



Q. How can reporting improve environmental performance?

A. What gets reported, gets measured. What gets measured, gets done.



ENERGY AND GREENHOUSE

The Greenhouse Effect suggests that human activities are changing the composition of the atmosphere and these changes are altering global weather patterns and climate. To reduce greenhouse emissions, State and Federal governments have introduced several initiatives including encouraging people to buy energy generated from renewable sources and introducing mandated renewable energy targets and abatement schemes.

Delta has responded to these initiatives by diversifying its portfolio with renewable energy projects. While total output is small at this time, it is expected to increase in time as more facilities are developed and commissioned. Improving the efficiency of existing coal-fired plant is another contributor to lowering greenhouse gas emissions.

Energy consumption and supply

Delta generated 21,500 GWh of electricity in the year from its four coal-fired power stations, representing almost 13% of the total electricity produced for the National Electricity Market. Black coal consumption of more than eight million tonnes equated to a sent out efficiency of 35.3%.

Approximately two thirds of the electricity supplied by Delta is generated at the two western region stations. The remaining one third is mainly generated at Vales Point. Mt Piper Power Station, as the most efficient black coal fired plant in NSW, operates at a high capacity factor, whilst Vales Point and Wallerawang operate at intermediate capacity factors. Munmorah operates on an intermittent basis depending on market demand.

Renewable energy production

Delta now co-fires small quantities of accredited biomass materials and operates three mini-hydro facilities which produce renewable energy and lower emission rates. Proposed projects include co-generation from sugar cane materials in conjunction with the NSW Sugar Milling Cooperative, further mini-hydro facilities and wind farms.

Renewable energy production totalled over 11GWh primarily from co-firing biomass materials at three power station sites (refer Table Three). The major production of renewable energy was at

FIGURE THREE: CONTRIBUTION TO TOTAL ENERGY GENERATED

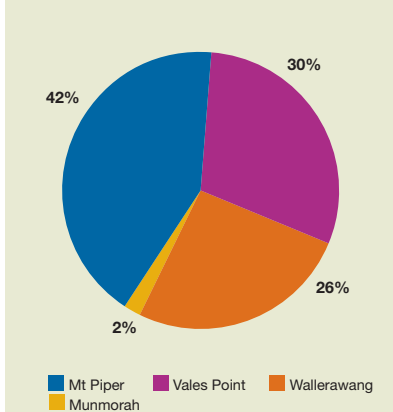


TABLE TWO: ENERGY CONSUMPTION AND SUPPLY

	Energy consumed
Black coal	207.7 PJ
Fuel oil	0.4 PJ
	Energy supplied
Generated	77.5 PJ (21,537 GWh)
Used in works	4.2 PJ (1,168 GWh)
Net energy supplied	73.3 PJ (20,369 GWh)
Efficiency sent out	35.3%

Vales Point, where full scale biomass co-firing commenced in May 2003. Output from biomass production in the western region was constrained due to technical issues with plant and fuel availability. Dungog mini-hydro was commissioned in May 2003, several months later than expected due to drought and some technical problems with the water supply system.

Further development of renewable energy generation is proceeding and it is expected that 2003/04 will see a significant increase in output.

Greenhouse emissions

Production of electricity at Delta Electricity power stations involves the combustion of black coal. The primary greenhouse gas emitted from this process is carbon dioxide (CO₂) which

constitutes more than 99% of total greenhouse emissions from Delta's operations. Small amounts of other greenhouse gases (methane and nitrous oxide) are also released during combustion. Emissions are normally expressed in carbon dioxide equivalents (CO₂-e), ie. the global warming potential of the gases when compared to carbon dioxide.

In 2002/03 Delta Electricity power stations generated approximately 500 GWh less than in the previous year. This resulted in greenhouse emissions of 18.5 Million tonnes of carbon dioxide equivalent, a reduction of 0.3 million tonnes from the previous year's emissions.

The emission rate per unit of energy supplied increased slightly to 908 tonnes

per GWh sent out, up from 903 tonnes/GWh in 2001/02. The main cause of the increase was scheduled maintenance and consequent lower production from Mt Piper, the most efficient coal-fired power station in NSW.

Generator Efficiency Standard performance

Delta was the first generator to sign the Commonwealth Government's voluntary Generator Efficiency Standards Agreement that agreed legally binding targets to reduce greenhouse emissions. To do this Delta is making its existing power plants operate more efficiently. These plants are constantly monitored, refined and upgraded to lower greenhouse emissions.

