

Loy Yang B Power Station

Environmental Performance Report 2005



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Introduction

Owned and operated under an International Power Mitsui (IPM), the Loy Yang B Power Station supplies base load electricity to the Victorian power grid and the National Electricity Market.

IPM Australia Ltd is a 70:30 joint partnership between International Power plc and Mitsui & Co., Ltd. International Power is one of the world's leading independent power generation companies, whilst Mitsui and Co., Ltd taps into a diverse range of business areas including manufacture, export/import, international trade and services such as energy.

In Australia, IPM operates plant in both Western Australia and Victoria. In Western Australia, the partnership operates the 118 MW gas-fired cogeneration plant at Kwinana. In Victoria, IPM owns and operates the Loy Yang B power station, a 1000 MW brown coal fired power station in the Latrobe Valley.

Environmental Performance at a Glance

IPM Loy Yang B Pty Ltd as owner operators of the Loy Yang B Power Station continue to achieve high standards of environmental performance for the 2005 calendar year, through fully integrated environmental management practices and best practice operations and maintenance systems.

Dust emissions from the Loy Yang B Power Station easily met Environment Protection Authority limits for dust emission mass rate, achieving 100% compliance. In fact dust mass rates were well within station based dust rate limits, recording an average dust emission rate of 1.5 kg/min against the licence limit of 11.1 kg/min.

Gaseous emissions from the Loy Yang B Power Station also easily met EPA licence limits with Process Emissions Monitoring data for oxides of nitrogen (NO_x) and carbon monoxide (CO) for 2005 showing:

- NO_x emissions for the station averaging 15.1 kg/min against a licence limit of 50.4 kg/min
- CO emissions for the station averaging 0.1 kg/min against a licence limit of 90.0 kg/min

Continuous emissions monitoring data for sulphur dioxide (SO₂) also confirm compliance with EPA licence limits for the reporting periods showing:

- A peak station mass emission rate of 162 kg/min at an annual average of 24 kg/min

- The peak SO₂ mass emission rate on a Unit basis was 80 kg/min (Unit 1) and 89 kg/min (Unit 2)

The EPA licence limits for total mass discharge rate of SO₂ for the station is 200 kg/min and 100 kg/min on a unit basis.

Monitoring programs have continued to provide valuable data in regulating the use of water resources and minimising the impacts of its water discharges to the environment from the site. During 2005 Loy Yang B has been able to achieve its performance targets set for high quality water usage, salt loadings discharged and for drainage discharge rate to the Traralgon Creek. KPI targets for low quality water use were exceeded; however these are influenced by both variable seasonal weather and plant operating conditions and unit availability profiles. Plant operational initiatives for cooling towers are to be implemented during 2006 and are aimed at reducing both LQW usage which should see this parameters meet set KPI targets.

Integrated Environmental and Quality Management Systems have continued to be the cornerstone of environmental improvement initiatives at Loy Yang B Power Station during 2005. These initiatives include:

- Continuation of EME status as an EPA accredited licensee for Loy Yang B Power Station
- Continuation of certification at Loy Yang B of the Environmental Management System to ISO14001 with total integration into the sites Quality, Environmental and Safety Management Systems
- Continued funding and support of the Environmental Community Projects associated with the Traralgon Railway Reservoir Conservation Reserve and the Traralgon Creek Catchment Neighbourhood Improvement Plan.
- Continuing funding of Loy Yang B Power Station's, \$1 million – 5 year Landcare based rehabilitation projects at various locations around the Gippsland/Latrobe Valley region

Major Plant Performance Statistics

Emissions To Air Environment		Internal Performance Target	Actual Performance Achieved	Compliance Status
Particulates: Maintain particulate emissions 25% below EPA 'Station Total Mass Discharge Rate' limit of 11,100 gram/ minute		8,325 gram/ minute	1,459 gram/ minute	☺
Carbon Dioxide Total Emissions Index.		Max 1,309 tonne CO ₂ / MWh exported energy	1,251 tonne CO ₂ / MWh exported energy	☺
Sulphur Dioxide: Maintain SO ₂ emissions 10% below Station Licence limits for mass emission rates as follows:				
<i>% Frequency Exceeding (Licence)</i>	<i>EPA Limit kg/minute</i>	<i>(kg/min)</i>	<i>(kg/min)</i>	
0.0	200	180	162	☺
0.1	180	162	137	☺
1.0	150	136	106	☺
5.0	120	108	84	☺
10.0	100	90	71	☺
50.0	60	54	41	☺
NO _x Maintain NO _x emissions 10% below Unit Licence limits for mass emission rates of 25.2 kg/min		22.7 kg/min	Unit 1 = 13.6 kg/min Unit 2 = 20.3 kg/min	☺
SO ₃ Maintain SO ₃ emissions 10% below Unit Licence limits for mass emission rates of 7.2 kg/min		6.5 kg/min	Unit 1 = 0.063 kg/min	☺
Maintain Chlorine Compound emissions 10% below Unit Licence limits for mass emission rates of 7.2 kg/min		6.5 kg/min	Unit 1 = 1.4 kg/min	☺
Maintain Fluorine Compound emissions 10% below Unit Licence limits for mass emission rates of 1.8 kg/min		1.6 kg/min	Unit 1 = 0.006 kg/min	☺
Emissions To Water Environment & Water Usage		Internal Performance Indicator	Actual Performance Achieved	Compliance Status
Low Quality Water - maintain usage rate at <= 2.2 kL/MWh benchmark		< 2.2 kL/MWh	2.3 kL/MWh	☹

