



2010

Gladstone Region

Industry Profiles



The Gladstone  
Region  
GAPDL *Be Surprised!*

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# Austicks

Austicks Pty Ltd produces high quality ice cream sticks from plantation timber – Australia’s renewable resource. The factory at Gladstone produces for both the Australian and export markets.

The hoop wood used is free of resin and has no taste or odour making it naturally safe and ideal for use with ice cream and iced water.

Austicks employs a quality management system to ISO 9002 standard and H.A.C.C.P. (food quality) to ensure a high standard is maintained.

## Boyne Smelter Limited

Rio Tinto Alcan (RTA) is the largest shareholder in the Boyne Smelters Limited. (BSL) joint venture and has been operating in the Gladstone region for over 40 years. As a shareholder in other local industry operations including Rio Tinto Alcan Yarwun, Queensland Alumina Limited (QAL) and the Gladstone Power Station, RTA maintains significant contributions of A\$3.34 billion into the region’s economy annually.

BSL has been in operation since 1982 and over time has undergone extensive expansion. The smelter underwent a A\$1 billion expansion in 1997 introducing a third reduction line which increased aluminium production from 260,000 to more than 558,000 tonnes per annum.

The company is once again undergoing significant modernisation with the re-building of Carbon Baking Furnace 3 and the construction of a new Carbon Baking Furnace 4 to upgrade technology. The new furnace will be more energy efficient and reduce onsite greenhouse gas emissions. A further project includes overhead crane replacement, a crane runway upgrade and an improved alumina transport system to the cells. These projects will modernise and extend the life of Boyne Smelters Limited and at investment of A\$685 million.

### SAFETY

Like all Rio Tinto Alcan managed sites, BSL operates under the safety principle – “The Goal is Zero” which aims to create a workplace free from incidents and injuries.

RTA is working to establish a safety culture that is grounded on the belief that all incidents and injuries are preventable, and that each employee is entitled to a safe work environment. Improvements have been made to safety performance via a number of initiatives including the Take 5 (pre-task hazard assessment process), safety interactions, increased focus on the application of work standards, and the recognition and communication of safety incidents and improvements.

### COMMUNITIES

BSL is committed to building enduring relationships with the community based on mutual respect, active partnership and long-term commitment. Our aim is to be a valued community member and to contribute to the enduring sustainability of the region.

### ENVIRONMENT

BSL has an overriding commitment to environmental responsibility, and aims to achieve best practice by minimising waste, emissions and impacts associated with our activities through the implementation of effective mitigation and management strategies.

A good example is the redistribution of spent cell lining, which is a solid waste from the smelting process. As part of a programme established in 2004, spent cell lining was transported to Cement Australia for use as an alternative fuel in the production of cement.

### EMPLOYMENT

Currently BSL employs over 1,300 people (including contractors) in a variety of roles including operation, maintenance, technical and administration based roles.

Efforts are made to employ locally and the business supports a policy to employ and retain highly capable and enthusiastic people, who enjoy their work and are committed to contributing to the business.

### PROCESS

Aluminium is produced in large electrolytic reduction cells, which are housed in one kilometre long Reduction Lines. Alumina, the raw material for aluminium production, is transported from Queensland Alumina Limited along a 10 kilometre conveyor system.

To convert alumina powder to primary aluminium an electrolytic reduction reaction known as the Hall-Heroult process is carried out. In this process Alumina (Al<sub>2</sub>O<sub>3</sub>) is

fed into cells at regular intervals where it dissolves in a bath of molten cryolite (sodium aluminium fluoride). An electric current of 232,000 DC amperes for Lines 1 and 2, and 347,000 DC amperes for Line 3, is passed through the carbon anodes suspended in the bath material causing the oxygen in the alumina to separate, and to combine with the carbon of the anodes. The aluminium settles to the bottom of the reduction cell as molten aluminium which is siphoned off daily and transferred to the metal casting facility where it is cast into three main shapes, namely ingots, billet and t-bar.

The carbon anodes used in this process are also made on-site in the Carbon Baking Furnaces.

### **RIO TINTO ALCAN COMMUNITY FUND**

The Rio Tinto Alcan Community Fund was established in 2002 to provide RTA an opportunity to contribute strategically to the sustainable development and economic growth of the Gladstone region. Over the past eight years and continuing into 2010 the fund will contribute A\$3 million to the region through partnership projects that will enhance skill and diversity in our workforces, contribute to sustainable employment opportunities and promote environmental awareness and liveability programmes for the region.

### **WEBSITE**

[www.riotintoalcan.com](http://www.riotintoalcan.com)

## **Cement Australia Limited (Queensland)**

Cement Australia Gladstone is the largest cement Plant in Australia and utilises state of the art technology. The plant is Australia's most efficient and is the leading environmental performer in the industry.

