	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm
01/07/2003	520	477	634	446	583	449
02/07/2003	392	501	520	462	470	460
03/07/2003	366	537	482	502	433	486
04/07/2003	369	581	487	538	433	561
05/07/2003	385	612	481	580	428	601
06/07/2003	390	627	507	606	450	576
07/07/2003	362	633	487	596	438	641
08/07/2003	338	651	450	626	394	598
09/07/2003	322	670	424	651	375	626
10/07/2003	303	681	400	668	353	648
11/07/2003	275	696	379	681	331	660
12/07/2003	283	731	432	696	362	673
13/07/2003	173	685	270	711	235	698
14/07/2003	262	620	347	705	286	680
15/07/2003	287	563	402	620	320	617
16/07/2003	208	551	355	576	299	570
17/07/2003	167	553	260	575	223	557
18/07/2003	139	563	239	587	182	571
19/07/2003	55	581	185	597	137	586
20/07/2003	92	591	131	622	82	605
21/07/2003	135	580	206	667	137	622
22/07/2003	131	586	198	635	129	620
23/07/2003	119	590	186	630	121	618
24/07/2003	132	575	203	633	122	612
25/07/2003	154	568	227	623	141	612
26/07/2003	156	571	244	607	165	593
27/07/2003	164	572	237	601	155	583
28/07/2003	167	572	255	599	165	583
29/07/2003	152	574	245	599	145	584
30/07/2003	126	574	223	602	125	585
31/07/2003	102	575	185	613	110	590
01/08/2003	82	573	161	631	86	610
02/08/2003	104	567	154	644	74	624
03/08/2003	111	558	173	643	95	637
04/08/2003	152	550	191	626	107	623
05/08/2003	155	541	221	602	131	606
06/08/2003	151	532	220	583	136	586
07/08/2003	132	531	207	578	126	576

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Date	GS210083		GS210125		GS210126	
	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm
08/08/2003	99	530	182	585	98	575
09/08/2003	100	532	159	606	81	589
10/08/2003	144	531	177	615	90	605
11/08/2003	230	514	268	580	175	587
12/08/2003	276	496	347	524	259	530
13/08/2003	264	477	354	496	264	507
14/08/2003	327	480	399	483	287	499
15/08/2003	338	511	445	493	338	496
16/08/2003	354	546	442	522	326	520
17/08/2003	325	584	453	547	349	544
18/08/2003	247	599	373	592	277	593
19/08/2003	194	626	287	610	189	608
20/08/2003	253	657	286	636	161	629
21/08/2003	324	681	426	665	310	658
22/08/2003	277	696	379	686	282	675
23/08/2003	300	673	385	682	269	687
24/08/2003	507	697	540	692	404	683
25/08/2003	1235	706	817	658	693	682
26/08/2003	2388	619	2622	654	2929	689
27/08/2003	2297	628	2400	581	2769	593
28/08/2003	1404	634	1475	613	1639	634
29/08/2003	877	651	957	611	937	628
30/08/2003	557	693	691	645	571	664
31/08/2003	348	743	498	689	391	703
01/09/2003	310	778	395	741	295	744
02/09/2003	293	799	396	770	299	774
03/09/2003	272	815	375	791	261	786
04/09/2003	243	816	330	805	219	807
05/09/2003	222	808	313	806	199	808
06/09/2003	197	800	279	809	157	810
07/09/2003	206	792	260	806	140	811
08/09/2003	203	771	278	800	162	809
09/09/2003	151	749	246	797	133	801
10/09/2003	120	753	202	790	91	793
11/09/2003	118	753	179	786	68	792
12/09/2003	169	721	215	786	73	796
13/09/2003	201	686	260	765	111	788
14/09/2003	251	665	329	721	175	744
15/09/2003	218	649	317	692	176	706
16/09/2003	185	639	282	680	141	699
17/09/2003	158	638	248	676	115	701
18/09/2003	119	651	206	684	81	707
19/09/2003	143	665	204	700	70	716
20/09/2003	183	652	231	704	90	734
21/09/2003	229	619	309	680	163	712

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Date	GS210083		GS210125		GS210126	
	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm
22/09/2003	257	595	369	641	212	691
23/09/2003	230	582	324	622	191	679
24/09/2003	217	572	304	618	148	662
25/09/2003	179	570	274	617	131	656
26/09/2003	139	581	227	624	91	667
27/09/2003	102	599	183	641	55	680
28/09/2003	120	598	188	666	52	691
29/09/2003	143	588	199	675	58	702
30/09/2003	139	583	194	663	68	705
01/10/2003	160	572	218	645	73	685
02/10/2003	244	535	279	612	123	655
03/10/2003	347	523	449	559	300	620
04/10/2003	248	530	412	549	300	593
05/10/2003	190	548	276	577	142	615
06/10/2003	213	579	315	593	115	628
07/10/2003	206	600	303	610	109	650
08/10/2003	266	612	336	637	124	684
09/10/2003	332	656	408	651	200	698
10/10/2003	342	707	471	685	291	726
11/10/2003	289	709	432	716	258	748
12/10/2003	206	706	355	727	160	761
13/10/2003	91	714	244	731	60	773
14/10/2003	43	733	164	739	20	803
15/10/2003	85	769	126	753	9	841
16/10/2003	232	729	259	795	59	863
17/10/2003	211	680	320	767	137	861
18/10/2003	222	644	309	725	120	818
19/10/2003	220	608	313	697	121	800
20/10/2003	193	589	309	661	125	766
21/10/2003	216	585	314	648	109	736
22/10/2003	192	582	307	644	123	716
23/10/2003	132	581	255	640	88	724
24/10/2003	112	593	206	652	58	739
25/10/2003	81	593	202	660	60	751
26/10/2003	166	587	228	666	63	761
27/10/2003	145	595	259	663	89	755
28/10/2003	132	601	235	650	76	751
29/10/2003	85	621	203	666	57	772
30/10/2003	72	638	156	683	36	794
31/10/2003	85	619	159	697	32	815
01/11/2003	156	585	207	718	52	834
02/11/2003	228	554	304	659	113	802
03/11/2003	227	532	336	567	154	735
04/11/2003	215	524	315	559	145	724
05/11/2003	126	544	274	574	105	731

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Date	GS210083		GS210125		GS210126	
	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm
06/11/2003	51	582	172	598	44	753
07/11/2003	38	623	122	635	23	785
08/11/2003	113	570	134	666	22	812
09/11/2003	129	532	198	689	49	864
10/11/2003	115	531	195	632	55	866
11/11/2003	78	537	175	621	46	855
12/11/2003	34	569	128	633	34	841
13/11/2003	33	577	91	655	31	830
14/11/2003	137	519	96	670	23	859
15/11/2003	187	488	241	655	77	879
16/11/2003	203	489	255	548	94	745
17/11/2003	210	475	275	540	107	675
18/11/2003	217	469	270	524	97	661
19/11/2003	117	483	246	519	75	670
20/11/2003	84	518	131	548	19	701
21/11/2003	239	473	204	598	44	692
22/11/2003	471	452	471	558	770	642
23/11/2003	803	480	710	451	983	540
24/11/2003	440	671	830	506	963	561
25/11/2003	835	686	998	656	650	639
26/11/2003	512	549	717	575	751	640
27/11/2003	271	631	421	555	410	609
28/11/2003	184	659	286	637	251	671
29/11/2003	207	691	261	691	213	719
30/11/2003	214	749	269	730	221	749
01/12/2003	175	753	262	759	212	777
02/12/2003	114	746	237	759	186	774
03/12/2003	69	695	189	764	149	782
04/12/2003	135	706	205	738	146	751
05/12/2003	463	612	443	680	365	728
06/12/2003	475	531	684	545	814	561
07/12/2003	352	535	515	554	505	562
08/12/2003	227	579	372	580	362	587
09/12/2003	174	683	265	656	250	620
10/12/2003	196	784	262	733	230	689
11/12/2003	197	849	294	802	272	766
12/12/2003	204	770	266	780	245	
13/12/2003	218	704	317	766	349	
14/12/2003	1735	506	1484	607	1650	
15/12/2003	1046	415	1332	390	1724	
16/12/2003	503	540	686	451	712	
17/12/2003	265	657	427	602	414	
18/12/2003	138	684	270	672	249	
19/12/2003	78	722	170	700	120	
20/12/2003	269	768	239	734	151	

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Date	GS210083		GS210125		GS210126	
	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm
21/12/2003	343	720	443	741	364	
22/12/2003	286	661	404	707	346	
23/12/2003	192	637	314	670	269	
24/12/2003	109	625	214	673	158	
25/12/2003	79	643	159	705	93	
26/12/2003	115	644	155	730	82	
27/12/2003	149	623	198	729	135	
28/12/2003	133	590	211	685	149	
29/12/2003	95	580	190	666	117	
30/12/2003	47	552	127	666	58	
31/12/2003	43	521	101	694	43	
01/01/2004	78	555	85	731	32	
02/01/2004	155	558	184	730	89	
03/01/2004	142	531	182	657	97	
04/01/2004	191	515	210	646	118	
05/01/2004	177	510	234	618	137	
06/01/2004	115	507	196	621	131	
07/01/2004	105	510	172	609	94	
08/01/2004	182	508	180	612	90	
09/01/2004	155	501	240	578	158	
10/01/2004	119	496	158	579	103	
11/01/2004	179	472	201	587	132	
12/01/2004	196	484	261	545	209	
13/01/2004	243	477	248	523	183	
14/01/2004	282	479	380	510	315	
15/01/2004	233	499	315	510	255	
16/01/2004	241	508	306	529	239	
17/01/2004	303	493	388	516	301	
18/01/2004	345	488	410	507	326	
19/01/2004	945	458	781	487	728	
20/01/2004	565	434	746	440	768	
21/01/2004	256	474	395	458	351	
22/01/2004	166	528	240	497	185	
23/01/2004	199	529	245	521	187	
24/01/2004	271	553	298	537	248	
25/01/2004	405	589	449	556	378	
26/01/2004	420	566	485	577	439	
27/01/2004	502	498	522	540	461	
28/01/2004	488	510	562	512	506	
29/01/2004	334	523	454	530	396	
30/01/2004	243	539	330	545	287	
31/01/2004	197	575	263	570	214	
01/02/2004	212	597	242	604	173	
02/02/2004	265	612	306	627	258	
03/02/2004	234	624	290	644	253	

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Date	GS210083		GS210125		GS210126	
	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm
04/02/2004	200	633	252	656	214	
05/02/2004	141	640	200	671	158	
06/02/2004	117	649	159	692	112	
07/02/2004	112	652	154	714	106	
08/02/2004	207	635	208	718	152	
09/02/2004	204	601	239	718	209	
10/02/2004	193	573	234	690	212	
11/02/2004	156	581	213	678	191	
12/02/2004	119	464	172	674	144	
13/02/2004	128	563	163	763	146	
14/02/2004	190	555	194	702	169	
15/02/2004	234	503	279	677	276	
16/02/2004	225	473	276	644	281	
17/02/2004	216	444	268	630	289	
18/02/2004	185	452	257	610	288	
19/02/2004	154	451	213	600	247	
20/02/2004	123	458	183	627	229	
21/02/2004	106	489	148	644	181	
22/02/2004	104	494	130	674	155	
23/02/2004	204	495	201	688	221	
24/02/2004	316	495	341	655	374	
25/02/2004	458	469	596	641	752	
26/02/2004	347	461	548	595	672	
27/02/2004	1802	360	1686	526	2204	
28/02/2004	737	329	1102	401	1603	
29/02/2004	212	429	432	479	565	
01/03/2004	100	506	187	573	316	
02/03/2004	205	525	217	642	338	
03/03/2004	249	548	311	674	470	
04/03/2004	250	584	310	703	480	
05/03/2004	259	622	323	756	510	
06/03/2004	248	623	325	816	524	
07/03/2004	230	600	308	823	529	
08/03/2004	218	596	289	819	510	
09/03/2004	209	609	274	843	500	
10/03/2004	174	615	248	863	494	
11/03/2004	154	618	220	869	510	
12/03/2004	144	618	207	869	549	
13/03/2004	131	615	189	872	568	
14/03/2004	148	606	208	872	663	
15/03/2004	199	592	245	868	800	
16/03/2004	2735	289	3280	528	6031	
17/03/2004	968	270	1443	342	3937	
18/03/2004	399	315	612	437	2197	
19/03/2004	247	376	385	506	1632	

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Date	GS210083		GS210125		GS210126	
	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm
20/03/2004	200	406	292	555	1274	
21/03/2004	185	431	274	594	1241	
22/03/2004	205	454	264	629	1304	
23/03/2004	230	470	306	643	1369	
24/03/2004	296	477	312	667	1443	
25/03/2004	920	420	813	636	2178	
26/03/2004	558	324	980	412	813	
27/03/2004	355	305	487	446	449	445
28/03/2004	290	331	401	463	369	442
29/03/2004	227	362	339	499	300	477
30/03/2004	186	391	284	538	245	517
31/03/2004	145	417	246	573	211	555
01/04/2004	110	442	206	606	159	586
02/04/2004	79	459	179	635	127	617
03/04/2004	66	436	160	664	115	645
04/04/2004	69	486	152	695	104	672
05/04/2004	157	517	193	728	94	700
06/04/2004	175	501	249	750	91	727
07/04/2004	173	484	273	734	100	734
08/04/2004	123	488	234	716	76	701
09/04/2004	125	483	199	720	42	706
10/04/2004	128	478	213	725	46	715
11/04/2004	121	479	198	722	31	710
12/04/2004	118	484	196	725	25	714
13/04/2004	121	488	201	726	26	715
14/04/2004	119	483	197	725	21	717
15/04/2004	104	483	184	729	16	720
16/04/2004	109	485	171	761	10	726
17/04/2004	161	483	207	745	8	734
18/04/2004	179	471	255	739	15	729
19/04/2004	174	456	268	711	14	706
20/04/2004	184	448	255	690	11	673
21/04/2004	164	441	258	675	10	662
22/04/2004	137	441	223	666	4	651
23/04/2004	115	448	198	668	2	654
24/04/2004	108	464	179	676	1	660
25/04/2004	120	475	190	690	1	671
26/04/2004	127	476	199	696	1	680
27/04/2004	123	476	203	695	1	677
28/04/2004	121	481	188	694	1	676
29/04/2004	126	484	183	698	0	680
30/04/2004	122	488	186	702	0	683
01/05/2004	129	489	185	705	2	688
02/05/2004	133	490	191	703	11	691
03/05/2004	122	493	179	696	18	688