High Quality Water – maintain usage rate at <= 0.042 kL/MWh benchmark	< 0.042 kL/MWh	0.041 kL/MWh	☺
	Internal Performance Target	Actual Performance Achieved	Compliance Status
Main Drain Discharge Rate @ Pit B1 at <= 0.6 kL/MWh benchmark	< 0.60 kL/MWh	0.53 kL/MWh	☺
Main Drain Salt Loading @ Pit B1 at <= 0.32 Tonne/MWh benchmark	< 0.32 tonne/MWh	0.24 tonne/MWh	☺
Reportable Incidents	0	0	☺
Non Reportable Incidents	≤ 10	10	☺
Notices of Violation (NOV'S)	0	0	☺
Waste Disposal/ Recycling Program	> 65% recovery / recycling of industrial and domestic	Tracking measures under development	☹

Emissions to Air

Particulate and gaseous emissions – Loy Yang B power station

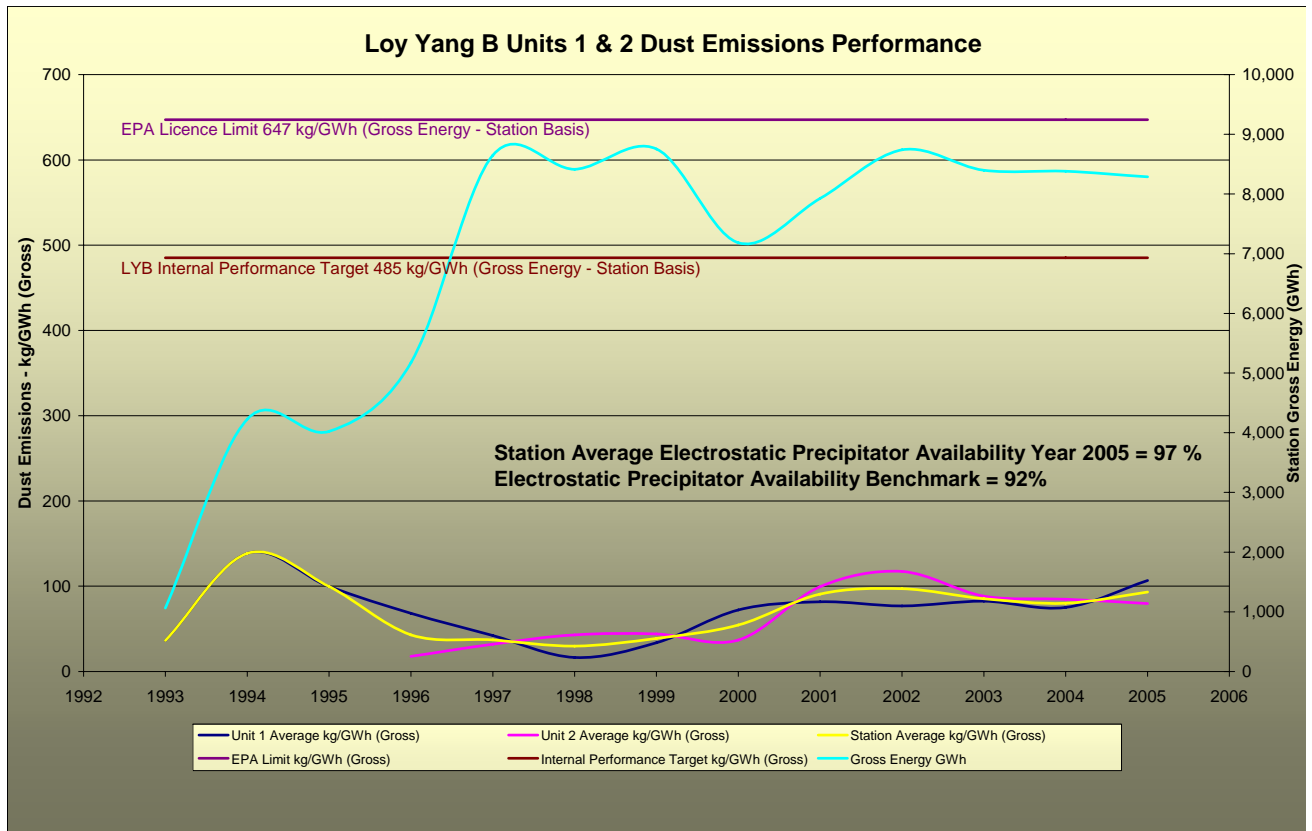
Loy Yang B particulate emissions during 2005 continue to easily meet EPA Licence Limits for particulate discharges from Loy Yang B Power Station.