Cement Australia Gladstone has a production capacity of over 1.6 million tones per annum and processes limestone, clay, silica sand and copper slag to produce and supply cement and clinker throughout Australia and overseas destinations, as well as cement in bulk or in bags.

Great emphasis is placed on achieving uniformity of products and processes, originating from materials mined at East End, to the manufacture and delivery of bulk and

bagged cement from the plant. Advanced process controls and laboratory systems are used to manage and monitor each step of the production and delivery process.

### **PROCESS**

The first stage of the cement manufacturing process is the production of 'clinker'. The main raw materials used in clinker are limestone and overburden (a mixture of clays containing silica, iron oxide and alumina). All the ingredients are then placed into a 5 stage dual string-in-line pre-calciner kiln.

Pulverised coal and air blasted into the lower end of the kiln is burned at 1650C. This extreme heat drives carbon dioxide from the raw materials. The fine solids that are left join together because of the heat and, when cooled, form different sized dark grey pebbles call clinker.

The clinker falls into a grate cooler where it is air cooled before being taken by conveyor to storage sheds or silos.

To make cement, clinker is mixed with gypsum and fed into a ball mill, which grinds it to form the fine, light grey powder, called Portland Cement.

Alternative Fuel & Raw Materials (AFR) are also being used in the K2 clinker kiln to reduce green house gas emission. These include a solvent based fuel, spent cell linings from BSC and tyres.

### **LIME PRODUCTION FACILITY**

Cement Australia has refurbished and converted an existing unused cement kiln (K1) at the Fisherman's Landing plant to produce up to 300,000 tonnes of lime product per annum.

Upgrades to the kiln include both the pre-heater tower and the installation of an advanced bag filter and dust collection system.

An additional lime storage silo with a capacity of 6,000 tonnes and a crushing and screening plant are also included as part of this upgrade.

Cement Australia's Lime expansion project will create a world-class energy efficient lime production facility at Fisherman's Landing in addition to current lime manufacturing operations located at Rockhampton in Queensland.

## EAST END MINE

East End mine is situated 24 kilometres from Gladstone, and was developed in 1964 near the township of Mt Larcom. It is Queensland's largest limestone mine operation and supplies raw material to the plant at Fisherman's Landing.

Queensland Rail constructed a rail link loop to the East End Mine (12km) to the Fisherman's Landing site. Block trains of 22 custom designed wagons transport raw material to the Fisherman's Landing plant daily.

## SHIPPING AND DESPATCH FACILITIES

Gladstone's clinker wharf was completed in 1981 and has sufficient draught for vessels up to 25,000 DWT capacity.

Clinker and Fly Ash are loaded through a radial arm that receives the material from a conveyor belt linked to the Fisherman's landing silos.

Cement Australia has three vessels, the Cementco, Alcem Calaca and Goliath that carry product from Gladstone to various facilities across Australia. In 2003 Cement Australia shipped approximately 860,000t Clinker, 460,000t Cement, 120,000t Fly Ash, 46,000t Limestone and 5,000t Gypsum.

## ENVIRONMENTAL STATISTICS

Fisherman's Landing employs the most energy efficient and environmentally sound methods of cement and lime manufacture. The clinker cooler is considered the most energy efficient in the industry because of its heat recuperation capabilities.

Because of these and other innovations the group's specific fuel consumption has fallen by 36% resulting in considerable reductions of greenhouse gas emissions. Cement Australia was the first to introduce bag filters to Australia, resulting in a large reduction of dust emissions.

To conserve natural resources, the Gladstone plant also uses by-product materials from industry and the general community as a source of fuel and raw materials for the cement making process.

The plant uses a solvent based liquid fuel and scrap car tyres to substitute 5% of the coal needed for cement production. This also reduces the amount of waste being transported to landfill.

Solid by-products from the aluminium, steel and power generation industries are also incorporated into the

cement production process, thereby adding value to material that would otherwise have been classified as waste product.

## COMMUNITY RELATIONS

Fisherman's Landing and East End have developed strong community relations and are committed to supporting the communities in which they operate. A Community Advisory Panel (CAP) and East End Mine Community Consultation Forum has been established by the Group, as a means by which they can keep the community informed and as a forum for receiving feedback on operational issues that concern the community.

The Fisherman's Landing and East End sites are also heavily involved in local sponsorship of various sporting, educational and community projects and participate regularly in the GAIN (Gladstone Area Industry Network) group.

Cement Australia has also continually supported large infrastructure projects within the Gladstone and Mt Larcom areas. As one of the largest employers in this region, Cement Australia is committed to supporting the community.