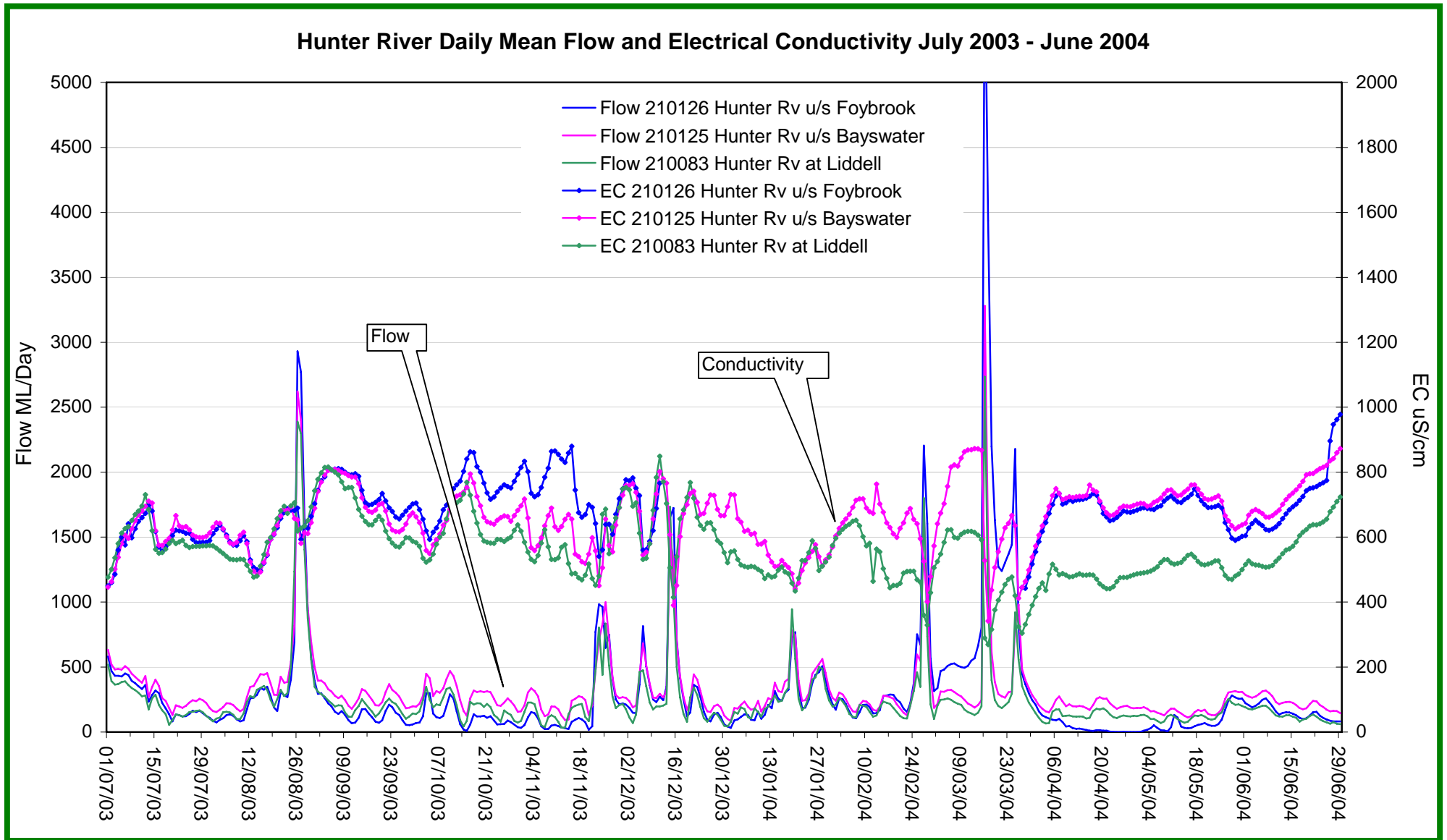
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Date	GS210083		GS210125		GS210126	
	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm
04/05/2004	98	496	160	698	30	687
05/05/2004	101	501	161	708	51	685
06/05/2004	84	509	148	713	32	693
07/05/2004	69	522	139	721	14	697
08/05/2004	81	531	128	733	12	711
09/05/2004	122	531	156	745	5	720
10/05/2004	133	521	182	746	36	726
11/05/2004	118	517	180	736	131	718
12/05/2004	100	519	161	728	112	709
13/05/2004	84	522	143	730	42	707
14/05/2004	72	533	126	739	32	716
15/05/2004	79	545	112	748	28	722
16/05/2004	106	548	123	761	31	732
17/05/2004	128	539	152	761	45	748
18/05/2004	125	525	170	748	56	729
19/05/2004	131	517	161	732	60	713
20/05/2004	120	515	172	719	69	700
21/05/2004	103	518	141	716	55	691
22/05/2004	94	521	132	718	48	692
23/05/2004	103	527	130	723	48	694
24/05/2004	135	527	148	728	61	698
25/05/2004	151	506	178	711	95	689
26/05/2004	215	483	254	667	172	645
27/05/2004	256	472	305	651	241	623
28/05/2004	225	470	310	635	282	597
29/05/2004	210	480	315	625	267	590
30/05/2004	213	487	306	632	255	595
31/05/2004	200	500	311	638	258	603
01/06/2004	190	516	285	643	222	605
02/06/2004	177	527	273	667	207	628
03/06/2004	173	518	264	680	190	642
04/06/2004	182	514	273	684	201	652
05/06/2004	192	514	291	680	221	644
06/06/2004	202	510	313	672	249	635
07/06/2004	201	507	320	662	260	624
08/06/2004	182	509	301	661	231	621
09/06/2004	155	513	275	666	198	625
10/06/2004	128	525	230	674	157	632
11/06/2004	120	535	214	683	134	642
12/06/2004	119	549	225	701	147	657
13/06/2004	130	560	231	716	153	672
14/06/2004	130	564	232	727	151	684
15/06/2004	118	572	226	735	141	693
16/06/2004	111	585	207	746	129	702
17/06/2004	80	604	185	758	110	714

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Date	GS210083		GS210125		GS210126	
	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm	Flow ML/day	EC uS/cm
18/06/2004	96	615	176	772	99	725
19/06/2004	103	623	183	792	106	743
20/06/2004	124	634	215	796	128	750
21/06/2004	135	639	239	796	153	752
22/06/2004	119	638	237	804	156	756
23/06/2004	97	641	207	811	125	763
24/06/2004	83	647	192	815	111	768
25/06/2004	74	656	172	821	96	775
26/06/2004	64	678	160	835	86	896
27/06/2004	77	692	164	842	82	947
28/06/2004	64	709	162	860	82	962
29/06/2004	61	724	146	872	82	978
30/06/2004	60	735	134	880	83	990



## **APPENDIX E**

### **SCALE MAP OF BAYSWATER/LIDDELL SITE FACILITIES**

This portion and the following Appendix of the report satisfies Clause 8.9 (b) of the licence.

Attached map depicts the location of all water sources, water management works and bulk water supply infrastructure.

Also included on the map are groundwater monitoring locations and water quality sampling locations

DRAWING LD800556 SITE FACILITIES MAP MODIFIED TO SHOW  
GROUNDWATER AND SURFACE MONITORING LOCATIONS

## **APPENDIX F**

### **SCALE MAP OF BARNARD SCHEME FACILITIES**

This portion and the previous Appendix of the report satisfies Clause 8.9 (b) of the licence.

Attached maps depict

1. Broad outline showing route of Barnard pipeline from the pumping station the Oakey Creek dam and spillway.
2. Detail of headworks (ie Pumping Station) area showing the location of the Barnard River weir, contour canal and pumping stations.

DRAWING BA 433275 BARNARD PROJECT AREA MAP

DRAWING BA 433276 BARNARD HEADWORKS AREA





## Appendix 2: Correspondence with DoP



1 September 2005

Manager Manufacturing and Rural Industries  
Major Development Assessment Branch  
Office of Sustainable Development Assessments and Approvals  
Department of Planning  
23-33 Bridge Street  
Sydney NSW 2000

Attention: Mr S Jeffries

**RE: PROPOSED WATER TREATMENT PLANT UPGRADE, BAYSWATER POWER STATION**

Dear Scott,

Reference is made to previous discussions and correspondence in this matter.

As previously advised, Macquarie Generation is proposing to upgrade the existing Water Treatment Plant (WTP) at its Bayswater Power Station. The upgrade is required to improve the salt removal capacity of the plant which is currently sub-optimal. Refurbishment and modifications to the existing WTP are required to optimise the performance of existing plant and ensure its efficient operation for the next 30 years.

The original development application for Bayswater Power Station (BPS) was lodged in June 1979 and was supported by an Environmental Impact Statement (EIS). Consent was granted by Muswellbrook Shire Council in September 1980. Alterations and additions have taken place at BPS, the most recent of which being the Antiene Rail Coal Unloader which was declared as State significant development and is currently awaiting determination by the Minister.

On this basis, it is evident that the Minister has previously formed the view that BPS is a State significant development and we contend that all development which forms part of the BPS operation is therefore also State significant development.

In light of the recent amendments to the Environmental Planning and Assessment Act (EP&A Act) and the gazettal of State Environmental Planning Policy (Major Projects) 2005 (SEPP 2005). The Minister's declaration that the proposed WTP upgrade is a 'major project' pursuant to the provisions of Part 3A of the EP&A Act is requested.

Schedule 1 to SEPP 2005 identifies classes of development which are defined as 'major projects' and includes certain electricity generation development. The proposed project is an upgrade of the existing WTP that is an essential and ancillary component of the existing coal-fired electricity generation facility at Bayswater. The proposed upgrade has a capital investment value of some



\$50 million. It therefore falls within the definition of an ancillary component of electricity generation under clause 24(a) of the Group 8 class of development listed in Schedule 1 of SEPP 2005.

The Director General's requirements for the environmental assessment of this project are also requested.

Options for the proposed WTP upgrade involve the refurbishment, modification or replacement of existing plant and equipment to fit within the existing WTP footprint. Macquarie Generation will not determine the preferred option until the design phase. As such, it is proposed to utilise the environmental envelope approach for the environmental assessment. The environmental envelope will be established using the worst-case performance scenario of each option for the various components of the WTP modifications (in accordance with the previous documentation provided to you).

As also noted in that previous documentation, the options involve modifications of the existing plant and operations. There are no identifiable or quantifiable discharges to air apart from the decarbonator step (if used). Noise would not be an issue considering the replacement equipment to be installed (pumps and electric motors), the small-scale nature of the modifications, and the location of the equipment relative to other components of BPS. Issues of hazardous material handling (sulphuric acid, caustic), if used, would be similar to existing and would be addressed through the procedures currently in place. Disposal of waste material (ie clarifier underflow) would follow current practices. Accordingly, since the proposed project involves the modification of the existing WTP and will not significantly increase the environmental impacts of the existing development at Bayswater, we request that the Director General's requirements confirm that a high level environmental assessment is not required.

Your early attention to these matters would be appreciated.

Should you require further information or wish to discuss this matter, please contact either Michael England on 0400 369 775.

Yours faithfully,

**HLA-Envirosciences Pty Limited**

A handwritten signature in black ink, appearing to read 'Michael England'.

**Michael England**

Senior Principal, National Practice Leader Environmental Planning



## Appendix 3: Correspondence with Council and other Government Departments

7 June 2005

Mr Mike Colreavy  
General Manager  
Muswellbrook Shire Council  
PO Box  
Muswellbrook NSW 2333

**RE: UPGRADE OF WATER TREATMENT PLANT - MACQUARIE GENERATION**

Dear Sir,

Macquarie Generation is proposing to upgrade the existing water treatment plant at Bayswater Power Station from the current design capacity of 24,000 tonnes of salt removed per year to an approximate level of 34,400 tonnes of salt removed per year.

The proposal is considered to be State Significant under the new State Environmental Planning Policy (State Significant Development) 2005. As such HLA-Envirosciences is preparing a Statement of Environmental Effects (SEE) to support the application for the upgrade of the plant for assessment by the Department of Infrastructure Planning and Natural Resources (DIPNR). Three proposals for the final makeup of the plant are being considered, however the chosen tenderer will not be known for some time. A summary of the three proposals is attached for your information.

To allow the greatest flexibility of approach DIPNR has agreed to a strategic assessment of the proposed development. This approach will involve assessment of the components from the three proposals that have the greatest potential environmental impact. This approach has the benefit of assessing the worst-case scenario regardless of the final design of the plant. In reality the final combination chosen will have lower impact than that assessed.

As Muswellbrook Shire Council was the original consent authority DIPNR will be forwarding the SEE to MSC for comment. If Council have concerns they wish to be addressed in the SEE please contact Kate Radford on (02) 4968 0044 or by return letter by 24 June 2005.

Yours faithfully,

**HLA-Envirosciences Pty Limited**

**Kate Radford**  
Environmental Scientist

**Graham Taylor**  
Manager Hunter Operations

## **Macquarie Generation Water Treatment Plant Proposals**

The following is an outline of the three proposals to upgrade the existing Water Treatment Plant at Bayswater Power Station. The following assumptions are made: any additional equipment will conform to equipment noise requirements; storage of hazardous materials will meet the appropriate regulations; and that suitable maintenance and operating procedures will be implemented.

All three proposals will contain various combinations of new and refurbished equipment. Most will fit within the existing water treatment plant footprint. In the scale of the total Power Station operation the size of this proposal is quite small, approximately less than 5% of the total plant footprint.

The following sections deal broadly with the main operating sections as described in the proposals. Items in italics are nonconforming tenders. Tenderers flagged with a '\*\*' are considered the 'worst case' for that section

### Lime Softening Plant

Tenderer 1 have no suggestions for change.

\* Tenderer 2 propose modifications to the lime dosing regime along with sundry pumps lime slurry tanks and lime feeder. Also plan to add polymer dosing in the clarifier and acid dose the clarifier overflow for alkalinity control

Tenderer 3 propose to install a small acid dosing facility to control overflow alkalinity and minor changes to lime dosing and storing equipment

### Alkalinity Reduction (AR) Plant

Tenderer 1 propose to reinstitute the AR function utilising strong acid cation ion exchange. Recovered water would be fed to a downstream Reverse Osmosis (RO) Plant and the AR Regenerant waste would be processed in a brine concentrator.

\* Tenderer 2 also propose to reinstitute the weak acid cation ion exchange AR function and install a decarbonator to remove CO<sub>2</sub>. Recovered water from the AR Plant to be further concentrated in a downstream RO Plant. They also propose to construct a sludge dam in the Bayswater ash dam to take regenerant waste from the AR plant.

Tenderer 3 propose to return the weak acid cation ion exchange AR plants to service together with an improved clarification step prior to the suspended solids filters.

### Reverse Osmosis Plants

Tenderer 1 propose AR modifications that will improve the existing RO recovery performance. Thin film composite (TFC) RO membranes to replace the existing cellulose acetate membranes. A second stage RO plant is to be installed.