The average availability of electrostatic dust precipitators during year 2005 remained at a very high 97% (against a plant benchmark availability target of 92%).

The maximum-recorded particulate mass rate for the station during the 2005 reporting period was:

- 20.4 kg/min recorded November 2005 during a unit shutdown event.

The average-recorded particulate mass rate for the station during the reporting period 2005 was 1.5 kg/minute.



IPM Loy Yang B achieved 100% compliance for the 2005 calendar year with EPA licensed emissions for particulates from Loy Yang B Power Station.

Gaseous emissions – Loy Yang B power station

Brown coal combustion releases carbon dioxide (CO₂), Oxides of Nitrogen (NO_x), Carbon Monoxide (CO) and Oxides of Sulphur (SO_x). The flue gases containing these gases, water vapour and a small amount of particulates are emitted to the atmosphere.

Carbon dioxide, a greenhouse gas, is a key emission and is tracked and reported under the Greenhouse Challenge Program to which IPM Loy Yang B is a signatory.

Gaseous Emissions from Loy Yang B Power Station Units 1 and 2 easily met the EPA licence limits for oxides of nitrogen (NO_x), carbon monoxide (CO) and sulphur dioxide (SO₂).

The following table shows the station emissions against EPA licence limits for the previous three years:

	2002 Emission s	2003 Emission s	2004 Emission s	2005 Emission s	EPA Licence Limit
Particulate Matter Station Average Mass Rate (kg/min)	1.6	1.3	1.2	1.5	11.1
(kg/GWh Dispatched)	105	92	86	93	647
Oxides of Nitrogen # kg/min NO _x at 7%O ₂	22 (Average)	13 (Average)	19 (Average)	15 (Average)	50
Carbon Monoxide # kg/min CO NTP	0.5 (Average)	0.9 (Average)	0.1 (Average)	0.1 (Average)	90.0
Sulphur Dioxide # kg/min SO ₂	38 (Average) 138 (Maximum)	23 (Average) 170 (Maximum)	24 (Average) 148 (Maximum)	24 (Average) 162 (Maximum)	200

Mass rates derived from Continuous and Process Emissions Monitoring program results and are expressed as an average station emission mass rate based on monitoring results for the individual units.

Greenhouse gas emissions – Loy Yang B power station

Loy Yang B Power Station has been able to maintain a static position for total Greenhouse Gas (GHG) emissions performance for the period 1994 - 2005, recording an Average Annual Greenhouse Intensity of 1.25 tonne CO₂- e /MWh exported energy for 2005.

Plant and efficiency improvement actions undertaken between 1996 and 2005 in accordance with commitments made under the Greenhouse Challenge Program and

Generator Efficiency Standards, have culminated in some 96 kilotonne per annum total GHG abatements (as of 2005), with these savings largely achieved through reducing in "in-house energy" consumed within the plant.

Loy Yang B Power Station has a Greenhouse Gas Management Plan approved by the Environment Protection Authority of Victoria in accordance with State Environment Protection Policy and the Greenhouse Gas Emissions and Energy Efficiency in Industry (Protocol for Environmental Management).

Water Use and Discharge to the Environment

Water Usage

Water is a vital and valuable resource to the power industry. IPM Loy Yang Pty Ltd believes the management and control of water usage and drainage discharges from the Loy Yang B Power Station are of vital environmental importance. Key performance indicators have been developed to monitor both water use and wastewater discharge from the site.

Water used at the power station site is defined dependant on its use and quality. Water drawn from the Latrobe River is termed Low Quality Water, as its main use is in the 'low grade' processes such as cooling and wash down and is untreated prior to use.