## WEBSITE

[www.cemaust.com.au](http://www.cemaust.com.au)

# Rio Tinto Aluminium Yarwun (RTA)

RTA has been part of the Gladstone community for over 40 years. RTA maintains a significant shareholding in Queensland Alumina Ltd, the Gladstone Power Station and a shareholding and management of Boyne Smelters Limited. A 2008 Socio-economic study found that Rio Tinto Alcan contributed A\$3.34 billion annually into the region's economy.

RTAY was constructed between 2002 and 2004 at a capital cost of A\$1.4 billion. Stage One of RTAY has the capacity to provide 1.4 million tonnes of smelter grade alumina per annum and with the construction of Stage Two currently taking place the refinery will increase its production capacity to 3.4 million tonnes per annum.

RTAY produces smelting grade alumina for the RTA aluminium smelters at Bell Bay, Tasmania and NZAS, New Zealand and also contributes to world markets.

### **SAFETY**

Rio Tinto Alcan Yarwun operates under the safety principle – “The Goal is Zero” which aims to create a workplace free from incidents and injuries. RTA is seeking to establish a safety culture that is grounded in the belief that all incidents and injuries are preventable, and that each of us is entitled to a safe work environment.

### **COMMUNITIES**

Rio Tinto Alcan Yarwun is committed to building enduring relationships with the community based on mutual respect, active partnership and long-term commitment. Our aim is to be a valued community member and to contribute to the enduring sustainability of the region.

### **ENVIRONMENT**

Rio Tinto Alcan Yarwun has an overriding commitment to environmental responsibility, and aims to achieve best practice by minimising waste, emissions and impacts associated with our activities through the implementation of effective mitigation and management strategies.

### **EMPLOYMENT**

Currently Rio Tinto Alcan Yarwun employs approximately 550 people (including contractors) in operational roles at the refinery, while the current construction operation at RTAY2 employs approximately 850 people. Efforts are made to employ locally and the business supports a policy to employ and retain highly capable and enthusiastic people, who enjoy their work and who are committed to contributing to the business.

### **PROCESS**

The refining process is a chemical one known as the Bayer process. To initiate this, grinding mills prepare the bauxite for a high temperature digestion where aluminium hydroxide is dissolved from the bauxite into a solution of caustic liquor. The resultant liquor and solids are separated in clarifiers before the liquor is sent to precipitation and the solids are washed and pumped into residue storage. Open top precipitation tanks allow hydroxide crystals to form from the super saturated liquor. These crystals are then heated in calciners to remove water molecules and produce alumina powder which is stored for shipment.

### **RIO TINTO ALCAN COMMUNITY FUND**

The Rio Tinto Alcan Community Fund was established in 2002 to provide RTA an opportunity to contribute strategically to the sustainable development and economic growth of the Gladstone region. Over the past eight years and continuing into 2010 the fund will contribute A\$3 million to the region through partnership projects that will enhance skill and diversity in our workforces, contribute to sustainable employment opportunities and promote environmental awareness and liveability programs for the region.

### **WEBSITE**

[www.riotintoalcan.com](http://www.riotintoalcan.com)  
[www.yarwun2.nga.net.au](http://www.yarwun2.nga.net.au)

## Gladstone Area Water Board

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Pursuant to section 1084 of the *Water Act 2000* (the Act), GAWB is taken to be a Category 1 Water Authority from 1 July 2000. GAWB is also a registered Service Provider under the *Water Supply (Safety & Reliability) Act 2008 (Qld)* (WSSRA) and operates as a commercialised statutory authority with the function of carrying out water activities. As a commercialised entity, GAWB has a key objective of ensuring its operations are as efficient as possible, with its prices being cost reflective.

GAWB owns and operates Awoonga Dam on the Boyne River along with a network of delivery pipelines, water treatment plants and other bulk water distribution infrastructure in the Gladstone region in Central Queensland.

GAWB holds an allocation of 78,000 MI per annum (MI p.a.) from Awoonga Dam on the Boyne River by virtue of a Resource Operations Licence issued pursuant to the *Water Resource (Boyne River Basin) Plan 2000* (WRP). Until the Awoonga Dam storage is first filled to its full current capacity of 40 metres, GAWB's licence limits the amount of water which GAWB may take to a notional yield of approximately 70,000 MI p.a. calculated by reference to the highest level filled to date (currently 36.94m or 75.63%).

GAWB's primary objective is to ensure that the water needs of their customers, today and into the future, are

met through commercially responsive and environmentally sustainable business practices.

GAWB strives to achieve and support a viable balance between efficient use of the water resources they manage, the commercial interests of GAWB and the needs and aspirations of the community. On-going long term planning is vital to achieving an appropriate balance for the future.