\* Tenderer 2 want to install a new (TFC) membrane in the existing RO Plant and an additional high pressure TFC RO unit after the existing RO stage. The existing solids water separation system will be retained.

Tenderer 3 plan to install new TFC RO membranes within the existing plant. The RO Plant shall be otherwise retained in its existing form.

#### Brine Concentrate

\* Tenderer 1 propose to refurbish and modify the brine concentrator (BC) plant. The modified BC plant will operate in seedless mode. BC reject will then be processed through crystallisers to recover various salts. Some waste salt to be disposed in the BC decant basin.

Tenderer 2 will modify one the existing BC's to operate in seedless mode. The second BC could be used in standby mode instead of continuous operation. The BC waste brine/salt to be further concentrated by crystallisation or disposal in existing decant basin. Tenderer 2 also plan to section 5% of the BC Holding Pond for RO reject.

Tenderer 3 will upgrade the existing BC and install a new BC to concentrate the water from the existing BCs, which in turn is further concentrated through a crystalliser for disposal in the decant basin.

#### Comments

*These proposals are all modifications, to a greater or lesser extent of the existing operations.*

*There are no identifiable or quantifiable discharges to air (apart from the 'decarbonator' step proposed by Tenderer 2).*

*Noise should not be an issue considering the equipment to be installed (pumps and electric motors), the replacement of existing equipment factor, and the small scale and location of the equipment relative to the size of the Station.*

*Issues of hazardous material handling etc (sulphuric acid, caustic) if they are used should be addressed through the normal procedures that are in use currently.*

*Disposal of waste material (i.e. clarifier underflow) should follow the current practices.*

27 May 2005

Mr Grahame Clarke  
Acting Regional Manager Hunter  
Department of Environment and Conservation  
PO Box 488G  
Newcastle NSW 2300  
Attention: Mr Trevor Henderson

**RE: UPGRADE OF WATER TREATMENT PLANT - MACQUARIE GENERATION**

Dear Grahame,

Macquarie Generation is proposing to upgrade the existing water treatment plant at Bayswater Power Station from the current design capacity of 24,000 tonnes of salt removed per year to an approximate level of 34,400 tonnes of salt removed per year. HLA-Envirosciences is preparing a Statement of Environmental Effects (SEE) to support the application for the upgrade of the plant to the Department of Infrastructure Planning and Natural Resources (DIPNR). HLA will address any concerns held by the Department of Environment and Conservation in the SEE.

Three proposals are being considered, however the chosen tenderer will not be known for some time. A summary of the three proposals is attached for your information.

To allow the greatest flexibility of approach DIPNR has agreed to a strategic assessment of the proposed development. This approach will involve assessment of the components from the three proposals that have the greatest potential environmental impact. This approach has the benefit of assessing the worst-case scenario regardless of the final design of the plant. In reality the final combination chosen will have lower impact than that assessed. As the proponent is the holder of an environment protection licence (EPL 779) DIPNR will be forwarding the SEE to DEC for comment.

Yours faithfully,

**HLA-Envirosciences Pty Limited**

**Kate Radford**  
Environmental Scientist

**Graham Taylor**  
Manager Hunter Operations

## Macquarie Generation Water Treatment Plant Proposals

The following is an outline of the three proposals to upgrade the existing Water Treatment Plant at Bayswater Power Station. The following assumptions are made: any additional equipment will conform to equipment noise requirements; storage of hazardous materials will meet the appropriate regulations; and that suitable maintenance and operating procedures will be implemented.

All three proposals will contain various combinations of new and refurbished equipment. Most will fit within the existing water treatment plant footprint. In the scale of the total Power Station operation the size of this proposal is quite small, approximately less than 5% of the total plant footprint.

The following sections deal broadly with the main operating sections as described in the proposals. Items in italics are nonconforming tenders. Tenderers flagged with a '\*\*' are considered the 'worst case' for that section

### Lime Softening Plant

Tenderer 1 have no suggestions for change.

\* Tenderer 2 propose modifications to the lime dosing regime along with sundry pumps lime slurry tanks and lime feeder. Also plan to add polymer dosing in the clarifier and acid dose the clarifier overflow for alkalinity control

Tenderer 3 propose to install a small acid dosing facility to control overflow alkalinity and minor changes to lime dosing and storing equipment

### Alkalinity Reduction (AR) Plant

Tenderer 1 propose to reinstitute the AR function utilising strong acid cation ion exchange. Recovered water would be fed to a downstream Reverse Osmosis (RO) Plant and the AR Regenerant waste would be processed in a brine concentrator.

\* Tenderer 2 also propose to reinstitute the weak acid cation ion exchange AR function and install a decarbonator to remove CO<sub>2</sub>. Recovered water from the AR Plant to be further concentrated in a downstream RO Plant. They also propose to construct a sludge dam in the Bayswater ash dam to take regenerant waste from the AR plant.

Tenderer 3 propose to return the weak acid cation ion exchange AR plants to service together with an improved clarification step prior to the suspended solids filters.

### Reverse Osmosis Plants

Tenderer 1 propose AR modifications that will improve the existing RO recovery performance. Thin film composite (TFC) RO membranes to replace the existing cellulose acetate membranes. A second stage RO plant is to be installed.

\* Tenderer 2 want to install a new (TFC) membrane in the existing RO Plant and an additional high pressure TFC RO unit after the existing RO stage. The existing solids water separation system will be retained.

Tenderer 3 plan to install new TFC RO membranes within the existing plant. The RO Plant shall be otherwise retained in its existing form.

#### Brine Concentrate

\* Tenderer 1 propose to refurbish and modify the brine concentrator (BC) plant. The modified BC plant will operate in seedless mode. BC reject will then be processed through crystallisers to recover various salts. Some waste salt to be disposed in the BC decant basin.

Tenderer 2 will modify one the existing BC's to operate in seedless mode. The second BC could be used in standby mode instead of continuous operation. The BC waste brine/salt to be further concentrated by crystallisation or disposal in existing decant basin. Tenderer 2 also plan to section 5% of the BC Holding Pond for RO reject.

Tenderer 3 will upgrade the existing BC and install a new BC to concentrate the water from the existing BCs, which in turn is further concentrated through a crystalliser for disposal in the decant basin.

#### Comments

*These proposals are all modifications, to a greater or lesser extent of the existing operations.*

*There are no identifiable or quantifiable discharges to air (apart from the 'decarbonator' step proposed by Tenderer 2).*

*Noise should not be an issue considering the equipment to be installed (pumps and electric motors), the replacement of existing equipment factor, and the small scale and location of the equipment relative to the size of the Station.*

*Issues of hazardous material handling etc (sulphuric acid, caustic) if they are used should be addressed through the normal procedures that are in use currently.*

*Disposal of waste material (i.e. clarifier underflow) should follow the current practices.*

7 June 2005

Ms Sharon Rixon  
Senior Natural Resource Officer (Corporate Licensing)  
Resource Access Unit  
Department of Infrastructure Planning and Natural Resources  
PO Box 2213  
DANGAR NSW 2333

**RE: UPGRADE OF WATER TREATMENT PLANT - MACQUARIE GENERATION**

Dear Ms Rixon

Macquarie Generation is proposing to upgrade the existing water treatment plant at Bayswater Power Station from the current design capacity of 24,000 tonnes of salt removed per year to an approximate level of 34,400 tonnes of salt removed per year.

The proposal is considered to be State Significant under the new State Environmental Planning Policy (State Significant Development) 2005. As such HLA-Envirosciences is preparing a Statement of Environmental Effects (SEE) to support the application for the upgrade of the plant for assessment by the Department of Infrastructure Planning and Natural Resources (DIPNR). Three proposals for the final makeup of the plant are being considered, however the chosen tenderer will not be known for some time. A summary of the three proposals is attached for your information.

To allow the greatest flexibility of approach DIPNR has agreed to a strategic assessment of the proposed development. This approach will involve assessment of the components from the three proposals that have the greatest potential environmental impact. This approach has the benefit of assessing the worst-case scenario regardless of the final design of the plant. In reality the final combination chosen will have lower impact than that assessed.

If DIPNR have concerns they wish to be addressed in the SEE please contact Kate Radford on (02) 4968 0044 or by return letter by 24 June 2005.

Yours faithfully,

**HLA-Envirosciences Pty Limited**

**Kate Radford**  
Environmental Scientist

**Graham Taylor**  
Manager Hunter Operations

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The following sections deal broadly with the main operating sections as described in the proposals. Items in italics are nonconforming tenders. Tenderers flagged with a '\*' are considered the 'worst case' for that section

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## Comments

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*Noise should not be an issue considering the equipment to be installed (pumps and electric motors), the replacement of existing equipment factor, and the small scale and location of the equipment relative to the size of the Station.*

*Issues of hazardous material handling etc (sulphuric acid, caustic) if they are used should be addressed through the normal procedures that are in use currently.*

*Disposal of waste material (i.e. clarifier underflow) should follow the current practices.*



## Appendix 4: Macquarie Generation's Standard Requirements for Work at Site and the Contractor Environmental Management Plan Guidelines and Assessment Checklist

## Specification

### Bayswater Power Station

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## PART 4 – STANDARD REQUIREMENTS FOR WORK AT SITE

### 4.1 Introduction

- 4.1.1 This document outlines the general requirements for Contractors performing work at Bayswater Power Station.
- 4.1.2 Bayswater Power Station is located off the New England Highway between Singleton and Muswellbrook, approximately 260 km north of Sydney, New South Wales. Approach to the Power Station is by road only.
- 4.1.3 Bayswater Power Station, and the adjacent Liddell Power Station, are surrounded by a buffer zone and outlying plant which are spread over an area of approximately 8000 hectares. The area extends from near Ravensworth to the east of the power stations, to Antiene towards Muswellbrook, from the Hunter River to the far shore of Lake Liddell. The area also includes the conveyor corridors and the lands surrounding Plashett Dam, Liddell Ash Dam, and Bayswater Ash Dam. These general requirements apply to work anywhere in these environs.
- 4.1.4 The resultant Contract may be either for work over a period, or for a specified project which is to be completed by a stated date. These standard requirements shall apply to all such contracts.
- Within the document, reference to “his” shall include reference “his” or “hers” as appropriate.

### 4.2 Site Manager

- 4.2.1 For each contract there shall be appointed a Site Manager who shall be responsible for all activities by the Contractor’s staff at the power station Site. The Contractor's proposed Site Manager and Head Office representative with responsibility for the project shall attend the Site and be interviewed by the Principal's Site staff to determine their acceptability, prior to commencement of work under the Contract at Site. Details regarding general site matters such as site supervision, working hours, safety, site facilities, storage/office areas, car parking, and staff induction will be discussed at this interview. Arrangements for this interview shall be made by the Contractor's Head Office Representative by submitting the appropriate form which will be forwarded to the Contractor following issue of the Principal's Contract. The completed form is to be submitted a minimum of five working days prior to the preferred interview date.
- 4.2.2 The Contractor's Site Manager shall visit the Site prior to the commencement of work under the Contract at Site and discuss the temporary services required and the access requirements for erection purposes with the Principal. The Site visit shall be as soon as practicable after the approval of the Site Manager.
- 4.2.3 The Principal reserves the right to execute work on the Site at all times during the currency of the Contract but will have due regard to the obligations of the Contractor in relation to the execution of the Works under the Contract. However the Principal will ensure that the Contractor will have possession of the Site that will permit the Contractor to execute in a reasonable manner the Works in accordance with the requirements of the Contract. Such possession shall not entitle the Contractor to have exclusive use of the Site. The Contractor shall not use any portion of the Site for a purpose not connected with the Works.

### 4.3 Sealed Areas and Roads

- 4.3.1 Only approved equipment shall be used on the Site. Equipment which will cause excessive damage to surfaces or other works shall not be used.
- 4.3.2 Only rubber tyred vehicles shall be used on the Principal's bitumen sealed roads and areas. If it is necessary for tracked vehicles to travel on or across such roads they shall do so in a manner approved by the Principal.
- 4.3.3 The Contractor shall ensure that as little material as is practicable is dropped on the Principal's roads as a result of operations. When material is dropped on the roads the Contractor shall remove it promptly.

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- 4.3.4 The Contractor shall ensure, by reference to the Principal, that appropriate safety clearances are maintained by vehicles and mobile plant entering switchyards or passing under distribution and transmission lines.
- 4.3.5 Where it is necessary for the Contractor to install temporary underground services, these shall be installed such that roads are not opened up. The Contractor shall provide adequate warning signs and alternative access if work under the Contract interferes with safety or normal access.
- 4.3.6 Damage caused by the Contractor to the Principal's roads shall be promptly repaired to the satisfaction of the Principal, at no cost to the Principal.
- 4.3.7 Crossing of trenches, conduits, light chequer-plate areas, roadside kerbs and the like, by vehicles and plant will not normally be permitted, but if the special nature of any work requires limited crossing of these items a form of protective crossing approved by the Principal shall be provided by the Contractor.

#### **4.4 Site Accommodation and Storage**

- 4.4.1 The Contractor shall provide, in the area(s) allocated at the Site, all sanitary and all other accommodation for the personnel employed by the Contractor and Subcontractors on the work under the Contract, except where otherwise stated in the Specification. Each building or structure must have its exact location approved. Use of other areas requires special approval. The Contractor is responsible for compliance by his Subcontractors.
- 4.4.2 The Contractor shall supply, erect, maintain and remove at Practical Completion of the Contract any temporary structures such as the Contractor's Site office, store shed, workshop, tool shed and employees' amenities shed, change room, sanitary accommodation, and hot water boilers all as required by the relevant industrial awards and statutory authorities. The buildings and associated services shall be maintained in a clean and sanitary condition, shall be clearly labelled with the company's name and shall all be subject to the approval of the Principal and authorities concerned. The Contractor shall give all notices to the authorities and pay all fees.
- 4.4.3 Site accommodation and amenities shall be of a standard that complies with the requirements of the Principal and regulations of the Occupational Health and Safety Act. Adequate facilities shall be provided before any Site Contract work commences.
- 4.4.4 Regulations under the Occupational Health and Safety Act shall be observed with respect to the minimum standard of shelter, change, dining, washing and sanitary facilities that the Contractor shall provide for staff working on Site.
- 4.4.5 Dining sheds shall be fully fly-proof.
- 4.4.6 Area for residential accommodation required for personnel will NOT be made available on the Principal's property and the provision of any accommodation away from Site will be the responsibility of the Contractor.
- 4.4.7 The Principal will allocate to the Contractor an area away from the working areas for the erection of the Contractor's Site facilities. In some instances, and where mutually agreed between the Contractor and the Principal, the Principal may also allocate areas closer to the working areas for the Contractor's use. Where, due to the reasonable requirements of the Principal it is necessary for the facilities in these areas to be transferred to other areas, the Contractor shall carry out the transfer when requested to do so to the satisfaction of the Principal and at no cost to the Principal. The Contractor shall provide all drainage and surface preparation required in the area allocated. The Contractor shall be responsible for the maintenance of the allocated area, road access and other installed services.
- 4.4.8 No covered storage space and only a limited amount of open storage space will be made available for the Contractor's materials. All methods of storing and protecting items of plant shall be to the approval of the Principal.