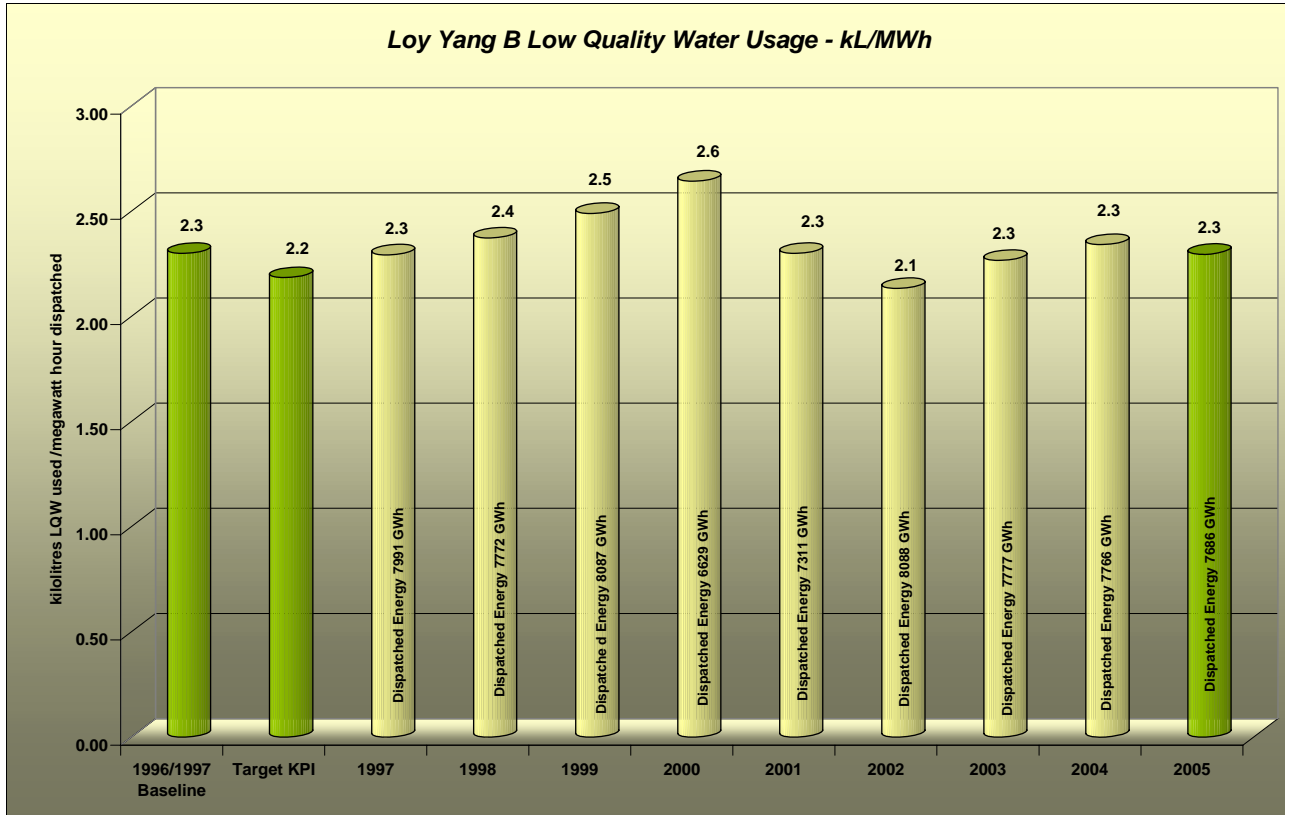
Water from the Moondarra Reservoir is termed High Quality Water and is used on-site as a domestic supply and as feedwater to the water demineralisation plant. This water is pre-treated in a clarification process to remove suspended solids prior to use.

Low quality water

Low quality water (LQW) is drawn from the Latrobe River at Yallourn and is predominantly used for cooling process steam with heat rejection through an evaporative process via the cooling towers.

Approximately 400 litres per second of cooling water flow is lost as tower evaporation for the station. This is seen as plumes of water vapour emanating from the hyperbolic shaped cooling towers, characteristic of Loy Yang B and the Latrobe Valley. Low quality water is used as make-up for these evaporative losses.

Usage rates have remained relatively constant and are a function of the amount of electricity generated. Programs to improve usage efficiencies are constantly being evaluated.



Performance Target

To manage Low Quality Water (LQW) consumption to meet usage rates representative of best practice levels since 1997 for 20GL LQW allocation against Actual Dispatched Generation.

Year 2005 target: Usage rate below 2.20 kL/MWh (Dispatched)

Actual Performance

The year 2005 average LQW usage was 2.30 kL/MWh (Dispatched).

Comments:

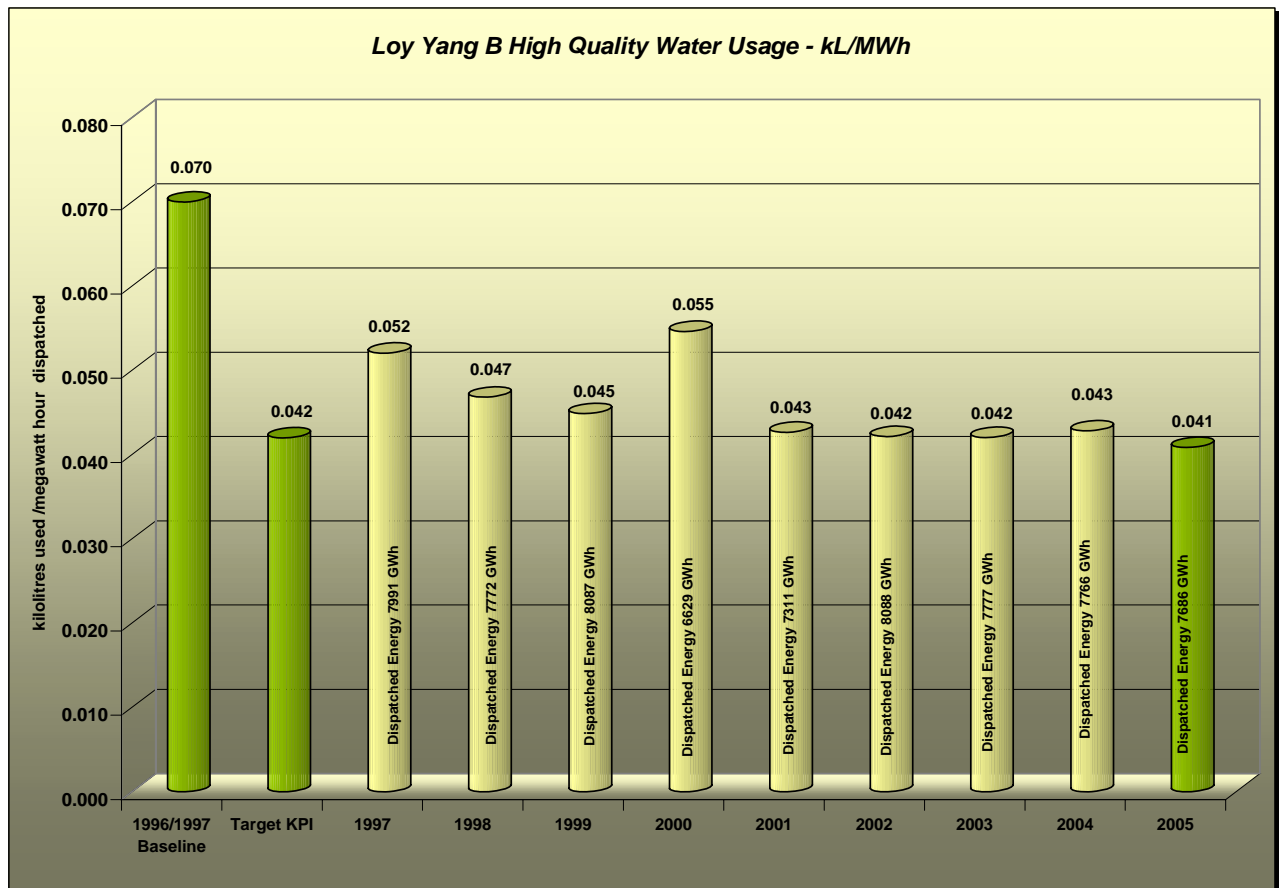
- The majority of Low Quality Water demand is related to unit cooling tower operations and the necessity to continually purge water from these towers to maintain total dissolved solids levels within target guidelines. LQW usage is also impacted on by Unit outage programs and the number of outages per annum.
- During 2005 a number of initiatives were commenced with the aim to reduce LQW consumption. The major activity relates to the increase in Cooling Tower cycles of concentration – increased Total Dissolved Solids loading in circulating water systems through reduced blowdown and replenishment with LQW (trial commenced September 2005). This action together with the occurrence of a major maintenance outage on Unit 2 resulted in some 703 ML less LQW being used in station over that used in Year 2004. Further operational modifications to Cooling Tower chemistry will contribute to further marginal reductions during Year 2006.

- Year 2006 Internal Performance Target for Low Quality Water usage has been set at ≤ 2.2 kL/MWh based on past performance and planned actions for cooling tower cycling.

Compliance Status: ☹ usage rate slightly exceeded KPI largely due to late commencement (September 2006) of cooling tower cycling trials due to the requirement to complete plant investigations and control system modifications prior to plant trials to ensure minimal impact on plant performance & operational procedures including licence compliance issues for PitB1 discharges.

High Quality Water

High quality water (HQW) for site domestic use and for makeup supply to the Demineralising Plant is sourced from Moondarra Reservoir. Most HQW is used to produce high quality demineralised water for use in the power station boilers. The usage rate is a function of electricity generation and plant leakage rates. Maintenance practices aimed at minimising leakage rates regulate and improve HQW use.



Performance Targets

Maintain HQW usage at best practice levels using best performance usage attained since 1996/1997 benchmark.

Year 2005 target: Usage rate below 0.042 kL/MWh (Dispatched)

Actual Performance

The year 2005 average HQW usage was 0.041 kL/MWh (Dispatched).