## THE FUTURE

To improve the security of the water supply system GAWB initiated its Contingent Supply Strategy (CSS). The CSS involves GAWB developing (and retaining) the capability to quickly and efficiently respond to identified “supply failure scenarios” which could be caused by either:

- failure of storage arising from (or “as a consequence of”) drought; or
- inability to meet new demand of customers due to the limits of the annual water allocation from Awoonga Dam, currently approximately 70,000MI p.a.

At its core is the development of capacity to respond to the uncertainty of the future, having regard to the consequences of supply failure. The CSS not only involves the identification and investigation of available augmentation options allowing the least-cost (highest benefit) solution to be identified, but also includes undertaking necessary preparatory work and planning on augmentation options to enable GAWB to respond in an efficient and effective manner with the most appropriate delivery augmentation option.

These works include feasibility and preparatory works for the Gladstone Fitzroy Pipeline (GFP) Project, feasibility studies for desalination and other technology driven options and potential commercial responses to achieve demand reduction including options for buy back of excess reservation of customers, curtailment options, contractual by-pass and buy back negotiations with customers.

GAWB’s 30,000 MI water allocation from the Lower Fitzroy River under the Central Queensland Regional Water Supply Strategy (CQRWSS) was formalised through the amendment of the Fitzroy Basin Resource Operations Plan 2004 in July 2009. However, to receive this allocation, the storage infrastructure must be in place prior to a successful wet season so that ample storage is contained before the delivery system, the GFP Project (GAWB’s current primary response for capacity development), is commissioned. The goal of the GFP is directed to the completion of approvals and works required to access the 30,000 MI entitlement for GAWB within a 24 month time frame of when required to meet demand or mitigate supply shortages from drought. This

process includes oversight and reporting by the QCA in response to a referral from the QCA Ministers. “Ready to Implement” status for the GFP is forecast to be achieved by the end of calendar year 2009 with ongoing attention directed to retaining the currency and relevance of this capability.

To support the GFP project and receive the allocation, GAWB has continued involvement as a joint proponent in developing the business case for the Lower Fitzroy River Water Infrastructure Project (LFRWIP). GAWB’s focus is to ensure infrastructure on the Fitzroy River is capable of being brought on line within the required complementary timeline and that delivery of the project meets GAWB’s criteria of necessary and efficient costs.

## SAFETY AND ENVIRONMENT

The Board operates a Fish Hatchery in which three fisheries staff are employed to implement fisheries breeding, restocking, and research. GAWB acknowledges the ongoing support from the Gladstone Ports Corporation Limited which provides the facilities at Lord Street to GAWB at no cost.

The Hatchery breeds and releases Barramundi, Sea Mullet and Mangrove Jack fingerlings into Lake Awoonga.

The Board employs a Safety Officer and Environmental Team who over see ongoing monitoring of safety and environmental programs to ensure compliance with quality management, environmental and safety systems as required with maintaining the certification of ISO14001, ISO9001 and AS/NZS 4801.

Water is analysed for physical, chemical and biological parameters with the results being compared to relevant guidelines with ongoing monitoring of water quality and investigation of any erroneous results.

## WORKFORCE

There are currently 46 staff at the Goondoon Street Office and 4 staff at Brisbane Office located at Hope Street, South Brisbane. GAWB also has three staff located at the Hatchery in Lord Street, Gladstone and five rangers and land management officers located at Awoonga Dam.

## WEBSITE

[www.gawb.qld.gov.au](http://www.gawb.qld.gov.au)

# Gladstone Ports Corporation

Gladstone's bustling world-class port is Queensland's largest multi-commodity port. It handles more than 79 Mt of cargo annually, with the region it serves tipped to be Australia's major industrial centre for the 21<sup>st</sup> century.

As a government owned corporation, Gladstone Ports Corporation (GPC) controls and manages the facility.

GPC is unique among Australian port authorities because it acts as a 'landlord' as well as owning and operating cargo handling facilities.

It is a well recognised member of the Gladstone community, providing 35 hectares of recreational waterfront facilities at the beautiful Marina and Spinnaker Park. Here, residents and visitors to the area will find barbecues, shade shelters, 250 mooring berths, playground equipment, walking trails and a man-made beach.

The port boasts many strategic advantages including:

- an expansive harbour
- protected waters sheltered by harbour islands
- stable weather patterns
- an abundance of nearby land for industrial development
- a nearby hinterland rich with natural resources linked by an efficient transport network
- abundant energy sources including coal, natural gas and water
- a short sailing time of 10 to 12 days to the Asia Pacific region

The port caters for vessels up to 220,000 dead weight tonnes and has a minimum sailing draft of 17 metres on any day of the year. GPC's 50 Year Strategic Plan indicates that the Port of Gladstone could accommodate up to 300 Mt of export product within the next 50 years.