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#### **4.5 Site Working Arrangements**

4.5.1 Hours worked on Site shall be as agreed with Contracts Administrator.

#### **4.6 Cleaning Up By Contractor**

4.6.1 For the duration of the Works the Contractor shall maintain and leave the Site in a clean and tidy condition. On a daily basis, and at no cost to the Principal, the Contractor shall clean up any debris from the Works such as insulation, waste materials and accumulated dust and dirt.

4.6.2 All material not in use and no longer required for inclusion in the Works, all condemned materials and all rubbish shall be removed from the Site as and when required by the Principal. Combustible rubbish shall be removed daily and shall not be burned. Disposal shall be in an approved fashion in an area designated by the Principal.

4.6.3 Waste oil shall not be collected or stored in open drums or containers. Spilt oil or other chemicals shall be cleaned up immediately using approved absorbent materials. The use of sand or sawdust is prohibited. Equipment, cable racks, walkways, floors, etc., shall be cleaned of contamination by using approved detergents and water wash or spray.

4.6.4 If the Contractor fails to comply with any of the above requirements within 24 hours of notice in writing by the Principal, the work may be carried out by the Principal and the total cost to the Principal of the work will be charged to the Contractor.

#### **4.7 Services at Site**

4.7.1 Where services are available the Principal will provide electricity and water supply for the Contractor's use from an existing source. One supply shall be provided for the Contractor's Site Facilities and others for the Works as approved by the Principal's representative. The quality and continuity of water and electricity supplies is not guaranteed. All costs associated with connection to services shall be the Contractor's responsibility.

4.7.2 The use of portable lights operated at 240 V a.c. will not be permitted in damp places, such as tunnels, pits or elsewhere as directed, but arrangements shall be made for the use of 32 V a.c. portable lights supplied from transformers of approved type connected to the 240 V a.c. system. The transformers and portable lights shall be supplied by the Contractor to suit the requirements. Residual Current Devices are required on all 240 and 415 volt outlets.

4.7.3 The Principal provides a limited number of fixed toilet facilities on the Site which may be used by the Contractor, but the availability of these toilets is not guaranteed by the Principal. In general, if the Contractor is established on Site, with site office and storage facilities, then the Contractor and his Subcontractors shall provide their own prefabricated transportable toilet units or arrange for joint usage. Individual septic tank installations require a council permit and Site approval. The standards required are set down by the Principal, the local authorities and the regulations of the Occupational Health & Safety Act.

4.7.4 Sullage water shall not be discharged directly or indirectly into watercourses, rivers, and lakes. The Contractor shall dispose of sullage in a manner approved by the Principal.

4.7.5 The Principal's mail and telephone facilities are not available to the Contractor, except in cases of extreme emergency. Local arrangements shall be made with other Contractors if there are communication problems in the initial stages. Public telephones are available at Bayswater and Liddell Power Stations.

#### **4.8 Site Safety**

4.8.1 On the matter of personnel safety on the Site, the Contractor shall comply with the requirements of all relevant statutory bodies and all appropriate codes. The Contractor shall at all times exercise all necessary precautions for the safety and health of employees appropriate to the nature of work and the conditions under which the work under the Contract are to be performed, and in compliance with all statutory requirements and such directions as the Principal may from time to time consider necessary or desirable.

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### Bayswater Power Station

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- 4.8.2 The Contractor shall conform to the provisions of the Occupational Health and Safety Act (hereafter OHS Act) and the regulations made thereunder and in force from time to time during the period of the work under the Contract. The Contractor shall provide, erect and maintain, as and when required, adequate fences or any other equipment which in the opinion of the Principal are required to ensure the safety of all personnel engaged in the execution of the Works and the safety of the general public.
- 4.8.3 The Contractor shall supply and deliver to the Principal at Bayswater Power Station a copy of all notices served in complying with Acts of Parliament and the requirements of Statutory Authorities.
- 4.8.4 The Contractor shall appoint for the duration of the work under the Contract at Site, a Site Safety Officer who shall be responsible for the implementation of all safety requirements of this Specification. The Site Safety Officer shall be located either permanently on Site or at a location from which he or she can attend the Site within three hours of being required so to do.
- 4.8.5 The Contractor shall be responsible for providing additional training on safety procedures specific to the Works.
- 4.8.6 The Contractor shall carry out the work under the Contract strictly in accordance with the requirements of the Principal's Safety Rules.
- 4.8.7 Accredited representatives of firms proposing to submit a Tender may inspect copies of these Rules at the Site. A copy of the Rules will, if required, be issued to the Contractor. They must be returned at the Date of Practical Completion.
- 4.8.8 Where the Works require Permits to Work (PTW), the Contractor shall provide one or more supervisors to be trained in the Principal's Safety Rules to attain qualification so as to carry out all activities associated with PTWs. Refresher training is required annually for persons to maintain such qualification. The names of the initial persons to be trained shall be submitted by the Contractor within the period set out in Table A - Table of Key Dates. All costs associated with the requirement for PTW training shall be allowed for in the Total Tender Price.
- 4.8.9 Where Works involve work on or inside a "confined space", training in confined space procedures in conformance with the **NSW OHS Act 2000 Regulation 2001 and any amendment thereto**, will also be required. This training will not be provided by the Principal and shall be arranged and provided by the Contractor with all costs allowed for in the Total Tender Price.
- 4.8.10 Prior to commencement of the works on Site or at the times specified in Table A – Table of Key Dates, the Contractor shall submit to the Principal for comment and approval:
- a) **Detailed Site Specific Project OHS&R Management Plan which shall comply fully with the New South Wales Government OHS&R Management Systems Guidelines and OHS Act and Regulations.**
  - b) **Detailed documented Risk Assessments covering design, manufacture, supply, construction and commissioning in accordance with the National Standard for Plant NOHSC:1010 (1994) and the NSW Occupational Health and Safety Act and associated Regulations.**
  - c) **Safe Work Method Statements.**
- 4.8.11 The Safe Work Method Statement shall be detailed and comprehensive, and make provision for environment protection where relevant. The Contractor shall ensure these Safe Work Method Statements will be communicated to, readily available to and used by all involved in the work.
- 4.8.12 The Contractor shall implement and observe the **Site Specific Project OHS&R Management Plan** approved by the Principal.
- 4.8.13 The Contractor shall be responsible for the safety of his visitors at Site.
- 4.8.14 Details of the Principal's procedures for emergencies requiring ambulance, fire fighting or police action are set down in the Principal's Site Emergency Plan.

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- 4.8.15 The Contractor shall be responsible for arranging and conducting inductions for his employees including the employees of his Subcontractors. Prior to commencing any work on Site each employee shall successfully complete the following courses conducted by a Macquarie Generation approved trainer who is also accredited jointly by the WorkCover Authority and the Building and Construction Training Council as having completed the "Orientation Course for Accreditation of Trainer for Industry Approved Occupational Health & Safety Induction Course":
- (a) a course on general occupational health and safety; and
  - (b) a course on general environmental awareness and occupational health and safety matters specific to the Site.
- 4.8.16 The Contractor shall state, in the **Site Specific Project OHS&R Management Plan**, the name(s) of the Person(s) it is proposed to engage for the purposes of complying with the above employee induction requirements and the WorkCover Authority Accreditation Number for that person. The Contractor shall also attach a list, provided and certified by the nominated trainer, of the topics, which will be covered by the training required in accordance with this Clause.
- 4.8.17 At the time of proposing commencement of work by an employee on Site, the Contractor shall either:
- (a) Provide a certified statement from the WorkCover accredited trainer confirming that the proposed employee has successfully completed the courses referred to in the **Site Specific Project OHS&R Management Plan**;
  - Or,
  - (b) Certify that the proposed employee will undertake and complete the courses referred to in the **Site Specific Project OHS&R Management Plan** on the day that it is proposed that the employee starts work on Site but before any work is commenced.
- 4.8.18 Prior to commencing work on Site, each employee shall acknowledge attendance at the courses referred to above by signing the form provided to the Contractor by the Principal.
- 4.8.19 Where an employee whom the Contractor or his Subcontractors proposes to work on Site has met the requirements for induction within the previous three (3) years and worked on site within the previous 12 months and will perform work of a similar nature, the Principal may agree, upon application by the Contractor quoting details of when the employee last met the requirements for induction to waive those requirements for a specific instance. In such circumstances the decision of the Principal shall be final.
- 4.8.20 The Contractor requires a written authority from the Principal to use plant owned by the Principal. Persons using such equipment must have the appropriate competencies or qualifications

## 4.9 Fire Protection and Fire Fighting

- 4.9.1 The Contractor shall be responsible for the fire protection of his own buildings, plant and equipment and shall assist in the fire protection of the buildings, plant and equipment of the Principal and other Contractors. The method of complying with this requirement shall be detailed in the Site Safety Management Plan.
- 4.9.2 The Principal has provided fire fighting equipment for the purposes of fire protection of the Principal's buildings, plant and equipment to meet normal operating needs. Additional precautions shall be taken to cover the specified work. The Contractor shall provide additional, appropriate and adequate fire fighting equipment in areas where the Contractor is working. The Contractor shall provide, as a minimum, the fire fighting equipment necessary to comply with Australian Standard *Portable fire extinguishers and fire blankets – Selection and location (AS2444)*.
- 4.9.3 The Contractor shall ensure adequate fire fighting equipment is appropriately positioned whilst carrying out work at the Site.

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- 4.9.4 The Contractor shall maintain and regularly service his fire fighting equipment in accordance with Australian Standard *Maintenance of Portable fire protection equipment, Part 1, Portable fire extinguishers and fire blankets* (AS1851.1) and shall recharge his extinguishers after use, at no cost to the Principal, regardless of how they were discharged. Provision for the maintenance and servicing of the Contractor's fire fighting equipment shall be included in the Safety Management Plan.
- 4.9.5 The Contractor is not prohibited from using the Principal's fire fighting equipment if the circumstances call for their use. However, the Contractor shall immediately inform the Principal of the use of any equipment so that systems can be recharged as required.
- 4.9.6 As part of its fire prevention measures, the Contractor shall ensure that all its inflammable materials, including flammable liquids and gases, are stored on site in accordance with the requirements of the Dangerous Goods Regulation.

#### **4.10 Site Security, Access and Removals From Site**

- 4.10.1 The Principal's power station site is maintained under a security system. The Principal's Security Staff will wear identification cards and each of their vehicles will be clearly identified as a security vehicle. Contractor's and Subcontractor's staff are required to wear Contractor's identity cards whilst on the power station site at all times.
- 4.10.2 Prior to initial entry to the power station Site of any employee, the Contractor shall request the Principal to issue a Contractor's identity card. The Contractor's staff will not be admitted to the power station Site unless wearing the appropriate identity card. All identity cards shall be returned to the Principal on completion of the Contractor's contractual obligations and/or termination of an employee's services.
- 4.10.3 In the event that an identity card is lost, the matter shall be reported immediately to the Principal. A fee will be charged by the Principal to the Contractor for all unaccounted Contractor's identity cards.
- The Tenderer shall ascertain the requirements at the specific Site at the Site meeting referred to in Clause 4.2.
- 4.10.4 The normal access to the Power Station Site is through the main gate which is manned to control vehicular access. Special access to other parts of the Power Station Site may be arranged subject to conditions on traffic control and security.
- 4.10.4 Only marked Contractor's vehicles will be permitted entry to the Bayswater Power Station Inner Site Perimeter. Private vehicles will not be granted access. Vehicle Access ID Cards may be issued following an application in writing by the Contractor to the Principal. The Contractor shall apply for Vehicle Access ID Cards for issue to its Subcontractors.
- 4.10.6 All vehicles, unless authorised to the contrary, are to use the Administration Gate to enter and exit the Inner Site Perimeter of Bayswater Power Station.
- 4.10.7 Vehicle Access ID card must be scanned to operate the automatic boom gates. In addition to scanning the vehicle access ID card, the driver and all passengers in the authorised vehicle shall be responsible for ensuring their Personal Access ID card is scanned when entering or exiting the Inner Site Perimeter.
- 4.10.8 The Vehicle Access ID card is not transferable. The Card is to remain with the vehicle at all times. Contractor may be asked to present the card whilst on the Bayswater Site.
- 4.10.9 The Contractor is responsible for the safe security of the Card.
- 4.10.10 All drivers of vehicles on Bayswater Site shall possess a current driver's licence.
- 4.10.11 Site parking regulations and speed limits shall be strictly observed. Offenders may be refused further access to the Principal's property.
- 4.10.12 Non employees are only permitted on Site on official business. Children are not permitted on the Site.

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### **Bayswater Power Station**

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- 4.10.13 Traction and prime mover vehicles that are primarily designed for travelling on public roads and are used on the Power Station Site shall be registered with the appropriate State Authority unless exempted in writing by the Principal. All non-registered plant shall be maintained to a satisfactory standard, as required by the Principal.
- 4.10.14 Neither the Contractors or its Subcontractors, shall remove materials or equipment from the Site unless accompanied by a signed docket ('Removal from Site Form' or 'Pass Note for Macquarie Generation Property') which shall be presented to the Principal's security staff when the removal takes place. The Contractor shall give adequate notice for the removal from the Site of all items owned by the Principal so that the Principal shall have adequate time to arrange insurance, notifications and clearances.
- 4.10.15 The Site Manager will be advised of the arrangements for the issue of dockets at the Site meeting referred to in Clause 4.3.4 prior to commencement of work at the Site.

#### **4.11 Site First Aid**

- 4.11.1 The Contractor, his Subcontractors and their respective employees shall be familiar with and comply with the emergency procedures applying to the Site. The Contractor shall in all respects be fully responsible for ensuring the provision of first aid services to his employees and those of his Subcontractors including transport for injured persons to hospital or other appropriate destination as and when required.
- 4.11.2 In addition to any Statutory requirements or regulations the Contractor shall promptly report to the Principal in the form to be supplied, all accidents involving the death or serious injury of his employees and those of his Subcontractors.
- 4.11.3 The Contractor shall comply with the requirements of the Occupational Health and Safety (First Aid) Regulation.