With the exception of Munmorah, all sites met or exceeded the Generator Efficiency Standard requirements. Although Munmorah fell outside the upper bound of the standard, a significant cause of this was the intermittent operation of the plant in 2002/03 with only 10% capacity utilisation.

AIR EMISSIONS

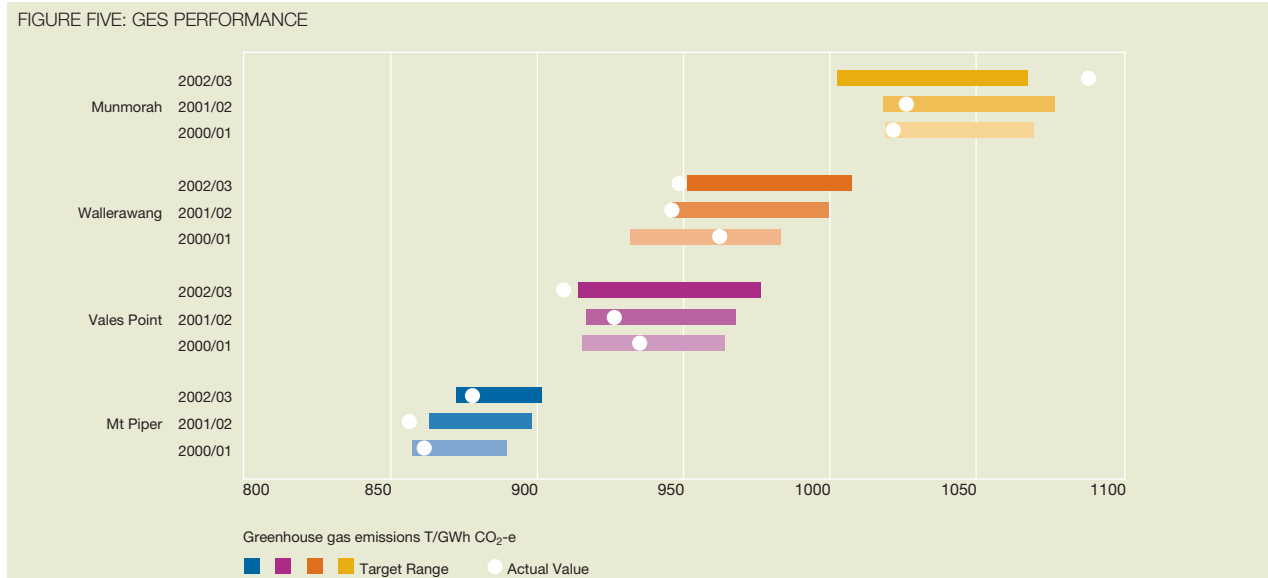
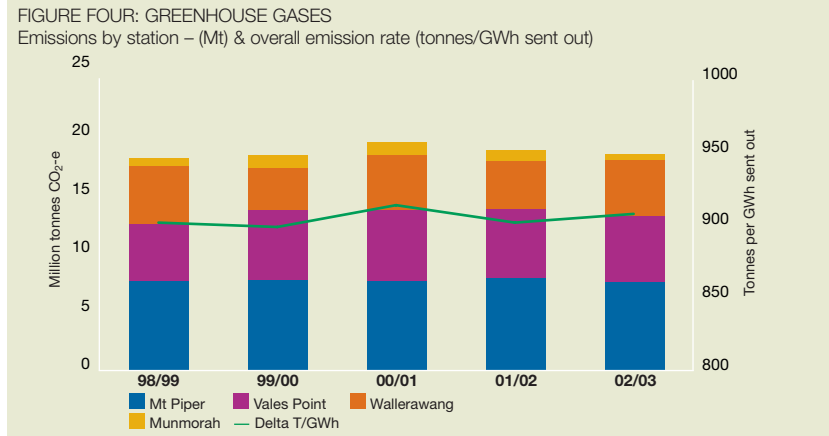
Nitrogen Oxides

Nitrogen Oxides total emissions and emission rate fell slightly in 2002/03, mainly due to a small decrease in production from Mt Piper, the highest emission rate plant in Delta's portfolio and a significant reduction in the emission rate from Wallerawang.

TABLE THREE: RENEWABLE ENERGY PRODUCTION

	Energy supplied	Details
Sustainable biomass	11.4GWh	Vales Point – 6.2 GWh; Wallerawang – 3.5GWh; Mt Piper – 1.8 GWh
Mini – hydro*	0.2 GWh	Chichester, Dungog

*Excludes Mt Piper mini hydro as it is classified as green energy



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Sulfur Oxides

Sulfur Oxides emission rates increased slightly during 2002/03 due to an increase in total generation from the Western region stations. While the sulfur content of coal used at all sites is low, Western region coals are slightly higher in sulfur than Central Coast coals.

Particulate emissions

Munmorah and Mt Piper power stations are equipped with fabric filters that remove 99.95% of all particulates, resulting in dust emission levels well below all the NSW statutory limits. Vales Point and Wallerawang power stations are fitted with more energy efficient fans and electrostatic precipitators which remove 99.5% of all particulates. As a result these power stations emit higher levels of dust but are still well below the applicable NSW statutory limits.

Total particulate emissions were significantly reduced in 2002/03, continuing a trend which commenced with trials of flue gas conditioning at Wallerawang in 1998/99. With this plant now fully operational, certified testing conducted for the Environment Protection Authority load-based licensing scheme indicates that Wallerawang emissions have been reduced to 14% of their 1999/00 level. Total emissions from Delta plant is now less than half of its 1999/00 value.

Flue gas conditioning has also been installed at Vales Point and, although not as effective as at Wallerawang, due to different coal properties, has significantly reduced visible emissions when burning certain coals. The plant became fully operational in May 2003 and it is expected that emissions from this power station will be noticeably reduced in the next year.

WATER USE

The main use of water in power stations is for cooling steam after it has passed through the generator turbines. In order to cool the steam from the production of one gigawatt hour (GWh) of electricity, 1.6 to 1.8 megalitres (ML) of water must be evaporated. The more efficient a power station the less water is needed for cooling. Small amounts of water are also used at power stations for steam to drive the turbine generators and for other general applications such as station cleaning.

In the case of coastal power stations (Vales Point and Munmorah), cooling water is extracted from and returned to

saline lakes. The heat absorbed is lost through evaporation of sea water and this water is not included in water accounting. In the case of inland power stations (Mt Piper and Wallerawang), fresh water is extracted from local rivers (Coxs River and Fish River) and evaporated in cooling towers.

Delta's use of fresh water is therefore determined by the relative generation between coastal and inland power stations and, to a lesser extent, by the relative efficiencies and generation of the inland stations. Due to maintenance work at Mt Piper, both the total amount of generation at Wallerawang and the proportion of generation at

FIGURE SIX: NITROGEN OXIDES
Emissions by station – (tonnes) & overall emission rate (tonnes/GWh sent out)

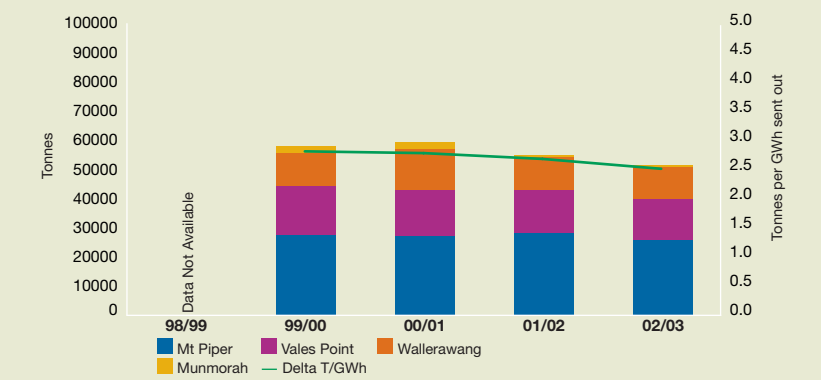


FIGURE SEVEN: SULFUR OXIDES
Emissions by station – (tonnes) & overall emission rate (tonnes/GWh sent out)

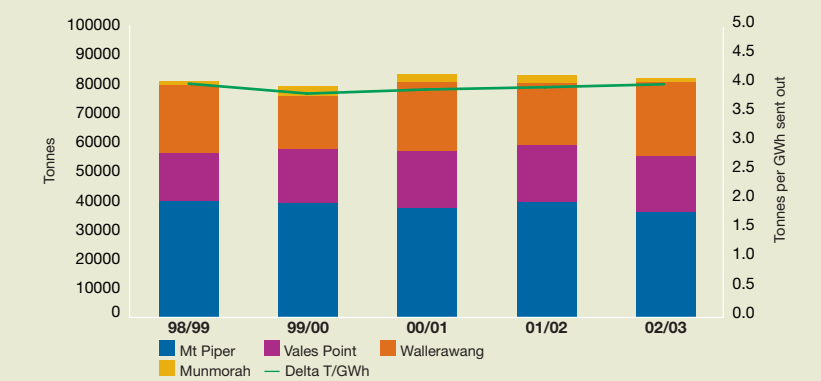
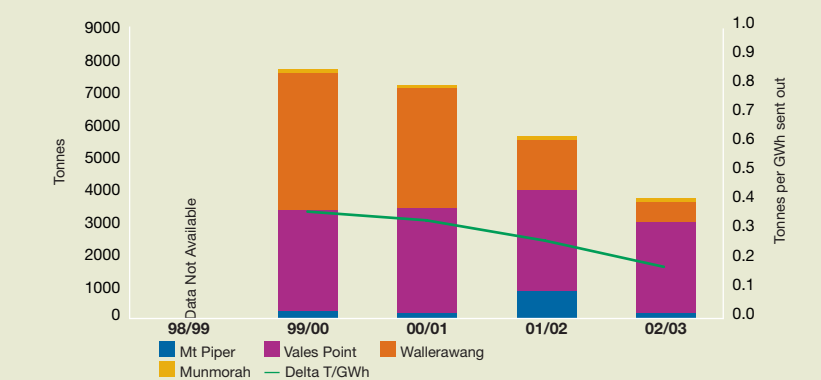


FIGURE EIGHT: PARTICULATES
Emissions by station – (tonnes) & overall emission rate (tonnes/GWh sent out)



Wallerawang to Mt Piper increased slightly in 2002/03. Consequently there was a slight increase in total water use per GWh sent out.

Extractions and environmental flow 2002/03

COXS RIVER SYSTEM

During 2002/03 a severe drought in NSW resulted in reduced inflows to the dams supplying Mt Piper and Wallerawang power stations. Under Delta's water licence, environmental flows are reduced when a "drought trigger" combined storage level is reached in these dams. The drought trigger was in effect for the entire year and environmental flow was restricted to 18% of natural inflows.

Additional water requirements for power station operations were obtained from non-natural sources (mine discharge, sewage plant discharges) and by drawing down the water supply dam levels.

FISH RIVER SUPPLY SYSTEM

About one third of the fresh water used at Mt Piper and Wallerawang is extracted from the inland flowing Fish River system. This supply was restricted to 80% of normal when storage levels

in Oberon Dam reached a drought trigger in May 2003.

RESOURCE MANAGEMENT

Resource consumption

In addition to energy and water the main resources used in power station operations include:

- 8.5 million tonnes of coal;
- 8,000 tonnes of fuel oil;
- 10,000 tonnes of biomass; and
- 148,000 litres of lubricating oil.

Other resources used include approximately 1,600 tonnes of sulfuric acid, 1,400 tonnes of caustic soda and 50 tonnes of ferric chloride for water purification processes, and approximately 140 tonnes of chlorine and 35 tonnes of ammonia for corrosion and scaling control.

Material recycling and reuse

NSW's Waste Reduction and Purchasing Policy (WRAPP) was announced in September 1997 by the Premier. The Policy requires all state government agencies to develop and implement a WRAPP Plan to reduce waste and increase purchases of recycled content materials.

Delta has implemented the WRAPP, including preparation of a Waste

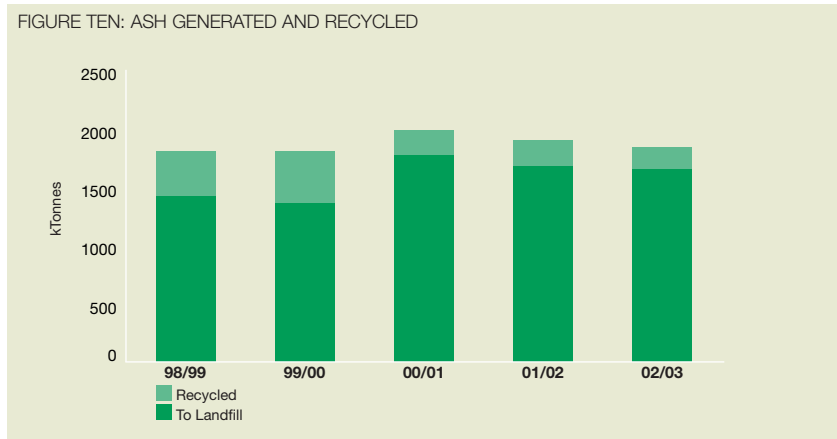
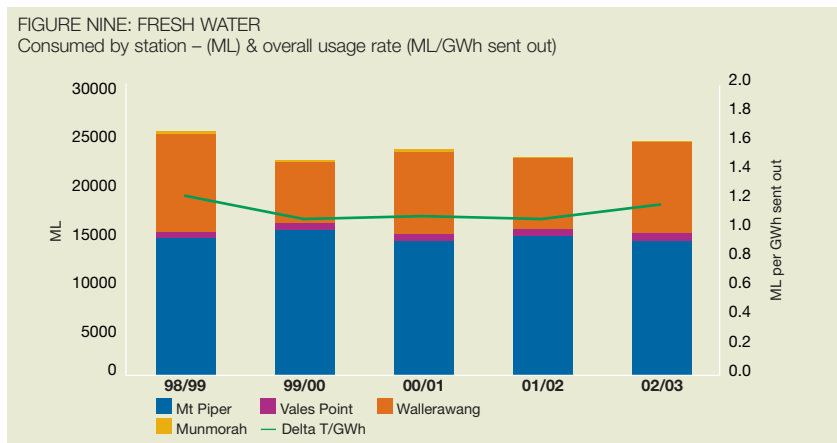
Reduction and Purchasing Plan, and reports performance to Resource NSW.

Waste reduction activities include: re-use of 187,000 tonnes of power station ash; co-firing of 10,000 tonnes of radiata pine sawmill waste, construction and demolition wood waste and green waste for energy recovery; and a large reduction in general station wastes to landfill. A further 5,000 tonnes of composted green waste was purchased and used for ash dam rehabilitation works at Wallerawang. In addition, the majority of the lubricating oil usage shown above is collected in station systems and re-used elsewhere as fuel oil.

Ash re-use

Fly ash is used in cement manufacture, with about 10% of Delta's ash used for this purpose. The cement manufacture industry is currently fully supplied and Delta is actively pursuing other opportunities to use the remaining ash.

Although a number of promising technologies are available to use the ash (brick, tile, wall panel, light-weight aggregate), to date, none of these products has been successfully brought to market.



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Waste reduction

Delta has implemented a waste management plan, which aims to reduce, reuse and recover waste materials. In 2002/03 this program has reduced the amount of material sent to council landfill to 60% of the 1998/99 figure.

COMMUNITY ENQUIRIES

Delta has established a comprehensive system of monitoring and addressing community concerns and enquiries. All community enquiries are recorded and reported. In all cases, Delta's environmental officers personally contact the person to ensure that the issue or concern is addressed to their satisfaction.

The number of enquiries and concerns received by Delta over the preceding 12 months has remained consistent with those recorded in previous years. During the 2002/03 reporting period, Delta received 34 enquiries regarding power station operations. Of these, 14 were subsequently found to be not directly related to power station operations.

Stack emission enquiries, mainly concerning Vales Point, were the most common community enquiry. However, there have been no community enquiries regarding stack emissions since the flue gas conditioning plant started operating in May 2003. A significant number of noise enquiries were also received by Vales Point. Seven of these noise enquiries were later found to be related to other industrial (non-power station) sources.

COMPLIANCE

Delta Electricity operates within the bounds set by government legislation, regulations and licences issued by various government authorities, including the NSW Environment

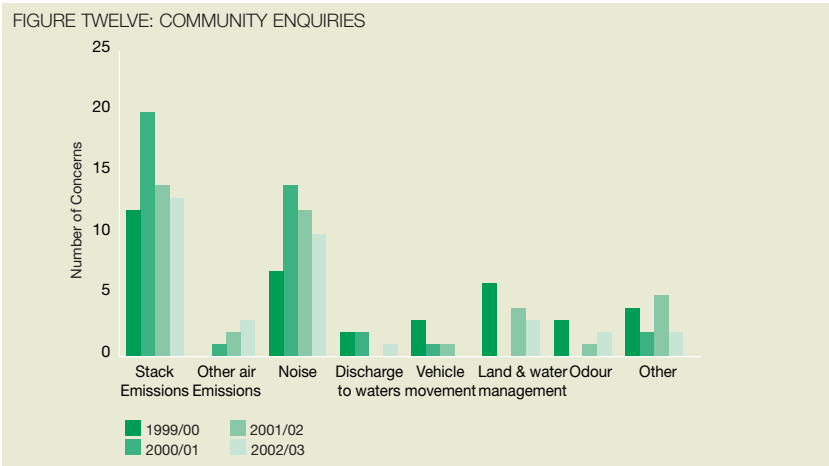
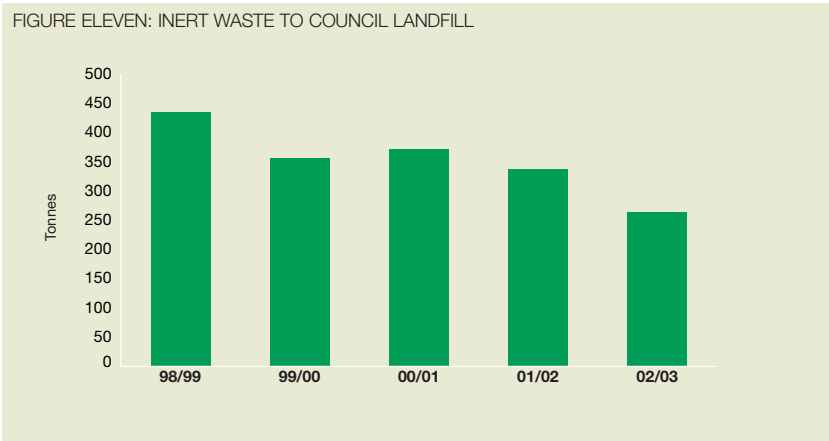
Protection Authority (EPA) and the Department of Infrastructure Planning and Natural Resources. These licences cover the full range of power generation activities including fuel and water use, air and water emissions, community air monitoring and other environmental protection activities.

One of the key environmental objectives is to comply with all statutory requirements by ensuring that there are no non-compliance issues with regard to EPA licences. Delta is pleased to report that for the third year in succession, no licence non-compliance events were

reported. Delta Electricity has not been issued with an environmental infringement notice, prosecution or penalty for non-compliance since its formation in March 1996.

Minor environmental issues

Whilst Delta is required by law to report significant environmental incidents to the appropriate licensing authority, it believes that its responsibility in safeguarding the environment does not end there. Delta views all environmental issues very seriously and action is taken to



ascertain the maximum amount of information from each issue to ensure that it is not repeated. During 2002/03, although the number of more significant issues are decreasing, there was a further small increase in the number of minor issues reported. Procedures are in place to ensure that all environmental issues are recorded, classified and reported regularly to senior management. Each environmental issue is classified into one of three categories:

Issues Categories

Category 1 incidents are those that involve a breach of an EPA licence condition or other statutory regulation.

Category 2 issues are near miss incidents that involve a possible or potential breach of a licence condition or other statutory regulation.

Category 3 issues are minor plant related matters that, although not serious in nature, are monitored to assist in the management of potential environmental problems.

ENVIRONMENTAL PERFORMANCE INDICATORS

The following information conforms to the Environmental Performance Indicator Guidelines for the Australian Electricity Industry February 2003. The guidelines were produced by the Electricity Supply Association of Australia (ESAA) as part of an eco-efficiency agreement with Environment Australia.

The purpose of the guidelines is to establish a core set of environmental indicators recommended for use by ESAA member companies to measure and report to internal and external stakeholders. For more information on this and other environmental initiatives, refer to the Environment & EMF section of the ESAA web site at <http://www.esaa.com.au>

TABLE FOUR: Management Indicators

Total number of incidents reported to environmental legislators	Nil	
Number of warnings or infringement notices received	Nil	
Number of prosecutions	Nil	
Penalties for non – compliance	Nil	
ESAA Code of Practice Audit results (maximum score is 5)	Policy area	Delta/Industry
	Sustainable development	3.7 / 3.8
	Social responsibility	3.8 / 3.7
	Environmental management	4.0 / 3.5
Resource management	3.8 / 3.6	
Fraction of activity with EMS to ISO 14001 (divided into certified and not certified)	100% of operation and maintenance of thermal generating sites. Excludes corporate head office and other non-thermal generating activities.	

TABLE FIVE: Performance indicators

Greenhouse gas emissions (tonnes, t/GWh sent out)	Mt Piper	7,567,000 t	873 t/GWh
	Wallerawang	4,847,600 t	947 t/GWh
	Vales Point	5,575,800 t	913 t/GWh
	Munmorah	504,000 t	1081 t/GWh
	Delta total	18,494,400 t	908 t/GWh
NOx emissions (tonnes, t/GWh sent out)	Mt Piper	25,650 t	2.96 t/GWh
	Wallerawang	10,950 t	2.14 t/GWh
	Vales Point	14,000 t	2.29 t/GWh
	Munmorah	900 t	1.98 t/GWh
	Delta total	51,000 t	2.53 t/GWh
SOx emissions (tonnes, t/GWh sent out)	Mt Piper	35,950 t	4.15 t/GWh
	Wallerawang	25,200 t	4.92 t/GWh
	Vales Point	19,450 t	3.18 t/GWh
	Munmorah	1,350 t	2.92 t/GWh
	Delta total	85,950 t	4.02 t/GWh
Dust (particulate) emissions (based on PM10) (tonnes, t/GWh sent out)	Mt Piper	128 t	0.01 t/GWh
	Wallerawang	174 t	0.03 t/GWh
	Vales Point	1,451 t	0.24 t/GWh
	Munmorah	17 t	0.04 t/GWh
	Delta total	1,770 t	0.09 t/GWh
Carbon monoxide emissions (tonnes, t/GWh sent out)	Mt Piper	920 t	0.11 t/GWh
	Wallerawang	530 t	0.11 t/GWh
	Vales Point	650 t	0.11 t/GWh
	Munmorah	50 t	0.11 t/GWh
	Delta total	2,150 t	0.11 t/GWh
Net water consumption or use, by source (eg surface water, groundwater, recycled waste water) (megalitres, ML/GWh sent out)	<i>Direct extraction from river systems (see below)</i>		
	Mt Piper	13,807 ML	1.59 ML/GWh
	Wallerawang	9,349 ML	1.83 ML/GWh
	<i>Domestic (treated) water from Council supply</i>		
	Vales Point	801 ML	0.13 ML/GWh
	Munmorah	103 ML	0.22 ML/GWh
Delta total	24,060 ML	1.18 ML/GWh	
Influence on water flows (surface or groundwater)	Coxs River system		
	Natural inflow at Lake Lyell	11,708 ML	
	Environmental flows released	2,121 ML	(18%)
	Non-natural inflow (STP, industrial)	5,503 ML	
	Extracted for power stations	14,861 ML	
	Fish River system		
Extracted for power stations	8,295 ML		

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TABLE FIVE: Performance Indicators continued

		Black coal	Fuel oil
Total energy consumption by fuel source (e.g. coal, oil, diesel)	Mt Piper	84.5 PJ	0.09 PJ
	Wallerawang	55.7 PJ	0.06 PJ
	Vales Point	61.8 PJ	0.19 PJ
	Munmorah	5.5 PJ	0.04 PJ
	Delta total	207.5 PJ	0.38 PJ
Thermal efficiency (% sent out)	Mt Piper	36.9%	
	Wallerawang	33.0%	
	Vales Point	35.5%	
	Munmorah	30.1%	
	Delta total	35.3%	
Consumption of recycled fuels (e.g. refuse derived fuels, waste oil)	0.06% of total fuel consumed		
Energy consumed in station GWh, % of generated	Mt Piper	455GWh	5.0%
	Wallerawang	394GWh	7.2%
	Vales Point	282GWh	4.4%
	Munmorah	36GWh	7.2%
	Delta total	1,168 GWh	5.4%
Total waste by type (hazardous, non-hazardous) and destination (reused, recycled, land-filled, destroyed)	Hazardous waste – Nil		
	Non-hazardous waste to council landfill		264 tonnes
	Non-hazardous (ash) to landfill		1,647,000 tonnes
Oil recycled	100% of waste oil produced		
Ash recycled	Mt Piper	16%	
	Wallerawang	0%	
	Vales Point	12%	
	Munmorah	0%	
	Delta total	10%	
PCBs (scheduled and non – scheduled) released to the environment, removed, captured & destroyed	Nil		
Total amount of land used for power generation activities (excluding buffer zones)	Not available		
Ratio of land rehabilitated to land used	Not available		
Compliance with water quality discharge licence conditions	All monitoring requirements met All discharges within limits		