## PORT TRADE

The Port of Gladstone handles a variety of cargoes associated with industries within the Central Queensland region.

The major export commodity is coal, and during 2008 – 09, coal exports reached a record 56.2 million tonnes

(Mt) which equals approximately 71% of total port trade. Over 30 products pass through GPC's facilities annually with exports to over 35 countries. Major exports include alumina, aluminium and cement. Overall, the port exported 18 cargoes to 38 countries and imported 15 cargoes from 18 countries.

The Port of Gladstone imports a variety of cargoes including bauxite (13.1 Mt), caustic soda (1.4 Mt) and petroleum products (0.8 Mt).

## FACILITIES

The Port of Gladstone has six main wharf centres encompassing 15 wharves. They stretch over 30 kilometres of coastline from Boyne Wharf in the east to Fisherman's Landing in the west.

## RG TANNA COAL TERMINAL (RGCT)

This terminal comprises three train unloading stations, 21 coal stockpiles, three mobile gantry shiploaders and four berths. A new terminal record was set with exports reaching 52.4 Mt during 2008 -09. Expansion works were completed in late 2007 with the construction of an additional train unloading station, two additional stockpiles, a third shiploader and a fourth berth.

## AUCKLAND POINT WHARVES

The four wharves at Auckland Point handle a variety of cargoes. Among the imports are petroleum products, caustic soda, magnetite, copper slag, cement gypsum, break bulk, LP gas, general and containerised cargo. Cargoes exported from these wharves include woodchip, grain, calcite, magnesia, containers, scrap metal, electro fused magnesia, break bulk and general cargo.

## FISHERMAN'S LANDING

This facility boasts three berths, including GPC's Bulk Liquids Wharf. Bauxite, caustic soda and liquid ammonia are imported through Fisherman's Landing, with exports including cement clinker, cement, alumina, fly ash and limestone. The planned Fisherman's Landing Northern Expansion Project will provide an additional six wharf sites to cater for future industrial growth within the Gladstone State Development Area. The project is in the final stages of the Environmental Impact Statement, with a decision from the Coordinator General expected in early 2010.

## BARNEY POINT TERMINAL

This terminal comprises one wharf and caters for the export of coal and other dry bulk products including grain and calcite. Barney Point has a throughput capacity of 8Mtpa.

## SOUTH TREES WHARF

This facility boasts two wharves (East and West) and services one of the world's largest alumina refineries, Queensland Alumina Limited. The wharves handled 14Mt for 2008-09, importing bauxite, caustic soda, and bunker fuel oil and exporting alumina.

## BOYNE WHARF

This wharf services Boyne Smelters Limited, Australia's largest aluminium smelter. Imports of petroleum coke and liquid pitch cross the wharf, with the sole export cargo being aluminium.

GPC also encompasses the Port Alma Shipping Terminal and recently acquired the Port of Bundaberg.

## WORKFORCE

GPC employs over 660 people with employee numbers expected to increase significantly over the next five years as new industry develops.

## WEBSITE

[www.gpcl.com.au](http://www.gpcl.com.au)

# NRG Gladstone Power Station

## OWNERSHIP AND OPERATION

The Gladstone Power Station is a major Queensland power station providing safe, reliable low cost electricity to customers. Since 1994 the station has been operated by NRG Gladstone Operating Services on behalf of the joint venture participants, Rio Tinto Alcan (42.125%) and NRG Energy Inc (37.5%), as well as SLMA GPS Pty Ltd (8.50%), Ryowa II GPS Pty Ltd (7.125%) and YKK GPS (Queensland) Pty Ltd (4.75%).

Located in Princetown, New Jersey NRG Energy Inc was established in 1989 and has ownership in 44 power generating facilities in the United States, Australia and Germany.

NRG has a diverse portfolio of electric generation facilities in terms of geography, fuel type and

dispatch levels. NRG projects uses a wide array of fuel sources including fossil fuels (natural gas, oil, coal and nuclear) and refuse-derived fuels

## PLANT DESCRIPTION

Gladstone Power Station is Queensland's largest with a generating capacity of 1,680 megawatts. The station was sited to take advantage of seawater for cooling and to be near to Central Queensland's vast coal reserves. Construction of the power station began in March 1971 and was completed in February 1982

The station's six-megawatt turbogenerators each output 15,750 volts to transformers that convert the power to a level suitable for transmission at 132,000 or 275,000 volts.

## CUSTOMERS

The Gladstone Power Station sells most of its electricity to Boyne Smelters under a long-term contract. The station remains inter-connected with the Queensland Electricity grid and the remainder of the power generated is committed to the state.

## COAL SUPPLY

Around four million tonnes of coal each year are railed to the station from coalfields in Central Queensland.