#### **4.12 Subcontractors**

- 4.12.1 Any Subcontractor to whom the Contractor proposes subcontracting any part of the work under the Contract must be approved by the Principal. In addition, before considering any request for the approval of a Subcontractor, the Principal may require production of the proposed Order between the Contractor and the proposed Subcontractor. Such Contract, executed by the proposed Subcontractor, shall forbid the assignment thereof and shall provide that the Subcontractor shall not further subcontract without the Contractor's previous approval in writing. Before giving any approval for such further subcontract by the Subcontractor the Contractor shall obtain the Principal's written approval. Notwithstanding any such approval given, the Contractor shall be liable to the Principal for the acts, defaults and neglects of any further Subcontractor or any of the employees or agents of any further Subcontractor as if they were the acts, defaults and neglects of the Contractor or the employees or agents of the Contractor.
- 4.12.2 The proposed Site Manager of any Site Subcontractor shall be required to attend a site interview with the Principal's Site staff, in the presence of the Contractor's Site Manager, to determine their acceptability prior to approval by the Principal and commencement of work. The Contractor shall request that this interview be arranged by submitting the appropriate form, available from the Principal. This form shall be submitted a minimum of five working days notice prior to the preferred interview date.
- 4.12.3 Subcontractors already working for another Contractor at Site shall be separately approved for work under this Contract.
- 4.12.4 The Contractor shall normally allow 14 days for approval of Subcontractors.

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#### 4.13 Industrial Relations

- 4.13.1 The Principal has an obligation to maintain reliability of supply to its customers and the Contractor shall take all reasonable and proper action to promote and obtain industrial harmony between his employees, agents and Subcontractors and those of the Principal and other contractors on the power station Site during the period of the Contract.
- 4.13.2 The Contractor shall consult with the Principal prior to commencing any negotiations for future industrial arrangements/agreements covering the work under the Contract and shall continue to liaise with and keep the Principal informed during the course of any negotiations with unions and/or employees. During the course of the Contract, the Contractor or his Site Manager shall promptly inform the Principal or his nominated Site representative of any potential or actual industrial problems or any proposed changes to the Industrial arrangements/ agreements. No changes shall be implemented without prior discussion with the Principal. The Principal shall be given at least 28 days prior written notice of any proposed changes to industrial arrangements/agreements. If requested by the Principal the Contractor shall provide the Principal with a copy of any current, new or amended industrial arrangement/ agreement relating to the Site work under the Contract.
- 4.13.3 The Contractor shall comply with the provisions of the appropriate industrial relations legislation during the course of the Contract.
- 4.13.4 The Contractor shall ensure that his industrial arrangement, and any future negotiated industrial arrangement or agreement, will not jeopardise or restrict the Principal's ability to operate and maintain the power station as a whole, as and when required.
- 4.13.5 Details of the proposed industrial arrangements, such as name of award(s)/enterprise agreements, shall be provided with the Quotation.

#### 4.14 Environmental Protection

- 4.14.1 **Environmental Compliance.** The Contractor shall ensure that the Contractor, its employees, servants, agents and invitees:
- a) Are environmentally conscious and minimise any adverse impact on the environment attributable to their activities;
  - b) Have all appropriate permits, approvals and licences and verify this by providing copies of such to the Contract Administrator;
  - c) Comply with the requirements of the New South Wales Department of Environment and Conservation and all applicable legal and legislative requirements;
  - d) Comply with the requirements of any relevant development consent, construction approval, Environmental Impact Statement and/or Determining Authorities Assessment Report;
  - e) Take all precautions necessary to prevent the discharge of any pollution (including water pollution, air pollution, noise pollution and land pollution as defined in Protection of the Environment Operations Act 1997 (NSW)); and
  - f) Ensure all liquids stored on Site are contained and stored in accordance with the requirements of the Dangerous Goods Act 1975 (NSW).
- 4.14.2 Facilities, Plant and Equipment.** The Contractor shall ensure that:
- a) All facilities erected on the Site by the Contractor, its employees, servants and/or agents shall be designed and operated to prevent the emission of any pollution into the atmosphere including smoke, dust, cement dust and other objectionable matter;
  - b) Plant and equipment is maintained in a manner which does not cause pollution, including contamination of soil; and
  - c) Washing down of machines and plant is only carried out on a paved concrete area, the

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drainage from which shall be provided with approved oil separation traps before discharge into any waterway. The Contractor shall be responsible for regular removal of deleterious matter from such traps and its disposal by approved methods. All oil and fuel spilt or leaving from any item of plant or equipment shall be cleaned up immediately if necessary by excavation of impregnated soil and its removal to approved disposal areas. If any waterway becomes contaminated by oils or similar materials as a result of the Contractor's failure to comply with the requirements of this clause, the Contractor shall, at no cost to the Principal, comply with all directions given by the Principal and any relevant Authority to clean-up the contaminated areas and to prevent any further pollution.

**4.14.3 Precautions to be taken by Contractor.** The Contractor shall take all proper precautions and shall ensure that its employees, servants, and agents take all proper precautions to:

- a) Minimise any nuisance (including dust) arising from the work being carried out, including complying with the Occupational Health and Safety Regulation 2001 (NSW). Such precautions may include but shall not be limited to spraying the roads with water or other suitable liquids, the removal of mud from the wheels and bodies of hauling equipment before they enter the public roads, and the removal of mud split by construction equipment on public roads; and
- b) Prevent the erosion of soil from any lands used or occupied by the Contractor or from the bed or banks of any stream or lake.

**4.14.4 Removal of Waste**

- a) All waste generated by the Contractor's activities is the responsibility of the Contractor to remove unless otherwise agreed. All waste disposal must be in accordance with the Protection of the Environment Operations Act 1997 (NSW).
- b) The Contractor shall not and shall ensure its employees, servants and agents do not deposit excavated or eroded materials in any stream or lake or reservoir.

**4.14.5 Clearing of Vegetation.**

The Contractor shall not and shall ensure that its employees, servants, agents and invitees do not destroy, remove or clear trees, timber and scrub to an extent greater than is necessary for the execution of the work under the Contract as determined by the Principal or any relevant Authority.

**4.14.6 Remedial Work to be Undertaken.** If, in the opinion of the Principal, the Contractor's operations cause erosion hazards, the Contractor shall at no cost to the Principal, obtain the advice of the Department of Infrastructure, Planning and Natural Resources after prior advice has been sought from the Principal and effect such remedial measures as recommended by the Principal or that Department.

**4.14.7 Environmental Emergencies.** The Contract shall ensure that in the event of an environmental incident:

- a) The Contract Administrator is immediately advised; and
- b) Adequate facilities and equipment are readily available to contain, remove and decontaminate affected areas in the case of an accidental spill or discharge of a pollutant.

**4.14.8 Reports and Assessment.** The Contractor shall and shall ensure that all of its employees, servants and agents:

- a) Carry out an environmental risk assessment to cover all work. This shall be documented in the Request for "Commencement for Work at Site" document, a copy of which will be forwarded by the Principal to the Contractor soon after letting of the Contract; and

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- b) Upon request from the Principal, submit to the Contracts Administrator for comment and approval a Project Environmental Management Plan showing all information of specific actions, responsibilities, dates of implementation and monitoring processes; and
- c) Comply, and procure that its employees, servants and agents comply, with the Project Environmental Management Plan as approved by the Principal and including such amendments, as the Principal reasonably requires.

#### **4.14.9 Content of Project Environmental Management Plans.** The Project Environmental Management Plan shall make reference to, as a minimum the following items:

- a) Statutory obligations;
- b) Site induction;
- c) Staff training in environmental matters;
- d) Environmental emergency procedures;
- e) Storage of environmentally hazardous materials;
- f) Incident reporting procedures;
- g) Pollution prevention procedures;
- h) Pollution containment procedures; and
- i) Risk assessment covering intended activities.

#### **4.15 Erection and Checking of Works**

4.15.1 All work on the Site shall be carried out in such a manner so as not to obstruct the operations of any other Contractor or the operation of existing plant. The Contractor shall submit to the Principal for discussion and approval all proposed erection and commissioning procedures and particulars of any proposed Temporary Works.

4.15.2 The Contractor shall make the Works available at all times for inspection by the Principal. Temporary access and landings shall be provided for this purpose and all such temporary access provided for inspection purposes shall be to the satisfaction of the Principal.

#### **4.16 Protective Clothing and Safety Equipment**

4.16.1 In addition to any Statutory requirements or regulations the Contractor shall ensure that protective clothing, safety footwear and personal protective equipment is worn where appropriate by his employees while carrying out the work under the Contract.

4.16.2 The Contractor shall comply with directives issued from time to time by the Principal specifying the nature and type of protective clothing and personal protective equipment that shall be worn by persons performing specified tasks or working in specified areas at the Site. Unless otherwise directed or specified the Contractor, his employees and those of his Subcontractors shall wear as a minimum requirement a long sleeved shirt and long trousers or combination overalls together with safety footwear and safety helmet.

4.16.3 The fact that the Principal has or has not issued a directive or directives regarding the wearing of protective clothing, footwear and personal protective equipment shall not absolve the Contractor from his obligations to his employees and other persons.

#### **4.17 Earthmoving Plant and Mobile Cranes**

4.17.1 All earthmoving plant and mobile cranes fitted with an enclosed cabin and required for use on the Site by the Contractor shall be air conditioned.

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#### **4.18 Hazardous Substances Register**

- 4.18.1 In addition to any Statutory requirements or regulations the Contractor shall maintain a register of his hazardous substances on Site in a manner and format acceptable to the Principal. Such register shall be readily available for inspection by the Principal. A copy of such register and updated weekly details shall be issued to the Principal by the Contractor. The Contractor shall provide current Material Safety Data sheets for the hazardous substances on Site listed in his register. Hazardous substances shall not be delivered to Site without prior notification to and the approval of the Principal.
- 4.18.2 The Contractor shall ensure that hazardous chemicals are stored as per legal requirements and that they have all appropriate permits, approvals and licences and verify this by providing copies of such to the Contract Administrator.

#### **4.19 Employee Remuneration**

- 4.19.1 The Principal will require a written statement that the Contractor has paid all entitlements due to its employees. The statement must be signed by a person authorised and attached to any Payment Claim. Failure to do so will result in payment being withheld.

#### **4.20 Pay Docket Details**

- 4.20.1 The Contractor shall provide each employee with their individual payment/deduction details on or prior to their recognised pay day. The Contractor's attention is also drawn to the provisions of the Contract for Supply of Works/Services in relation to the payment of wages and allowances.

#### **4.21 Pressure Welding**

- 4.21.1 Employees who are actually engaged in butt welding of pressure pipes and fabrication of pressure vessels shall have undergone and passed a test, to the satisfaction of the Principal, to the minimum standards below:
- 4.21.2 All welds shall be subjected to visual, radiographic and physical examination to AS 1228, part 4.5.1.c; ASME, Part IX; AS 1210, parts 4.2.2.2.C. and 5.15.2 and C.B. 15, Part 6.1.6.3. If all tests are passed the employee qualifies.

#### **4.22 To 4.25 Not Used**

#### **4.26 Contract Documentation**

##### **4.26.1 Submission of Information and Drawings**

- 4.26.1.1 Where drawings, documents and information are required, under the Contract, to be delivered to the Principal, they shall be forwarded under cover of a letter. Unless approved otherwise the original of this letter shall be mailed to the Principal's postal address (PO Box 3416 Hamilton Delivery Centre NSW 2305). All drawings, documents, information, correspondence, test reports, etc., shall be in the English language. In the case of pamphlets and trade brochures, English translations neatly marked on the documents shall be deemed to have complied with this Clause.
- 4.26.1.2 All drawings and information provided shall be in metric Units in accordance with AS 1000 - "The International System of Units (SI) and its Application", AS 1046 - "Letter Symbols for Physical Quantities" and AS 1100 - "Drawing Practice".
- 4.26.1.3 Copies of documents supplied by the Contractor shall be the property of the Principal but shall not be used or copied otherwise than for the use, maintenance, alteration, repair, rehabilitation of the Works or the procurement of spare parts for the Works by the Principal, its Contractors, Subcontractors or Agents.

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#### **4.26.2 Program and Progress Reports**

- 4.26.2.1 By the date or within the period stated in Table A - Table of Key Dates of Part 1, the Contractor shall submit to the Principal, for comment and approval, a detailed program for the Works indicating how it is proposed to meet the programmed dates set out in Table A - Table of Key Dates of Part 1.
- 4.26.2.2 The program shall be presented such that it complies with the Principal's standard for contract drawings.
- 4.26.2.3 The program(s) shall indicate for each item of plant, building, structure or services, the various phases of the work from the date of Acceptance of Tender to the Date for Practical Completion (ie. design, preparation of drawings, submission to the Principal of information and drawings, placing of orders for materials, manufacture of materials, delivery of material to Site, erection, testing and commissioning of each section of the Works). The appropriate program(s) shall contain references to delivery and erection of all the Works, and shall show when each terminal point will be made available to other contractors, and when the various items or access to be provided by the Principal under Part 1 of the Specification will be required to be made available to permit the Contractor to carry out all contractual obligations.
- 4.26.2.4 If listed in Table A - Table of Key Dates of Part 1, the Contractor shall by the date or within the period indicated, submit to the Principal for comment and approval a detailed plant commissioning and testing program for the work under the Contract indicating how it is proposed to meet the programmed dates.
- 4.26.2.5 The Contractor shall submit to the Principal, each month, detailed reports on the progress of the work under the Contract. The reports shall be referenced to the items in the Contract program(s), and the details of and the form in which the progress reports are furnished shall be to the approval of the Principal.

#### **4.26.3 Copies of Orders**

- 4.26.3.1 As soon as practicable after entering into the Contract, the Contractor, having obtained the Principal's approval, shall enter into the Subcontracts he considers necessary for the satisfactory completion of the Works.
- 4.26.3.2 Three unpriced copies of the Contractor's orders to Subcontractors shall be supplied to the Principal. This requirement shall apply also to those cases where a Subcontractor further subcontracts its work except for items of a minor nature and which are not manufactured specifically for this Contract. Orders and Sub-orders passed between autonomous divisions or Work-Centres in multi-divisional organisations shall be subject to the same requirements as Orders or Sub-orders passed by the Contractor or Subcontractor.
- 4.26.3.3 The orders shall be marked "Subject to Inspection by "Macquarie Generation" and shall include:
- An adequate description of the work plant item for proper identification.
  - A reference that the items or services are to comply with this Specification.
  - Contract number, Contact title and Order number.
  - The name of the Supplier/Subcontractor.
  - The address of Point of Service of Manufacture.
  - The Quality System Standard and Category applicable.
  - An Inspection and Test Plan Reference.
  - The form of, and responsibility for, acceptance for delivery to the Contractor's works or to Site.