Comments

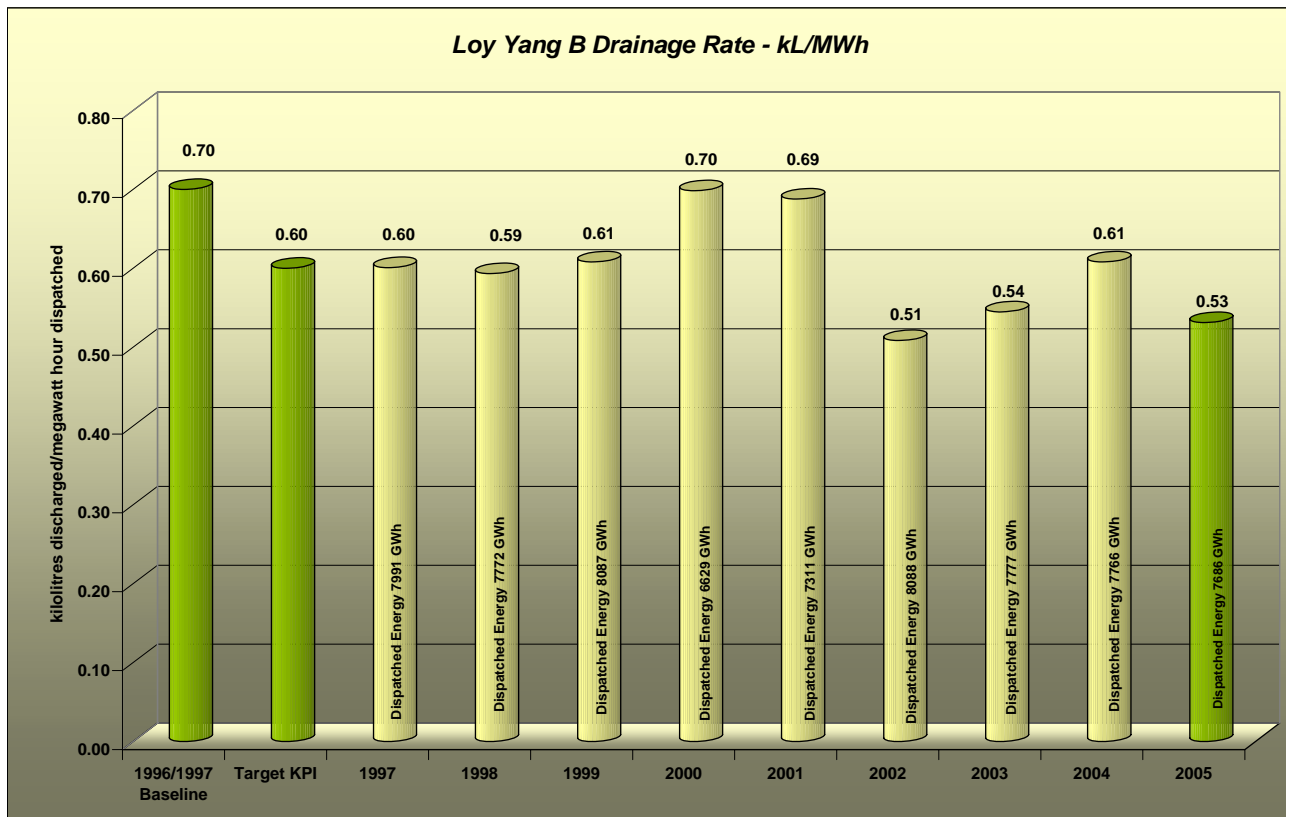
- During normal running, the use of High Quality Water is centred on making up for operating unit losses. These losses encompass small leaks and sootblower usage. Leakage accounts for a little less than 1 kg/sec and signifies very good unit 'tightness' for the LYB units.
- Year 2006 Internal Performance Target for High Quality Water usage rate has been set at ≤ 0.042 kL/MWh, representative of the minimum usage rate achieved to 2004 and of best practice achieved.

Compliance Status: ☺

Water Discharges

Drainage Discharges

Wastewater drainage from the site is monitored for both quality and volume discharged. A remote water quality monitoring station continuously samples and analyses drainage discharges from Loy Yang B to ensure compliance with EPA licence requirements.



Performance Targets

Sustain LYB Pit B1 main drain discharge rate at best practice levels using averaged discharge rate achieved since 1996/1997 benchmark.

Year 2005 target: Usage rate below 0.60 kL/MWh (Dispatched)

Actual Performance

The year 2005 average Drainage Discharge Rate was 0.53 kL/MWh (Dispatched).

Comments

- The majority contributor to drainage volumes is related to unit cooling tower operations and the necessity to continually purge water from these towers to maintain total dissolved solids levels within target guidelines.
- Increased drainage rates in 2000 and 2001 are predominantly due to reduced generation in those years with major outage works in progress.
- Cooling Tower cycling trials commenced in September 2005 have given initial reductions in drainage discharge rates from 13ML/day (2004) to 6ML/day (over trial period Sept – Dec 2005). These levels of reduction are expected to be sustainable through 2006 onwards as cooling water systems are operated at higher cycles of concentration.
- Year 2006 Internal Performance Target for Drainage Rate at Pit B1 has been set at ≤ 0.60 kL/MWh, representative of the average drainage rate achieved since 1997 and of best practice levels achieved. KPI to be reassessed in 2007 EIP development.

