

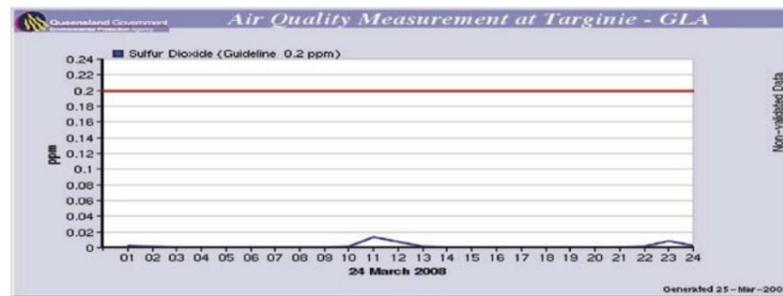
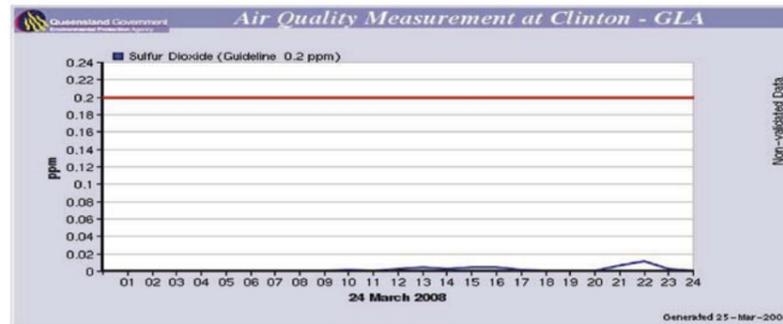
LOCAL MONITORING

The Queensland EPA currently maintains monitoring stations at Clinton (Airport), Targinnie and South Gladstone (Primary School) for sulphur dioxide emissions.

Emission effects from the Power Station would most likely affect Clinton and Targinnie monitoring locations and trends of emissions in real time can be found on the EPA (Qld) web site - Air Quality Monitoring. <http://www.epa.qld.gov.au/projects/air/>

Examples of trends at these two sites are shown below for the 24 March 2008.

To exceed the target guideline of 0.2 ppm would take an extremely rare occurrence which would possibly include an extremely high sulphur dioxide source emission and rare plume dispersion phenomena.



WHO AIR QUALITY GUIDELINES

The World Health Organisation (WHO) Air Quality Guidelines (AQG) provides interim targets and guidelines for 24 hour and 10 minute concentration values for SO₂.

Pollutant	Averaging period	Current	Future
Sulphur dioxide	24 hours	0.05 ppm	0.008 ppm
	10 minute		0.19 ppm

These are long term goals set for countries which will take some time to achieve and will have to be done by a stepped approach through control of major sources of emissions one at a time.

Motor vehicles, industrial sources and power sources will have to participate whilst monitoring of public health and SO₂ levels for health effect gains, will have to be monitored.



*Sulphur Dioxide
Emissions from
Gladstone Power Station*



CHARACTERISTICS OF SULPHUR DIOXIDE

Sulphur is found naturally occurring in all coal types at varying concentration levels. Generally Australian coals are low in sulphur relative to global levels. Sulphur can also be released from natural sources eg decaying material, marshlands and oceans.

When sulphur is burned during the coal combustion process it burns to form Sulphur Dioxide with virtually 100% conversion of the sulphur to sulphur dioxide.

Sulphur dioxide can irritate the respiratory tract and can cause respiratory tract infection in susceptible individuals. In high enough concentrations it is extremely toxic and may cause death.

SULPHUR DIOXIDE LEVELS AT GLADSTONE POWER STATION

Sulphur dioxide ground level concentrations (glc) from power stations are typically lower than 'World Health Organisation Guidelines for Air Quality' and 'National Environmental Protection Measures for Air Quality.'

The Environmental Authority established for the Gladstone Power Station (GPS) has quality limits placed on the level of sulphur contained in the coal and fuel oil.

The licence limit for GPS is based on sound science and the GPS emission has no impact on the Gladstone community and ambient air sulphur dioxide level. This is confirmed by the EPA monitoring sites.

LICENCE REQUIREMENT (EPA ENVIRONMENTAL AUTHORITY)

The Environmental Authority for GPS allows coal burned in the boilers to have maximum sulphur content of 0.8%, and in fuel oil of 1.8%. (See Gladstone Power Station Agreement Act 1993 Second Schedule Part B - Air emissions S1.11 Other gaseous emissions).

GPS GENERATION OF SULPHUR DIOXIDE

The major coal supplies currently burned at Gladstone Power Station come from Rolleston mine and Boundary Hill mine. Additional supplies are occasionally purchased to supplement existing supplies or to investigate the feasibility of purchasing new coal supplies.

The Rolleston coal mine is located in the Bowen Basin coal seam which has typically sulphur coal concentrations in the range 0.5% - 0.8%. The Boundary Hill coal mine which lies within the Boundary Hill / Callide coal seam has sulphur levels which vary from 0.1% - 0.4%.

During the daily operation of the Power Station, the Rolleston and Boundary Hill types are blended to ensure the Oxides of Nitrogen source emission levels are not exceeded. The blending ensures the

DERIVATION OF LIMIT

For coal, the specified value was determined as a result of Gladstone air shed modelling studies carried out in the 1980's where it was found that the coals then being burned had sulphur dioxide source emissions (gas released from the stack) of 350-500 parts per million (ppm) sulphur dioxide. This resulted in ground level concentrations (glc) of 0.2 - 0.8 ppm downstream of the stacks where the plume effects contacted the ground. In recent years GPS has on occasions tested the flue gas which measured 300 parts per million or less.

The height of the stacks, temperature of the flue gas, exit velocity of the flue gas, topography of the land and ambient weather conditions all influence the behaviour characteristics of the plume dispersion and subsequent ground level concentrations. The combustion gas which includes the sulphur dioxide is released from the 153 metres chimneys and is readily dispersed.

Allowing for a maximum sulphur level concentration of 0.8% in the coal and the fact that sulphur burns completely to sulphur dioxide, the limits for glc's specified for sulphur dioxide by regulatory authorities were never exceeded at any location downstream of the power station, provided the limits placed on the maximum level of sulphur in the fuel (coal and fuel oil) are complied with.

This is ensured by NRG initially entering into Fuel purchase agreements specifying the limits on sulphur content in the Coal and Fuel Oil and having analytical testing being carried out and records kept on all fuel deliveries.

Using this process, GPS has never exceeded its Environmental Authority limit for sulphur.

combined coal feed has an energy value which sustains boiler combustion. Also the individual oxides of nitrogen releases of each coal type are mixed to lower the final oxide of nitrogen emission value to atmosphere. The Rolleston coal produces higher oxides of nitrogen value than the Boundary Hill coal type.

The blending process ensures the sulphur in the two coals is also mixed, resulting in the final coal blend having a sulphur content of less than 0.8%.

There is no on-line monitoring of Sulphur Dioxide source emissions because all investigations, air quality modelling and data for glc Sulphur Dioxide values obtained in previous air quality studies has been validated by current monitoring stations. Current results show no variation to results obtained in the 1980's.



NATIONAL STANDARDS (NEPM)

The National Environment Protection Council (NEPC) has established Australia's first national ambient air quality standard as part of the National Environment Protection Measure for Ambient Air Quality (the 'Air NEPM').

NEPM GOALS

Pollutant	Averaging period	Maximum (ambient) Concentration	Goal within 10 years (max. allowable exceedance)
Sulphur dioxide	1 hour	0.20 ppm	1 day per year
	24 hours	0.08 ppm	1 day per year
	1 year	0.02 ppm	Nil

EPA QLD GOALS

The Qld Environmental Protection (Air) Policy 1997 has indicators and goals for Sulphur Dioxide levels and averaging times as shown below.

Pollutant	Averaging period	Maximum Concentration
Sulphur dioxide	10 minute	0.25 ppm
	1 hour	0.2 ppm
	1 year	0.02 ppm

FOR BIOLOGICAL INTEGRITY RELEVANCE

Pollutant	Averaging period	Maximum Concentration
Sulphur dioxide	24 hours	0.04 ppm
	1 hour	0.02 ppm

The current EPP (Air) Policy 1997 and the Air quality indicators and goals are due for review following a 10 year period. It is expected that new concentrations for Sulphur Dioxide and averaging times will align with NEPM values.

Air Quality Standards