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#### 4.26.4 Test Certificates

- 4.26.4.1 Unless otherwise indicated in the Quality Assurance Requirements in Part 1 of this Specification, the contractor shall supply and deliver to the Principal two certified copies of all test results required under the Contract. The result(s) of each test shall be recorded in the form of test certificates or test reports and shall be delivered within one month of the test being carried out.
- 4.26.4.2 Information shall be given on each test certificate sufficient to identify the material or equipment to which the certificate refers. The Contract No. and contract title shall appear on all test certificates/reports.

#### 4.26.5 Minor Omissions and Minor Defects List

- 4.26.5.1 The Contractor shall, when the Works reach the stage of Practical Completion, prepare a list and a program for the completion of the minor omissions and minor defects. The non-supply of Operating and Maintenance Manuals shall not be listed as a minor omission.
- 4.26.5.2 The Contractor shall provide and retain sufficient staff (including Subcontractors' staff) until the programmed work has been completed.
- 4.26.5.3 The Contractor shall modify the program to comply with all reasonable requirements of the Principal and carry out the work in accordance with the program approved by the Principal.

#### 4.27 Contract Drawings

##### 4.27.1 Specification Drawings

- 4.27.1.1 The drawings included in and forming part of the Specification are listed in Table B of Part 1.
- 4.27.1.2 It shall be noted that notwithstanding the fact that drawing numbers are shown without amendment numbers or letter in the body of the Specification, each drawing included in the Specification shall be deemed to have the appropriate amendment number or letter as detailed in Table B of Part 1.
- 4.27.1.3 Engineering documents such as drawings, programs, graphs, diagrams, schedules, etc. shall be forwarded by the Contractor to the Principal and be suitable for xerographic production and be at full size, in the form of opaque paper copies with a minimum weight of 75 GSM (for drawing sizes A4 to A1 only).
- 4.27.1.4 Documents submitted by the Contractor shall be first generation copies.
- 4.27.1.5 Processing shall be to the copying-material manufacturer's recommendation and shall be carried out in such a way that background, clogging and thickening or thinning of line-work are minimised. Contrast shall be optimised so that maximum re-printability is obtained with minimum background.
- 4.27.1.6 Initially, sample copies shall be submitted by the Contractor to the Principal for approval prior to the production of official copies. Folding or creasing of the copies shall not be permitted.

##### 4.27.2 Contract Documents

- 4.27.2.1 Engineering documents such as programs, graphs, schedules, etc. shall be forwarded by the Contractor to the Principal at full size, in the form of opaque paper copies with a minimum weight of 75 GSM
- 4.27.2.2 Documents submitted by the Contractor shall be first generation copies and shall be suitable for xerographic reproduction.
- 4.27.2.3 All submission of drawings and diagrams, both initial and accepted shall be in electronic form and, in particular, shall be in AUTOCAD format stored on a CD-ROM.
- 4.27.2.4 A sample of drawing and document types shall be submitted by the Contractor to the Principal for approval prior to the production of official copies.

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- 4.27.2.5 All drawings submitted by the Contractor, whether final or preliminary drawings, shall be particular to the contract and shall where applicable, be drawn to scale. Each drawing shall include a reference to the location, Contract No., Unit No. if applicable, plant item and part concerned for proper identification. Each drawing shall be clearly marked indicating the basis of issue.
- 4.27.2.6 All drawings shall be titled in accordance with the Principal's Standard Drawing Management System.
- 4.27.2.7 Drawings shall conform to the relevant parts of Australian Standard AS 1100 (Engineering Drawing Practices) in line density and thickness, character size and formation and legibility.
- 4.27.2.8 All drawings and subsequent amendments provided under the Contract shall be approved by a responsible representative of the Contractor and this shall be indicated on the drawing.
- 4.27.2.9 Documents supplied by the contractor, other than in electronic form, shall comply with the following standard:

#### Standard Document Sheet Sizes

ISO Size	Sheet Size (mm)
A0	841 x 1189
A1	594 x 841
A2	420 x 594
A3	297 x 420
A4	210 x 297

Where extreme circumstances exist, other document sizes may be accepted on approval from the Principal.

Document Material: Documents provided by the contractor shall be opaque paper copies with a minimum weight of 75 GSM (for drawing sizes A4 to A1 only).

Image: Shaded images are not permitted. Hatching or extra bold outlining to aid emphasis is acceptable.

Packaging: Copies shall be packed and delivered in suitable cardboard cylinders.

**FOLDING OR CREASING OF THE COPIES SHALL NOT BE PERMITTED.**

#### 4.27.2.10 **SETTINGS FOR AUTOCAD**

4.27.2.10.1 To provide consistency, the settings as listed shall be used in the preparation of drawings and shall not be varied without the approval of the Principal.

#### 4.27.2.10.2 **LINETYPES**

All line types are to be metric where 1 unit = 1mm and conform to AS1100. Entity line types are to be set to "BYLAYER". Under no circumstances shall any new line types be created unless approved by the Principal. The following table lists the line types to be used.

DESCRIPTION	AutoCAD NAME
CONTINUOUS	CONTINUOUS
CENTRE	CENTRE2
HIDDEN	DASHED
SHORT HIDDEN	HIDDEN2
PHANTOM	PHANTOM

**Table 1 - Line Types**

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##### 4.27.2.10.3 COLOURS

Entity colours are to be set to "BYLAYER". The following table lists the standard AutoCAD colour and plotting pen line thickness and number association.

ACAD NO.	COLOUR	PEN THICKNESS
2	(yellow)	0.35
3	(green)	1.00
4	(cyan)	0.5
5	(blue)	0.7
6	(magenta)	0.13
7	(white)	0.25
8	(grey)	0.18
254	(grey)	0.18

**Table 2 - Colours**

##### 4.27.2.10.4 TEXT STYLES AND FONTS

The following table lists the standard text styles and fonts to be used for the creation of all text. The standard font file is 'iso3098b'. Other text styles can be used on approval of the Principal.

STYLE	STD	STD	STD	STD	STD
FONT	iso3098b	iso3098b	iso3098b	iso3098b	iso3098b
PLOTTED HEIGHT	1.8mm	2.5mm	3.5mm	5.0mm	7.0mm
COLOUR	1 (red)	7 (white)	2 (yellow)	4 (cyan)	5 (blue)
LAYER	T1	T2	T3	T4	T5
A1 PLOT PEN WT.	0.18	0.25	0.35	0.5	0.7

**Table 3 - Text Styles**

##### 4.27.2.10.5 DIMENSIONS

All dimensions are to be associative and must not be exploded. They are to be created on layer prefixed 'Dim'(ie Dim10, Dim20, Dim50, etc) which reflects the intended Paper Space viewport scale.

All dimensions are to be created using the dim styles available on the standard template drawings.

Dimension shall be in Paper Space.

Dimensioning in Model Space will only be allowed at the direction of the Principal.

All dimensions are to be expressed in millimetres.

##### 4.27.2.10.6 HATCHING

All hatching shall be on layer Hatch.

##### 4.27.2.10.7 ANNOTATION

All annotation such as text, hatching, symbols, revision clouds and hold clouds must be produced on the separate allocated layers and be drawn in AutoCAD paper space.

Sections are to be called up alphabetically and Details are to be called up numerically.

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Descriptive text and general notes to have a height of 2.5 mm

Labels and names of structures to be 3.5 mm.

Main titles to be 5.0 mm.

#### 4.27.2.10.8 SCALES

Any change to the following standard drawing scales must be approved by the Principal.

1:1	1:10	1:100	1:1000
1:2	1:20	1:200	1:2000
	1:25	1:250	1:5000
1:5	1:50	1:500	1:10000

**Table 4 - Scales**

Note that 1:20 and 1:25 scales are not to be used on the same drawing.

#### 4.27.2.10.9 HOLDS

'Hold' clouds shall be used to segregate tentative information so that any drawing can be issued for tender or construction prior to the drawing being completed. The word 'HOLD' and the reason for the hold shall be shown inside the cloud. Clouds shall not be drawn through text or detailed information where legibility of the information will be compromised.

#### 4.27.2.10 LEVELS

Generally, levels shall be expressed in metres to 3 decimal places. Where the level is less than 1 metre it shall be prefixed by a zero eg. RL 0.940

#### 4.27.2.10.11 COORDINATES

Coordinates shall be expressed in metres to 3 decimal places prefixed by E or N as befitting for example, E 1200.242.

When giving coordinates for a point, Easting shall precede the Northing.

#### 4.27.2.10.12 REFERENCE DRAWINGS

All drawings which are required to be read in conjunction with another drawing shall be cross referenced using the 'reference drawing' section of the standard drawing sheet.

#### 4.27.2.10.13 NOTES

Notes specific to a drawing shall be placed under the heading "Notes" in the bottom right hand side of the drawing in Paper Space.

#### 4.27.2.10.14 LAYERING

Layer naming shall have no more than 10 characters.

#### 4.27.2.10.15 UNITS

All data shall be produced in a real world 1 unit = 1 mm scale.

#### 4.27.2.10.16 DRAWING FORMAT

All CAD files must be produced in AutoCAD R14.DWG or later version.

#### 4.27.2.10.17 COMPRESSED FILES

Files may be compressed using WINZip.

#### 4.27.2.10.18 STANDARD LAYERS (FOR REFERENCE ONLY)

LAYER NAME	COLOUR	PEN	LINE TYPE	USE
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LAYER NAME	COLOUR	PEN	LINE TYPE	USE
T1	1 (red)	0.18	CONT	TEXT 1.8
T2	7 (white)	0.25	CONT	TEXT 2.5
T3	2 (yellow)	0.35	CONT	TEXT 3.5
T5	4 (cyan)	0.5	CONT	TEXT 5.0
T7	5 (blue)	0.7	CONT	TEXT 7.0
0	7	0.25	CONT	
CL	8 (grey)	0.18	CENTRE2	CENTRELINES
Dim	254	0.18	CONT	DIMENSIONS
H1	1	0.18	DASHED	0.18 HIDDEN LINES
H2	7	0.25	DASHED	0.25 HIDDEN LINES
H3	2	0.35	DASHED	0.35 HIDDEN LINES
H5	4	0.5	DASHED	0.5 HIDDEN LINES
H7	5	0.7	DASHED	0.7 HIDDEN LINES
H10	3 (green)	1.0	DASHED	1.0 HIDDEN LINES
HATCH	1	0.18	CONT	HATCHING
L1	1	0.18	CONT	0.18 LINES
L2	7	0.25	CONT	0.25 LINES
L3	2	0.35	CONT	0.35 LINES
L5	4	0.5	CONT	0.5 LINES
L7	5	0.7	CONT	0.5 LINES
L10	3	1.0	CONT	1.0 LINES
Ph	1	0.18	PHANTOM	PHANTOM LINES
SYM	7	0.25	CONT	SYMBOLS
Ti	7	0.5	CONT	TITLE BLOCK

**Table 5 - Standard Layers**

#### 4.27.3 Initial Contract Drawing Submissions

##### 4.27.3.1

The Principal, having received the submitted drawings, shall either:

- a) Advise of acceptance of the drawings. Acceptance means that the drawings have been received without comment being required at that time. Acceptance of the drawings does not have any meaning or connotation of approval;
- b) Require the drawings to be resubmitted after making comments seeking clarification of or amendment to the drawings or further drawings; or
- c) Reject the drawings and require the Contractor to submit substitute drawings.

#### 4.27.4 Accepted Contract Drawings

##### 4.27.4.1

After the acceptance of drawings the Principal reserves the absolute right to convert all drawings to a format suitable for permanent storage in any Macquarie Generation Drawing Management System.

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4.27.4.2 All accepted drawings will be registered by the Principal in the Principal's Drawing Management System.

4.27.4.3 Immediately design alterations are made, the associated drawings shall be amended accordingly. Such drawings shall clearly indicate the extent of the amendment made and the date on which it was made.

4.27.4.4 Where a drawing is amended during the Contract, the amended drawing shall be submitted in accordance with clause 4-7.2.3 within two weeks of such amendment being made.

#### **4.27.5 Arrangement And Foundation Drawings For Civil Work**

4.27.5.1 Where civil work and associated support services are to be designed by the Principal, the Contractor shall supply and deliver to the Principal within the period(s) stated in Table A - Table of Key Dates of Part 1, all arrangement and foundation drawings required to enable the Principal to design and detail the work required. Foundation drawings shall indicate details of pre-scabbling levels required and shall show final nominal depth of grout.

4.27.5.2 The drawings shall include but shall not be limited to the drawings listed in Table C of Part 1 of the Specification.

#### **4.27.6 Working Drawings And Information**

4.27.6.1 The Contractor shall supply and deliver to the Principal drawings, including control logic diagrams, cross-sections and parts lists and information showing the major portions of the plant in detail so that the Principal can approve all components of the plant and the method of operation before manufacture commences.

4.27.6.2 While every endeavour will be made to ensure that the works provided under this Contract do not interfere with equipment provided under other Contracts, the Contractor shall ascertain from site measurements the positions of such other equipment and make such minor deviations as may be required to prevent interference.

#### **4.27.7 Not used**

#### **4.27.8 Logic Diagrams**

4.27.8.1 Logic diagrams shall use the system of symbols shown in AS 1102. The diagrams shall describe the entire reasoning and principles in a sequential form of logical operations and shall be prepared in accordance with AS 1103. Symbol wording is to be kept to a minimum and no attempt is to be made to relate the logic to control hardware. The only references to hardware in the diagram shall be to initiating and controlled devices.

#### **4.27.9 Plant Flow Diagrams And Instrumentation Flow Diagrams**

4.27.9.1 The Contractor shall use the system of symbols shown on AS 1101 for all diagrams and shall comply generally with the requirements of AS 1100. Plant flow diagrams shall show the plant and interconnecting piping or conveyors in the process system in a clear and easily understood presentation.

#### **4.27.10 Electrical System, Circuit And Wiring Diagrams**

4.27.10.1 The Contractor shall supply and deliver to the Principal within the dates or periods stated in Table A - Table of Key Dates of Part 1, circuit diagrams of all control, alarm and sequence interlocking circuits.

4.27.10.2 The symbols and device identification numbers used in the electrical system and circuit diagrams shall comply with the requirements of AS 1101, AS 1102 and AS 3702 and is preferred to be drawn in the horizontal format as indicated in AS 1103. A table of the symbols and device identification numbers used shall be included on each drawing with appropriate identification with equipment shown on the panel layouts.