## GENERATORS

Coal is stockpiled after unloading, then reclaimed from the stockpiles by either of two stacker reclaimers at a rate of 800 tonnes an hour, or via a covered slot bunker system that provides dry coal storage for extended operation in wet weather. Sufficient coal is stockpiled on site to run the station at maximum output for several weeks.

## COOLING WATER SUPPLY

The station requires 245 million litres of cooling water an hour, sufficient to fill nearby Awoonga Dam in six weeks. Saltwater pumped from Auckland Inlet passes through the Station's condensers to condense spent water for repeated use in the boilers. The cooling water is discharged into Calliope River.

## STACKS

The 153 metre high chimneystacks provide a natural draught that assist in the removal of the boiler flue gas. Two boilers are connected to each of the three stacks. Water reservoirs, for emergency fire fighting, are located in the base of the stacks.

## CONTROL SYSTEMS

Gladstone Power Station's complex operations are controlled by modern computer systems, allowing all operations to be monitored in a single control room.

## BOILERS

Coal is burned in the boilers to generate steam from water at high pressure and temperatures. Each of Gladstone's six boilers has been designed with high dynamic response and is capable of increasing output at a rate of 100 thermal megawatts in 10 seconds.

## TURBOGENERATORS

Each of the six 280 megawatts turbogenerators weigh about 700 tonnes and are comprised of three steam turbines directly coupled to a generator. Hydrogen is used to cool the generators that spin at 3,000 revolutions a minute.

## ENVIRONMENT

NRG Gladstone Operating Services and the Joint Venture participants are committed to protecting the environment. Since 1994, NRG and the Joint Venture participants have completed major environmental improvements to the plant. New fabric filters to remove dust from flue gases, equipment to maintain clean water standards, and a tree planting program are part of the upgrade. All waste products from the station are properly treated, monitored and controlled to avoid harmful effects on the environment.

## WORKFORCE

NRG has 290 employees.

## REPLACEMENT COST

Approximately \$2.2 billion.

## WEBSITE

[www.nrggos.com.au](http://www.nrggos.com.au)

# Orica Australia Pty Ltd

Orica Australia commenced operations in Gladstone in May 1990. Since commencing in the Gladstone Region, they have undergone several expansions, and are considering further expansions. Orica produce various chemicals, principally sodium cyanide (which is used to leach gold from ore), ammonium nitrate prill and ammonium nitrate emulsion phase (principally used to manufacture explosives). Chlorine is also produced which is used to purify water.

## PRODUCTION

Sodium Cyanide	80,000tpa
Chlorine	9,000 tpa
Ammonium Nitrate	590,000 tpa

In addition, Orica also produces its own caustic soda (which is used to produce sodium cyanide) and nitric acid (which is used to produce ammonium nitrate). Hydrochloric acid and sodium hypochlorite (used for pool chlorine, disinfectant, and bleach) are also manufactured.

## RAW MATERIALS

Ammonium nitrate production -	Ammonia
Chlorine production -	Salt, Electricity
Cyanide production -	Ammonia, Caustic soda and natural gas.

## PROCESS

**Sodium Cyanide** Methane gas is burnt in a mixture of ammonia and air over a platinum catalyst. This produces hydrogen cyanide gas. The gas is passed through a caustic soda solution, where it is absorbed and converted into sodium cyanide liquid. The liquid is evaporated, dried and compacted.

**Chlorine** Salt from Port Alma is dissolved in water and the resultant brine solution is passed through an electrolytic process. The chlorine is dried, compressed and cooled to -35°C, producing a liquefied gas.

**Ammonium Nitrate** Ammonia is converted to nitric acid by high temperature oxidation using air over a platinum catalyst. Ammonium nitrate liquid is then manufactured by adding more ammonia to the nitric acid. This liquid is then converted to prill (dry spherical beads), or emulsion phase product.

Prill is produced by spraying hot ammonium nitrate liquid down a 50-metre tower against a conditioned air stream. This product is dried and cooled, screened and coated before it is sold.

Emulsion Phase product is produced by spraying liquid oxidiser solution into a special chamber where a gelatinous paste results.

## ENVIRONMENTAL/SAFETY

The Company values include a commitment to operate to the highest standards of safety, health and environment, recognising that nothing is so urgent or important that the time cannot be taken to do it safely. One of the four key principles for the Company is 'SH&E - Ensuring our Future' and the SH&E Vision of:

**"No Injuries to Anyone, Ever"**  
**"Value People and the Environment"**

symbolises Orica's commitment to eliminate all work related injuries, illnesses, motor vehicle incidents, environmental incidents, complaints and other adverse SH&E incidents and acknowledges the belief that all such incidents are preventable.

## WORKFORCE

Orica Australia currently has 200 employees.