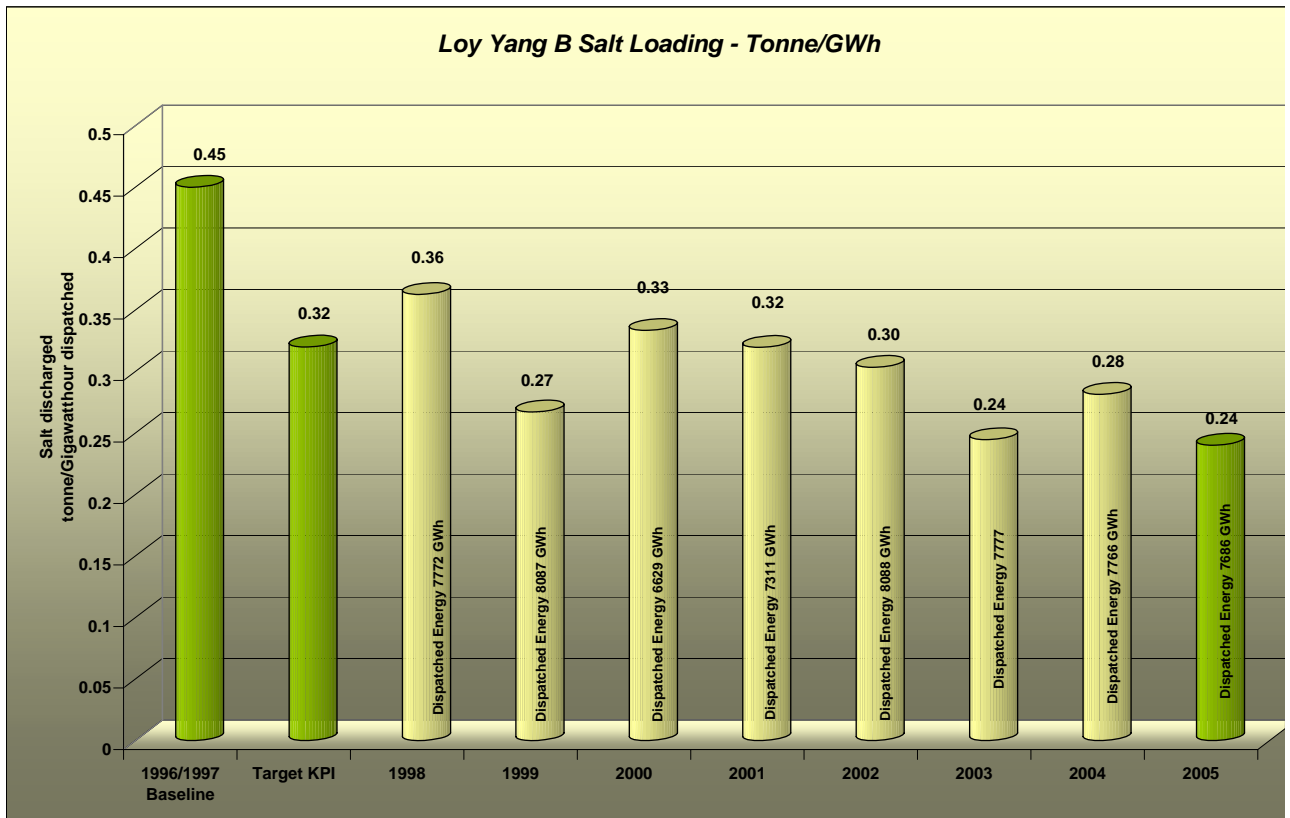
Compliance Status: ☺

Salt Discharges

Wastewater discharged from the site to the Traralgon Creek, as a consequence of the evaporative processes in the cooling towers, has an increased total dissolved solids (TDS) concentration (collectively referred to as salt loading) over that of the low quality water used as make-up to the cooling towers.

Maintaining the number of cycles of concentration in the cooling towers, at a level that allows water discharged from these towers to meet EPA limits on TDS or salt loading, controls this salt loading.

See next page for graph



Performance Targets

Sustain LYB Pit B1 main drain salt loadings at best practice levels using averaged discharge rate achieved since 1996/1997 benchmark.

Year 2005 target: Usage rate below 0.32 kL/MWh (Dispatched)

Actual Performance

The year 2005 average Total Salt Loading was 0.24 Tonne/GWh (Dispatched).

Comments

Decreasing salt loading rates during 2002, 2003 & 2004 are attributed to a trial period when the partial diversion of cooling tower purge water to the Loy Yang Ash Pond through use in the Loy Yang B ashing plant.

Year 2005 realised a reduction of 372 Tonne of salt discharged over that discharged in 2004. (These reductions are consistent with the reduced drainage discharge rates reported above).

Year 2006 Internal Performance Target for Salt Loading at Pit B1 has been set at \leq 0.32 Tonne/GWh, representative of the average drainage rate achieved since 1997 and of best practice levels achieved.

Compliance Status: ☺

Environmental Community Projects

Through a process of community consultation IPM Loy Yang B has worked with selected community groups to develop environmental improvement initiatives and continues funding support for two local environmental projects of significant importance.

Traralgon Railway Reservoir Conservation Reserve

The Traralgon Railway Reservoir Conservation Reserve is a wetlands development centered on an historic local landmark. IPM Loy Yang B in-conjunction with the Reserves "Friends Group" have committed funding to an on-going program of activities focused on re-establishing the reservoirs unique native flora and expanding the reservoirs wetland areas to provide habitat for the numerous aquatic and bird species that inhabit the reserve.

Traralgon Creek Neighbourhood Improvement Plan

The key objectives developed under this Neighbourhood Improvement Plan are aligned with the overall improvement of waterway health for the Latrobe River and its tributaries. The first stage of the NEIP is aimed at the Traralgon Creek catchment with the main objectives of:

- Improve the health of the Traralgon Creek catchment and the surrounding land use
- Improve the amenity of the Traralgon Creek catchment
- Enhance understanding, communication, partnerships and coordination within the Traralgon Creek catchment community
- Improve the image of the catchment for community and investment

IPM Loy Yang B, together with other key stakeholders are committed to a long term program of restoration for the Traralgon Creek and its catchment, a program supported and endorsed by the Victorian Government through the Environment Protection Authority.

Landcare Programs

Loy Yang B has committed \$1 million dollars to a program of revegetation and other land rehabilitation projects in Gippsland, following a successful introductory project which involved planting more than 120,000 new indigenous trees, shrubs and understorey plants.

The programs key objectives are:

- Reverse land and water degradation

- Increase biodiversity
- Facilitate greenhouse related data collection and research
- Expand “carbon sink” capacity

To date since the program’s inception in 1997, Loy Yang B has facilitated the planting of some 654,426 trees with a total of 59,880 trees being planted in 2005.

Landcare

International Power plc and Mitsui & Co., Ltd and its predecessor Edison Mission Energy has been a Landcare partner since 1997. Bass Coast Landcare Network initiatives – the Phillip Island Wildlife corridor and the nearby Powlett Project have formed a cornerstone of the company’s Landcare Program.

The ongoing funding commitment from IPM to these two projects and Churchill Wildlife Corridor and Wellington Maffra has enabled each project to establish momentum, trial emerging techniques, be strategic and plan for future works and direction.

Phillip Island Landcare

Revegetation programs this year focused on building Biolinks from the main corridor through the middle of Phillip Island out to the coastal foreshore reserves. These Biolinks aim to link farm vegetation, commonly windbreaks or buffer strips, dams and wetlands, roadside remnant vegetation, creek riparian vegetation, urban remnants and the coastal strip, providing safe passage and habitat for native fauna.

In 2005, the Phillip Island Wildlife Corridor initiative saw approximately 35,000 trees, shrubs, grasses and ground covers planted, taking the total number of plantings for the project to more than 200,000 and directly attributed to Loy Yang B funding. The plants will contribute to the landscape change envisaged by the 200 members and 13 partners involved in the project.

Phillip Island has continued to promote its effective partnership with Loy Yang B at information stalls and at every event.

Monash University/Churchill Landcare

During 2005 and with the support of IPM Loy Yang B, the group planted 2,520 trees on nine sites around the Churchill district. An additional 1,500 trees were planted on Monash University property.

Once again the group focused its activities adjacent to or nearby Bennett’s Creek and worked in conjunction with IPM Loy Yang B, Monash University, the West Gippsland Catchment Management Authority and private landholders. Riparian vegetation endemic to the local area and other indigenous windbreaks were planted to facilitate the control of erosion and enhance the habitat of birds and animals.

Local seed collected by the group was propagated by GEST Nursery who supplied the tubestock. All of the stock ordered was successfully planted and at this point in time, the group estimates an average survival rate of around 95%.

Powlett Project

2005 was a very busy year with many successful activities. The Powlett Project is delivering outstanding on ground results with more than 200 land managers and 30 different funding sources contributing to the establishment of over 104,000 trees and more than 40,000 metres of fencing in 2005. A total of 160 hectares were protected, including, 38 hectares of remnant vegetation protected, 40 hectares being direct seeded and 82 hectares of revegetation.

Around 64 project sites covering 116 hectares of land which were retired from grazing or consisted of existing remnant vegetation that was fenced for protection from stock. A total of 26.2km of fencing was erected around these sites for protection. 10 sites covering a total of 12 hectares were direct seeded using around 24kg of indigenous seed from the Wonthaggi Indigenous Seedbank.

Year 2005 also saw the development of the Gippslandcare Program, combining 4 regional Landcare Networks into one large project. The Powlett Project has a significant role to play in helping the effective operation of this program.

Minor Projects

A number of minor projects are also sponsored by Loy Yang B during the year. In 2005 this included the provision of native trees, stakes and guards to employees and a number of community groups throughout the Latrobe Valley area. A total of 6360 trees have been planted.