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- 4.27.10.3 Where the plant to be provided under the Contract forms part of a more extensive control, alarm or sequence interlocking scheme, the Principal may provide circuit diagrams which will incorporate or be complementary to the circuit diagrams of the specialised plant provided by the Contractor. The Contractor shall examine the diagrams supplied by the Principal to ensure that the design is compatible with the plant being provided and, before work is commenced on that plant, shall draw to the attention of the Principal any shortcoming in the design.
- 4.27.10.4 Within a period of one month from the date of the Principal's comments on the circuit diagrams, or such other period nominated by the Principal, the Contactor shall supply and deliver to the Principal the wiring diagrams listed in Table C of Part 1.
- 4.27.10.5 The wiring diagrams to be supplied shall be of the back-of-panel type (except for front connected equipment) and shall show all terminals on selector switches, relays, contactors, terminal blocks, etc., in their correct relative positions. The diagrams shall be prepared using the interrupted line technique as stated in AS 1103.
- 4.27.10.6 A list of equipment mounted on each panel shall be included on each panel layout. This list shall include for each piece of equipment a reference number, the function of the equipment, the manufacturer, the type quality, and a reference to the manufacturer's drawing or catalogue number (as applicable).
- 4.27.10.6 The wiring and connection diagrams shall include suitable cross-reference to the various items of equipment and components shown on the corresponding circuit diagrams and panel layouts.
- 4.27.10.7 All electrical diagrams shall be in accordance with AS 1103, particularly line types and thicknesses.

#### **4.27.11 Maintenance Drawings And Information**

- 4.27.11.1 Prior to the dates or periods nominated in Table A - Table of Key Dates of Part 1, the Contractor shall supply and deliver to the Principal, one complete set of drawings (including parts lists) showing the material specification finished sizes, tolerances and clearances of all the various wearing parts of the plant and copper and insulation details of electric motors in sufficient detail to enable maintenance, routine inspections, repairs to and renewal of any part to be undertaken by the Principal without the necessity of dismantling any part of the plant to obtain details of materials, dimensions and clearances.
- 4.27.11.2 Maintenance drawings shall include, but shall not necessarily be limited to the following:
- Sectional views and list of parts of all items of the plant.
  - Details of wearing parts, including shaft and bearing sizes.
  - Complete piping and electrical wiring diagrams, and printed cards showing all devices correctly numbered to correspond with the numbering on the actual equipment and complete circuit diagrams of connections of electrical alarm and control apparatus showing coils, resistors, contacts, etc., of each device and the sequence of operation of the apparatus. For components such as resistors, capacitors and diodes, details of the electrical characteristics shall be included (eg. for resistors - resistance and wattage).
  - Layout drawings of all items of electrical plant included in the Contract.
  - Schedules showing, for each alarm initiating device the normal operation value of the measurement and the value(s) at which the alarm is set.
- 4.27.11.3 Detail maintenance drawings shall be cross-referenced to their main plant arrangement drawing.
- 4.27.11.4 The drawings shall include the manufacturer's detail number and name for each part in a manner, which clearly indicates the part to which the detail number refers. The quoting of such detail number shall be sufficient information to enable the correct replacement part to be purchased at any future date.
- 4.27.11.5 Within three months of the date of Practical Completion of the Works the drawings shall be amended to show the plant as finally installed and the amended drawings delivered to the Principal.

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- 4.27.11.6 The foregoing provisions of the Clause shall apply for all items of plant whether such items are supplied by the Contractor or by a Subcontractor.

## 4.28 Operating And Maintenance Instructions

### 4.28.1 Information To Be Supplied

- 4.28.1.1 The Contractor shall provide bound sets of operating and maintenance instructions, diagrams and drawings covering all plant and equipment supplied under the Contract. The instructions, diagrams and drawings shall be sufficiently comprehensive to facilitate the training of the Principal's staff and to enable the operation and maintenance of the plant to be performed in an efficient manner, and shall be to the satisfaction of the Principal. Drawings and diagrams used for operator instructions are to be devoid of engineering dimensions, installation and contract information, however, they must relate to the installed equipment, rather than similar or typical equipment. Component part numbers shall be included in the text and identified on the drawing.
- 4.28.1.2 Diagrams or drawings used for staff instructions and bound in the manuals shall be 210 mm x 297 mm, or 297 mm x 420 mm, or 297 mm x 630 mm and should be so arranged that when unfolded they may be viewed in full on the right hand side of the text. The instruction manuals shall be 297 mm x 420 mm sheet size and the folded size of the instruction manuals shall be 297 mm x 210 mm, the standard A4 international size.
- 4.28.1.3 Symbols used on diagrams and drawings should, as far as possible, be in accordance with Australian or British Standard Specifications and in addition shall be identified on the actual diagrams or drawings. The identification numbers of valves, switches, dampers, etc., and the plant identification shall be those as used by the Principal on the installed plant.
- 4.28.1.4 All copies of instructions shall be mounted in substantial bindings with detailed indexes and index tabs which will enable specific items to be quickly and accurately located. The text should be set at least 9 pt type, justified and contain in-text illustrations and tabular matter printed both sides on a 117 GSM white stock.
- 4.28.1.5 The operating procedures and instructions shall be bound separately from the maintenance instructions and compiled so that reference to maintenance instructions is not necessary. Maintenance information shall not be contained in the operating instructions.

### 4.28.2 Draft Operating And Maintenance Instructions

- 4.28.2.1 Prior to the dates or periods nominated in Table A - Table of Key Dates of Part 1, or in the absence of a nominated date, prior to the Date of Practical Completion, the Contractor shall supply and deliver to the Principal four complete sets of a draft of the final operating and maintenance instructions for the plant.
- 4.28.2.2 The draft operating and maintenance instructions shall be as near as possible to the final instructions proposed by the Contractor, and shall be in accordance with the general format set out in Clauses 4.28.4 and 4.28.5.
- 4.28.2.3 Should the Contractor fail to comply with the requirements of the Contract regarding the supply of the draft operating and maintenance manuals by the Date of Practical Completion, this preventing the Principal from adequately instructing its operating staff, then the Contractor shall supply operating and maintenance personnel as considered necessary by the Principal, to operate the plant until the draft manuals are supplied.
- 4.28.2.4 Within 12 weeks of supply these instructions shall be discussed between the Contractor and the Principal and such additions and amendments, which may be required by the Principal, shall be made to the instructions before the final instructions are supplied.

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#### 4.28.3 Final Operating And Maintenance Instructions

4.28.3.1 Prior to the Date for Practical Completion of the plant (or where the contract provides for the plant to reach Practical Completion in Separable Portions, prior to the Date for Practical Completion of the first Separable Portion) as stated in Table A - Table of Key Dates of Part 1, the Contractor shall supply and deliver to the Principal 12 copies (or other number if specified in Part 1), of complete operating and maintenance instructions (separately bound) incorporating all the additions and amendments. If any final information is not available when the instructions are due, the instructions shall be forwarded without the final information, which shall be supplied as soon as possible on sheets, which can be inserted in the instructions. A suitable loading device to open the manual, for insertion by the Principal, of loose sheets may be required for some spiral type manuals.

4.28.3.2 The instructions shall contain sufficient information and drawings to enable the plant to be operated and maintained in a safe and efficient manner. Such instructions shall be especially prepared for the plant as installed, and shall apply specifically to such plant. Typical instruction books only will not be accepted. The information supplied must cover all specific equipment actually used, its location and function.

#### 4.28.4 Format Of Operating Instructions

4.28.4.1 A separate set of operating instructions shall be prepared for both main and auxiliary systems in accordance with the following general format:

- a) A general description of the plant outlining its general function, supported by functional arrangement drawings to show how it works as well as how it is constructed;
- b) A design and technical data section, which shall include:
  - i) Detailed descriptions of plant components and systems, including detail drawings;
  - ii) Technical plant data for the plant as installed;
  - iii) Design and material limits for loadings, pressures, pressure differentials, temperatures, temperature differentials, rate of change of temperature, voltage, current, vibration, out-of-balance running, operating limits, settings, etc;
  - iv) Grades of lubricant and recommended frequency of lubrication;
  - v) Test and performance data;
  - vi) Details of electrical circuitry accompanied by schematic and logic diagrams and indicating physical location of the equipment parts;
  - vii) A list of electrical interlocks and a statement of their functions; and
  - viii) A list of alarms detailing alarm initiator location and settings for alarm operation and reset;
- c) Drawings and diagrams referred to above;
- d) Normal operating procedures set out in step-by-step instruction with each step numbered in correct logical sequence and including:
  - i) Pre-start check lists covering all the individual plant systems;
  - ii) Starting procedures under the conditions outlined in Part 1 of the Specification;
  - iii) In-service checks and limits including routine test procedures for alarms; and
  - iv) Shutting-down procedures under the conditions outlined in Part 1 of the Specification; and
- e) Emergency and abnormal conditions procedures, set out in step-by-step instructions, including remedial action on loss of individual auxiliaries and uncontrolled departure from normal operating conditions and upon receipt of alarms.

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4.28.4.2 In every instance, operating procedures shall be kept separate and distinct from descriptions and technical data. The instructions shall be indexed for convenience.

#### 4.28.5 Format Of Maintenance Instructions

4.28.5.1 Maintenance instructions shall be prepared with the object of providing sufficient detailed technical information and step-by-step instructions to enable the efficient overhaul and replacement of all part of the main plant and unit auxiliaries to be carried out by power station staff, to provide guidance in the tracing of faults and their rectification and to permit the order of replacement parts. Separate maintenance instructions shall be prepared for each item of main plant and unit auxiliary components and shall be in accordance with the following general format:

- a) A design and technical data section which shall include;
  - i) Serial numbers of plant items and rating plate details of electrical equipment;
  - ii) Weights of electric motors, transformers and other large components;
  - iii) Details of materials and parts required for normal overhaul;
  - iv) Details of special tools, jigs and gauges and their uses;
  - v) Limits of wear and parts rejection criteria, including life expectancy for bearings and high temperature bolts, and limits of deterioration of electrical insulation and windings;
  - vi) rewind details for every motor and transformer including total length and cross section of conductor required; complete details of insulation and other rewind materials; coil details including dimensions, number of turns and any special requirements; connection diagrams; electrical values for checking purposes (eg. resistance and for special motors, vector relationship). These requirements shall extend, where appropriate, to associated plant such as induction regulators;
  - vii) Details of welding instruction including preparation and heat treatment; and
  - viii) Type test certificates covering the performance of individual plant items (eg. motors) incorporating or supported by information as to the method of testing used so that the Principal could carry out check tests to determine whether performance has deteriorated;
- b) Reference drawings and diagrams comprising:
  - i) Sectional arrangement drawings with part numbers and material specification and including, where appropriate, exploded sections and isometric views necessary to carry out normal maintenance procedures as covered in Clause 4.27.11; and
  - ii) Detail drawings of wearing parts giving full details of dimensions, tolerances, material specifications and manufacturing instructions;
- c) Normal maintenance procedures set out in step-by-step instructions with each step numbered in correct logical sequence and including:
  - i) List of special tools and equipment required;
  - ii) Check list of operations prior to dismantling;
  - iii) Dismantling sequence, with particulars of methods to be adopted;
  - iv) Inspection of components and checking of permissible tolerances;
  - v) Reconditioning, replacement and adjustment procedures; and
  - vi) Re-assembly sequence, with particulars of methods to be adopted;
- d) Recommended spare parts list;
- e) A trouble shooting program base on symptoms and including suggested frequency of inspection of components and frequency of routine maintenance. The program shall include details of the points at which measurements should be taken, details of the normal readings at those points and

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the possible reasons for abnormal readings. Electrical trouble shooting details shall include voltage level maximums for solid state equivalent or other equipment as appropriate;

- f) Re-commissioning procedures set out in step-by-step instructions and including:
  - i) List for checking of settings prior to re-commissioning; and
  - ii) Procedures for preparing for service those items of equipment which are required to be “tuned” or otherwise adjusted at re-commissioning following a major overhaul; and
- g) Instructions to cover mechanical, electrical, instrument and control of maintenance of individual plant items shall be prepared separately.

4.28.5.2 Where, after the completion of the final instruction, modifications are required to plant and/or operating and maintenance procedures, such changes not being the responsibility of the Principal, the instructions shall be appropriately revised and 12 copies of revised sections or sheets, which can conveniently replace the existing sections or sheets, shall be provided as soon as practicable after the modifications have been finalised. Such revised instruction shall be suitably identified to facilitate the finding of the document to be replaced.

Contractor  
Environmental Management Plan (CEMP)  
Guidelines and Assessment Checklist

## **CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

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## CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST

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### 1. INTRODUCTION

#### 1.1 USE OF THESE GUIDELINES

These Contractor Environmental Management Plan (CEMP) Guidelines have been developed to provide guidance to Contractors when preparing a CEMP for Macquarie Generation. These guidelines provide the basic requirements for CEMP's and the environmental matters that should be considered when developing a CEMP.

A CEMP should always be prepared specifically for the activity and location of the project on site. Generic and non-site specific EMP's will not be accepted by Macquarie Generation.

#### 1.2 CONTRACTOR EMP'S

The objective of the CEMP is to provide information for environmental management during the proposed works/ activities on site at Macquarie Generation. This is to ensure that the Contractor (and any subcontractors) have minimal impact on the environment.

The CEMP must be site-specific and should include details of control measures that will be utilised on site to minimise any potential environmental impacts from the proposed works/activities.

If the proposed works/activities contained within the CEMP are altered during the Contract, the CEMP will be required to be modified by the Contractor to reflect these changes or modifications.

**Section 2** provides guidance on the content for the CEMP's. This document can be used as a template for the CEMP, or the Contractor's own document can be provided. The suitability of the suggested tables provided, will depend on the complexity of the Contractor's proposed works or activities on site. If you are unsure, please consult with your Macquarie Generation representative.

**Section 3** is a checklist to be completed by the Contractor regarding the CEMP content. It will also be used by Macquarie Generation to assess the adequacy of the document.

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

**2. CONTENT GUIDANCE NOTES FOR CEMP'S**

**2.1 DOCUMENT CONTROL**

The CEMP should be a controlled document.

Include the following information:

- A document description;
- Date of issue;
- Revision status;
- Distribution list; and
- Preparation personnel details and signoff.

These details could be entered into a table such as the one below

<b>DOCUMENT CONTROL</b>				
<b>Document Name:</b> [Company Name] Environmental Management Plan				
<b>Revision Status:</b>				
Revision No.	Description	Date of Issue	Prepared By	Approved By
<b>Distribution List:</b>				
MASTER COPY	Project Manager [Contractor]			
COPY 1	Site Manager [Contractor]			
COPY 2	[Contractor]			
*COPY 3	Station Plant Owner (Contract Administrator)			
*COPY 4	Station Environment Officer			

\* Mandatory distribution

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**2.2 PROJECT DESCRIPTION**

Briefly describe the proposed works/activities that will be conducted on site.

Information should be provided on:

- Timing and duration of works;
- Description of the site;
- Scope of works; and
- Areas of environmental sensitivity.