## OTHER

Orica is the largest producer of sodium cyanide in Australia and is the third largest in the world. Orica is the largest producer of Chlorine and Chlorine based products (sodium hypochlorite & hydrochloric acid) in Australia. Orica is also the world's leading manufacturer and supplier of commercial explosives.

## WEBSITE

[www.orica.com.au](http://www.orica.com.au)

# Queensland Alumina Limited

Queensland Alumina Limited (QAL) is recognised as one of the world's largest alumina refineries, supplying approximately 10% of the Western world's alumina. Since commissioning in 1967, the refinery has continued to grow from its original production rate of 600 000 tonnes of smelter quality alumina a year to its current production of 3.95 million tonnes a year. QAL has achieved ISO 9001 accreditation to ensure product quality is of the highest standard.

The two owners, Rio Tinto Alcan (80%) and Rusal (20%) transport the alumina product to their smelters within Australia and overseas.

A tolling charge per tonne of alumina is applied to recover the costs of processing, including operating, maintenance, raw materials, energy and administration. Each of the partners consigns alumina from Gladstone to aluminium smelters for metal production in proportion to their equity in the company.

The refinery itself covers 80 hectares of a 1200 hectare site. Adjacent to the plant is South Trees Island where QAL's wharf and storage facilities are based. The island is connected to the mainland via a causeway and bridge.

## PRODUCTION

Current rated capacity of 3.95 million tonnes of alumina per annum.

## RAW MATERIALS

Bauxite	9 million tpa
Coal	1.5 million tpa
Caustic Soda	800,000 tpa

Natural Gas	13 PJ pa
Lime	80 000 tpa
Water	30 ML / day
Electricity	85 MW

## PROCESS

The Bayer process is used by Queensland Alumina Limited to refine alumina from bauxite. The process was discovered and patented by Austrian chemist Karl Bayer in 1887 and involves the four core activities of:

Digestion	Dissolving bauxite's alumina content
Clarification	Settling out undissolved impurities
Precipitation	Forming alumina crystals
Calcination	High-temperature drying of alumina

The process is a continuous one with more than 550 megalitres of process solution circulating through tanks, pressure vessels, and pipes to achieve the scale of production required.

## WORKFORCE

Queensland Alumina Limited employs approximately 1060 people in a wide variety of operative, technical, trade, and administrative roles. The workforce is bolstered by an additional 300 to 350 contractors depending on workload.

QAL contributes in excess of \$200 million to the local economy in wages, salaries and maintenance and capital work carried out by local contracting companies each year.

## ENVIRONMENT

Given its close proximity to the township of Gladstone, Queensland Alumina Limited has a very strong focus on its environment. QAL is committed to continually reducing the environmental impact of its operations with areas such as dust, alkali, odour, noise, water, waste management and revegetation its top priorities. QAL was the second alumina refinery in the world to achieve the stringent ISO14001 standard for its Integrated Environmental Management System in 1999. In 2006, QAL achieved certification for the upgraded 2004 standard of ISO 14001.

Community involvement in environmental programs is also a focus and is best demonstrated through QAL's regular tree planting initiatives. Local community members, QAL Retiree Club members and QAL employees have planted more than 18 000 trees at QAL's buffer zone since 2001.

Environmental audits are regularly scheduled using accredited auditors to check environmental compliance.

Continuous dust monitors have been installed to monitor the effects of dust reduction programs across the 80 hectare plant and these are audited annually to ensure their accuracy. Water, atmospheric and land emissions from the plant are also subject to continuous monitoring.

Dust reduction programs at QAL include the installation of Baghouses on stacks to eliminate their dust emissions, installation of a cascading chute alumina loader, revegetation of the ash ponds and red mud dams, dampening coal as its unloaded and while stockpiled and dampening down of unpaved work areas.

Recycling and segregation are important components of QAL's waste minimisation program, with chipped timber (used for revegetation), paper, cardboard and scrap steel all being recycled. The recycling percentage of onsite waste is now climbing towards the 90% mark. Materials segregated for secure handling, such as fluorescent tubes, nickel cadmium batteries and heavy grease are sent to approved handling facilities.

### **DISPOSAL**

Bauxite residue is washed several times with salt water to neutralise any remaining caustic soda and pumped to a large contained storage facility on Boyne Island where the red mud is allowed to settle. The neutralising effect of mixing sea water with the red mud helps conserve fresh water and also ensures saltwater discharge into the estuary has no environmental impact.

### **SAFETY**

Safety is QAL's highest priority and there is a range of systems and management tools in place to identify and reduce or eliminate risks, report and investigate incidents, whilst monitoring and improving individual safety behaviour in order to achieve a zero incident working environment. In 2006, QAL achieved certification of its health and safety systems to AS/NZS 4801 standard.

### **REPLACEMENT COST**

Over US\$4.5 billion.

### **COMMUNITY RELATIONS**

QAL takes pride in supporting the community that supports its operations and, thus, has a long established record of developing community infrastructure and supporting development.

QAL's community forum was formed in 2001 and provides a constructive discussion with top level

management and community members with an aim to raise awareness and understanding of QAL operations and issues within the wider Gladstone community. The forum comprises 25 members and has grown to become a valuable and constructive asset within the community relations program.

From plant start-up QAL has always provided substantial monetary support to build necessary infrastructure in Gladstone and continually supports many local events and community groups. QAL also makes available its Community House as a free meeting place for the use of not-for-profit community groups. The house is currently the headquarters of the QAL Retirees Club and Queensland Health's Men's Resource Centre.

QAL is also actively involved in heightening the education of local students with the Alumina Learning Partnership, the Reef Guardian Schools fund, Gladstone Area Mathematics, Science and Engineering Teachers Group (GAMSET) and the provision of an annual scholarship to a successful CQUniversity student.

### **WEBSITE**

[www.qal.com.au](http://www.qal.com.au)

## **Queensland Gas Pipeline**

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The 627km Queensland Gas Pipeline (QGP) transports gas from the Surat and Cooper Basins and from the Rolleston and Westgrove gas fields to markets in Gladstone and Rockhampton. The pipeline links with the Roma to Brisbane pipeline and connects most of the gas resources in the State, including the Northern and Southern Denison Trough and the CSG fields in the Surat and Bowen Basins. In all, five lateral pipelines connect the main pipeline to important gas sources and markets.

The 627 km Queensland Gas Pipeline (QGP), was constructed by the Queensland Government in 1989 and has a design life in excess of 50 years. The original purpose of the pipeline was to supply gas to the foundation customer Queensland Alumina Limited (QAL), owner and operator of the world's largest alumina plant.

The current uncompressed capacity of the QGP is 32 PJ per annum. Capacity is currently being expanded to 49 PJ/a through the addition of compression at Rolleston and Banana, and looping from Moura to Bell Creek. This stage 1 expansion project is due for completion in early 2010.

## CUSTOMERS

Gas is supplied to large industrial customers in Gladstone and Rockhampton, including

- Queensland Alumina
- Rio Tinto
- Orica
- Boyne Smelter
- Queensland Magnesia

Gas is also supplied to the small retail distribution networks of Gladstone, Rockhampton and Wide Bay.

## OWNERSHIP AND OPERATION

Is owned by Jemena who has responsibility for management, maintenance and construction activities on the pipeline.

Previously, QGP was a part of the old Alinta Ltd. which was sold to a consortium of Babcock and Brown and Singapore Power International in September 2007.

Alinta Asset Management Pty Ltd (AAM1) will now be known as Jemena Asset Management (6) Pty Ltd.

## ENVIRONMENT

Natural gas is the cleanest burning and most environmentally acceptable fossil fuel. It produces fewer polluting emissions and contributes to the reduction of greenhouse gas emissions.

The environmental, economic and societal benefits of introducing natural gas to communities are proven at commercial, industrial and domestic levels. From supply of energy for domestic cooking, heating and natural gas vehicles through to gas-firing of hospitals, mills, power stations and mining operations, natural gas is universally preferred.

## WORKFORCE

Employees have recorded more than 570,000 hours without lost time to injury, testimony to the success of safety programs and training on the pipeline.

## WEBSITE

[www.jemena.com.au](http://www.jemena.com.au)

# QER Pty Ltd

QER is an integrated resources company with several large oil shale deposits in Queensland. At the Stuart site in Yarwun, QER has removed the former ATP plant and refurbished the site. A new permanent administration building and Visitor Information Centre is currently under construction. Following government approval of permit applications and existing license amendments, QER plans to build a small-scale technology demonstration plant to demonstrate the reliability and performance of Paraho II technology to community and stakeholders. The new plant will employ about 45-50 operations personnel.

## WEBSITE

[www.qer.com.au](http://www.qer.com.au)

# Unimin Australia Limited

Unimin owns and operates a large limestone operation at Taragoora, supplying varying grades of crushed limestone to state and local government departments and the construction, industrial and agricultural industries. Limestone is an extremely versatile product with a wide range of applications, from road building materials through to flux in the aluminium and steel industries.

Limestone is extracted by opencut method and transported by off-highway 50 tonne dump trucks to a 350 tonne per hour crushing plant. The finished product is dispatched by road and rail to customers from Proserpine to Brisbane.

## EMPLOYMENT

The operation employs 20 permanent people and up to 25 sub contractors mainly delivery trucks.