These details could be entered into a table such as the one below

<b>PROJECT DETAILS</b>
<b>Timing and Duration of works:</b>
<b>Description of the Site:</b>
<b>Scope of Works:</b>
<b>Areas of Environmental Sensitivity:</b>

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

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**2.3 ROLES AND RESPONSIBILITIES**

Detail the environmental responsibilities of all Contractor personnel including subcontractors working on site. These details could be entered into a table such as the one below.

<b>PROJECT TEAM ENVIRONMENTAL RESPONSIBILITIES</b>			
<b>Title</b>	<b>Name</b>	<b>Contact Details</b>	<b>Responsibility</b>
Project Manager			
Site Manager			

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**2.4 ENVIRONMENTAL TRAINING REQUIREMENTS**

Detail the environmental training that all site Contractor personnel (including subcontractors) are required to undertake.

As a minimum all project personnel entering or working Macquarie Generation’s sites must:

- Undertake an environmental induction for the site. The extent of the induction will be dependent on the proposed activities that the person will be undertaking on site. Information will be provided to the Contractor on Macquarie Generation’s Environmental Management System (EMS);
- Be familiar and understand the CEMP for the works;
- Be aware of their environmental responsibilities and legal obligations on site; and
- Undertake emergency response training.

Additional specific environmental training may be required for the Contractor’s specific tasks on site (eg spill containment). Such training should be identified in this section of the CEMP.

The Contractor should also provide:

- Information relating to the experience and competency of the Contractor personnel working on site (e.g. relevant experience and qualification’s); and
- Environmental records verifying that each project team member has received the required environmental training.

These details could be entered into a table such as the one below.

<b>PROJECT TEAM</b>			
Title	Name	Qualifications and Experience	Environmental Training Required
Project Manager			
Site Manager			

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**2.5 SUMMARY OF KEY ENVIRONMENTAL ISSUES**

This section should provide a summary of the key environmental issues associated with the proposed works/activities on site.

The Contractor should identify the key environmental issues relevant to the proposed works/activities on site. These could include environmental issues such as:

- Air;
- particulates/ dust;
- odour;
- noise/ vibration;
- surface water;
- groundwater;
- wastewater;
- discharges to water/ land;
- erosion and sediment control;
- flora and fauna;
- archaeological;
- wastes;
- chemicals; and
- traffic.

These environmental issues identified will provide the basis for the risk assessment and control measures.

These details could be entered into a table such as the one below.

<b>KEY ENVIRONMENTAL ISSUES</b>	
Activity	Potential Environmental Issues

## **CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

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### **2.6 ENVIRONMENTAL RISK ASSESSMENT**

Identify the environmental risks associated with the proposed works/ activities at Macquarie Generation.

The Contractor should:

- Identify the potential environmental aspects and impacts related to the work/activities proposed on site and undertake an environmental risk assessment by completing a Job Environmental Analysis (JEA), using the template and Risk Assessment Matrix provided; and
- Document the consequence and likelihood (based on the tables provided) of an identified aspect having an impact on the environment.

All Contractor personnel should be aware of the activities that have the potential to cause an environmental impact on site. It is the Contractor's responsibility to ensure that all personnel working on site have been appropriately trained.

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**JOB ENVIRONMENTAL ANALYSIS (JEA) RECORD SHEET**

<b>Project Name:</b>		<b>Expected Date of Work:</b>				
<b>CONTRACTOR</b>		<b>CONTRACTOR APPROVAL</b>			<b>MACQUARIE GENERATION APPROVAL</b>	
<b>Prepared By:</b>		<b>Site Manager:</b>			<b>Approved By:</b>	
<b>Position:</b>		<b>Position:</b>			<b>Position:</b>	
Signature and Date:		Signature and Date:			Signature and Date:	
<b>Project Description:</b>						
Aspect No.	Aspect of Job	Hazards Associated	Control Measures (Prevention, Mitigation & Recovery) Procedures/Equipment, etc	Person Responsible	Risk Assessment H = High M=Medium L=low	Significant Aspect  Yes/No

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**RISK ANALYSIS MATRIX**

		PROBABILITY				
		A	B	C	D	E
CONSEQUENCE	5	25	24	22	19	15
	4	23	21	18	14	10
	3	20	17	13	9	6
	2	16	12	8	5	3
	1	11	7	4	2	1

Legend

Risk Score	Risk	Management Response
1-11	Low	<ul style="list-style-type: none"> <li>Managed by routine procedures</li> </ul>
12-19	Medium	<ul style="list-style-type: none"> <li>Risk management responsibility must be specified</li> <li>Review or establish permanent control measures</li> </ul>
20-25	High	<ul style="list-style-type: none"> <li>Management attention needed</li> <li>Review or establish permanent control measures</li> </ul>

**Environmental Aspects are considered Significant if:**

- the Risk Score is greater than or equal to 12;
- there are legislative issues or;
- there is relevant stakeholder interest.

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

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**What will be the likely potential impact on the environment?**

<b>Level</b>	<b>Descriptor</b>	<b>Environmental Impact</b>
1	Insignificant	No discernable environmental impact
2	Minor	Temporary Environmental Impact (Simple cleanup - on site release immediately contained by on-site staff and facilities)
3	Moderate	Incident Reportable to the EPA (On-site release contained with outside assistance)
4	Major	Environmental Prosecution (Off site release with no discernable or long term detrimental effects)
5	Catastrophic	Major Environmental Incident (Release off-site with detrimental effect)

**What is the likelihood that this aspect will have an impact on the environment?**

<b>Level</b>	<b>Descriptor</b>	<b>Probability</b>
A	Almost certain	Almost certain to happen
B	Likely	Likely to happen at some point
C	Moderate	Possible, heard of so it might happen
D	Unlikely	Not likely to happen
E	Rare	Practically impossible

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

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**2.7 POLLUTION PREVENTION AND CONTAINMENT**

This section should detail how the significant environmental aspects identified in the JEA will be managed on site. These details could be entered into a table such as the one below.

<b>Environmental Aspect</b>	
Objective	
Legislation/ Permits	
Targets	
Control Measures	
Monitoring	
Reporting Requirements	
Corrective Actions	
Training Requirements	
Responsibility	
Timing	

\* Please note that the above information should be provided for each significant aspect identified in your JEA.

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

**2.8 REGULATORY REQUIREMENTS**

Provide a summary of any specific environmental regulatory requirements appropriate to the proposed works/activities on site.

Information should be provided on:

- Applicable legislation;
- Other Requirements (Regulations/Guidelines);
- Any conditions of approval or consent; and
- Licences or permits required.

These details could be entered into a table such as the one below.

<b>REGULATORY REQUIREMENTS</b>				
<b>Activity</b>	<b>Applicable Legislation</b>	<b>Other Requirements</b>	<b>Conditions of Approval or Consent</b>	<b>Licences or Permits</b>

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

**2.9 DANGEROUS GOODS AND HAZARDOUS SUBSTANCES**

Provide the details of any dangerous goods or hazardous substance expected to be using during the proposed works/activities on site.

Information should be provided on:

- Type of dangerous good or hazardous substance;
- Proposed quantities;
- Relevant MSDS;
- Handling and Storage Requirements; and
- First Aid Requirements;

These details could be entered into a table such as the one below.

<b>DANGEROUS GOODS AND HAZARDOUS SUBSTANCES</b>					
Type	Proposed Quantity	MSDS Available and attached	Handling Requirements	Storage Requirements	First Aid Requirements

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

**2.10 SUPPLEMENTARY ENVIRONMENTAL MANAGEMENT PLANS**

Provide the details of any Supplementary Environmental Management Plans (EMP's) required by the Contract or Environmental Impact Assessment.

For example; Plan of Management for Aboriginal Heritage, Water Management Plan or Ecological Management Plan.

A copy of each supplementary management plan should be included as an attachment to this CEMP.

These details could be entered into a table such as the one below. An example is provided for your information.

<b>SUPPLEMENTARY ENVIRONMENTAL MANAGEMENT PLANS</b>				
<b>Environmental Issue</b>	<b>How issue was identified</b>	<b>Supplementary EMP Required</b>	<b>Appendix</b>	<b>Approval Received by</b>
Aboriginal Heritage	Statement of Environmental Effects	Plan of Management required by Development Consent Conditions	A	Department of Environment and Conservation (DEC)

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

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**2.11 ENVIRONMENTAL INCIDENT REPORTING**

Provide the details of how any environmental incidents will be recorded and managed on site.

The Contractor should be aware of the following requirements:

- The Contractor is required to immediately contain, clean and report the incident to the Site Manager (Contractor) and relevant Macquarie Generation representative; and
- If an environmental incident occurs, the Contractor is required to provide recommendations on steps to avoid similar incidents occurring on site.

Information should be provided on the process and responsibilities for recording, investigating and reporting environmental incidents on site.

These details could be entered into tables such as the tables below.

<b>ENVIRONMENTAL INCIDENT PERSONNEL</b>			
Title	Name	Contact Details	Responsibility
Contract Administrator			Macquarie Generation Representative

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

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**ENVIRONMENTAL INCIDENT REPORTING**

**Containment Requirements**

**Cleaning Requirements:**

**Reporting Requirements:**

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

**2.12 EMERGENCY RESPONSE**

An environmental emergency is an event that causes or has the potential to cause environmental damage and is beyond the capabilities of the Contractor to contain the problem.

Provide details on the process and responsibilities of how an emergency will be dealt with on site.

\* Please note that the first point of external contact should be your Macquarie Generation representative, who will inform Station Management of the problem. Station Management will assess the situation and make the decision if external assistance beyond power station employees will be required.

Information should be provided on:

- The names, responsibilities and contact details of key emergency response personnel;
- Location of information on hazardous materials and dangerous goods (including MSDS's and spill containment material);
- The procedure to follow in the case of an emergency; and
- The process for notifying the Macquarie Generation representative.

These details may be provided in the Contractors OH&S Plan. In this case, these details should be included as an attachment to this CEMP.

These details could be entered into tables such as the tables below.

<b>ENVIRONMENTAL EMERGENCY RESPONSE PERSONNEL</b>			
Title	Name	Contact Details	Responsibility
Contract Administrator			Macquarie Generation Representative

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

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**ENVIRONMENTAL EMERGENCY RESPONSE**

**Location of information on hazardous materials and dangerous goods:**

**Emergency Response Procedure:**

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

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**2.13 WASTE MANAGEMENT**

Provide details on any waste generated during the works on site.

Information should be provided on:

- Types of wastes generated;
- Proposed quantities; and
- Waste disposal and storage on or off site.

These details could be entered into a table such as the one below.

<b>WASTES</b>				
Activity	Waste Type	Proposed Quantity	Waste Disposal and/or storage	On or Off site

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

**3. CONTRACTOR EMP CHECKLIST**

This checklist is provided to assist the Contractor in identifying the items that are relevant for inclusion in their CEMP.

Information should be provided on all items that are identified as relevant to your proposed works/ activities on site at Macquarie Generation.

Please tick the boxes provided under the **scope** to show that you have included these items within your CEMP and comment to why you have excluded any sections within your CEMP. This information will be used to assess the adequacy of your CEMP.

Item No.	Element of CEMP	Scope	Relevant to proposed works/activities Yes/No/NA	Contractor Comments	FOR MACQUARIE GENERATION USE ONLY Comments
1.	Document Control	<input type="checkbox"/> Title <input type="checkbox"/> Date of Issue <input type="checkbox"/> Revision Status <input type="checkbox"/> Distribution List <input type="checkbox"/> Preparation personnel details and Sign off			
2.	Project Description	<input type="checkbox"/> Timing and duration of works <input type="checkbox"/> Description of the site <input type="checkbox"/> Scope of works <input type="checkbox"/> Areas of Environmental Sensitivity			

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

Item No.	Element of CEMP	Scope	Relevant to proposed works/activities Yes/No/NA	Contractor Comments	FOR MACQUARIE GENERATION USE ONLY Comments
3.	Roles and Responsibilities	<input type="checkbox"/> Environmental Roles and Responsibilities defined <input type="checkbox"/> Contact Details provided			
4.	Environmental Training Requirements	<input type="checkbox"/> Environmental training requirements identified <input type="checkbox"/> Information on experience and competency of Contractor's Working on site			
5.	Summary of Key Environmental Issues	<input type="checkbox"/> Summary of key environmental issues			
6.	Environmental Risk Assessment	<input type="checkbox"/> Completed environmental risk assessment <input type="checkbox"/> Significant aspects identified			
7.	Pollution Prevention and Containment	<input type="checkbox"/> Information provided for managing significant environmental aspects <input type="checkbox"/> Information provided on any monitoring requirements <input type="checkbox"/> Responsibilities identified			

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

Item No.	Element of CEMP	Scope	Relevant to proposed works/activities Yes/No/NA	Contractor Comments	FOR MACQUARIE GENERATION USE ONLY Comments
8.	Regulatory Requirements	<input type="checkbox"/> Applicable legislation identified <input type="checkbox"/> Other Requirements (Regulations/Guidelines) identified <input type="checkbox"/> Any conditions of approval or consent identified <input type="checkbox"/> Licences or permits required			
9.	Dangerous Goods and Hazardous Substances	<input type="checkbox"/> Identified any dangerous goods or hazardous substances to be used on site <input type="checkbox"/> Identified types <input type="checkbox"/> Proposed quantities <input type="checkbox"/> Provided MSDS <input type="checkbox"/> Identified handling and storage requirements <input type="checkbox"/> Identified First Aid requirements			
10.	Supplementary Environmental Management Plans	<input type="checkbox"/> Supplementary EMP's listed <input type="checkbox"/> Supplementary EMP's attached			

**CONTRACTOR EMP GUIDELINES AND ASSESSMENT CHECKLIST**

Item No.	Element of CEMP	Scope	Relevant to proposed works/activities Yes/No/NA	Contractor Comments	FOR MACQUARIE GENERATION USE ONLY Comments
11.	Environmental Incident Reporting	<input type="checkbox"/> Environmental incident process identified <input type="checkbox"/> Responsibilities identified			
12.	Emergency Response	<input type="checkbox"/> Environmental emergency procedure developed <input type="checkbox"/> Responsibilities and contact details of relevant personnel identified <input type="checkbox"/> Process for notifying Macquarie Generation staff established			
13.	Waste Management	<input type="checkbox"/> Identified types of wastes generated <input type="checkbox"/> Proposed quantities <input type="checkbox"/> Proposed waste disposal and storage on or off site			
<b>FOR MACQUARIE GENERATION USE ONLY</b>					
<b>ACTIONS</b>					
CEMP APPROVED FOR USE			<input type="checkbox"/> YES	<input type="checkbox"/> NO	Reviewed By: Position:
ADDITIONAL INFORMATION REQUIRED PRIOR TO APPROVAL, COMMENTS ARE PROVIDED ABOVE			<input type="checkbox"/> YES	<input type="checkbox"/> NO	Approved By: Position: