Category	Question Heading	Yarwun Answers
Licence	What is Yarwun licensed to do?	Queensland environmental licences are based upon permission to carry out specified Environmentally Relevant Activities (ERAs). The licence ensures that these activities are managed by the company in order to have minimal environmental impact. Yarwun's key ERA is mineral refining. This consists of commercially processing, classification, mixing or concentration of mineral ores to produce mineral concentrates in works having a design production capacity of more than 100,000 t per year. This is the definition used under the Environmental Protection Regulation 1998, however a new regulation has been proclaimed and includes a similar definition - mineral processing (the relevant activity) consists of processing, in a year, a total of 1,000 t or more of coke or mineral products, processing includes—(a) in relation to coke—quenching, cutting, crushing, and grading the coke; or (b) in relation to other mineral products—washing, leaching, classifying, mixing and concentrating the mineral products. Yarwun's other ERA's are for chemical storage, crude oil or petroleum product storing, fuel burning, power station, extracting rock or other material, motor vehicle workshop, sawmilling or wood chipping, stockpiling, loading or unloading goods in bulk, waste disposal and regulated waste storage.
	What is the approach used in Yarwun's licence? Risk based or prescriptive?	Yarwun's licence parameters, conditions and guidelines are formed on a risk based approach.
	What technology and processes does Yarwun use to reduce their environmental impact?	The Yarwun Refinery has been operating since 2004. In that time Yarwun has incorporated a variety of technologies to: ・ reduce consumption of inputs (raw materials and energy) ・ minimise emissions and discharges to the environment (low nitrogen oxide burners, fabric filter baghouses and direction of non-condensable gases to the boilers). The licence conditions have been tailored by DERM to ensure that emissions from the Yarwun refinery do not impact adversely on the environment.

<table>
<tr><td rowspan="2">Air Emissions</td><td>What is Yarwun licensed to emit to the air?</td><td>This table from the Yarwun environmental licence gives the points sources from which emissions are only allowed, the height and velocity at which these emissions must be released and the maximum release limits.

<table>
<tr><th>Release point, source, activity</th><th>Minimum release height (metres)</th><th>Design velocity (m/sec)</th><th>Contaminant release</th><th>Average release limit (rolling 12 month average calculation)</th><th>Maximum Release Limit (hourly average)</th><th>Sampling frequency</th></tr>
<tr><td rowspan="3">Boiler 1</td><td rowspan="3">120 m
RL 141 m
AHD</td><td rowspan="3">23 m/s</td><td>SO_2</td><td>161 g/s</td><td rowspan="3">258 g/s</td><td>Continuous</td></tr>
<tr><td>NO_X</td><td>93 g/s</td><td>Continuous</td></tr>
<tr><td>Particulates</td><td>13.2 g/s</td><td>Continuous</td></tr>
<tr><td rowspan="3">Boiler 2</td><td rowspan="3">120 m
RL 141 m
AHD</td><td rowspan="3">23 m/s</td><td>SO_2</td><td>161 g/s</td><td rowspan="3">258 g/s</td><td>Continuous</td></tr>
<tr><td>NO_X</td><td>93 g/s</td><td>Continuous</td></tr>
<tr><td>Particulates</td><td>13.2 g/s</td><td>Continuous</td></tr>
<tr><td rowspan="2">Calciner 1</td><td rowspan="2">60 m
RL 81.00 m
AHD</td><td rowspan="2">17 m/s</td><td>NO_X</td><td>2.24 g/s</td><td rowspan="2"></td><td>Quarterly</td></tr>
<tr><td>Particulates</td><td>2.0 g/s</td><td>Continuous</td></tr>
<tr><td rowspan="2">Calciner 2</td><td rowspan="2">60 m
RL 81.00 m
AHD</td><td rowspan="2">17 m/s</td><td>NO_X</td><td>2.24 g/s</td><td rowspan="2"></td><td>Quarterly</td></tr>
<tr><td>Particulates</td><td>2.0 g/s</td><td>Continuous</td></tr>
</table></td></tr>
<tr><td>What levels do you emit?</td><td>All emissions to air are within limits specified in Yarwun's environmental licence.

Emissions from the boilers are consistently below licence limits for all pollutants (oxides of nitrogen, sulphur dioxide and particulates). Emissions from the calciners (particulates and oxides of nitrogen) are also consistently under limits specified in the Yarwun environmental licence.</td></tr>
<tr><td rowspan="3">How do you know that you are operating within your licence conditions?</td><td>What pollutants does Yarwun monitor for?</td><td>Yarwun monitors for sulphur dioxide, oxides of nitrogen and particulate emissions as well as for all other know process emissions.</td></tr>
<tr><td>Where are Yarwun's monitoring sites - on site and off site?</td><td>A map of Yarwun' s emission and monitoring locations is at:
http://www.gilg.com.au/document/show/47</td></tr>
<tr><td>How does Yarwun monitor? Real time or sample?</td><td>Yarwun completes both real time and sample monitoring of the site’s air emissions, in accordance with Yarwun's environmental licence.</td></tr>
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	If sample, how often does Yarwun sample, who collects samples and where are samples analysed?	On boiler 1 and 2, sulphur dioxide, oxides of nitrogen and particulate emissions are monitored by Continuous Emissions Monitoring instruments. Particulates from the calciners are monitored using similar instruments. Additionally, an independent certified external consultant analyses oxides of nitrogen each quarter and every 12 months analyses a complete inventory of air emissions as part of the National Pollutant Inventory (NPI).
	Does Yarwun report monitoring results to the DERM and, if so, how?	Yarwun reports to DERM in one of the following ways: • Upon event - Notifications are made within 24hrs of the incident occurring. • Upon exceedances of a licence condition - Written notification made within 5 business days. • Upon request, Yarwun will supply all of its monitoring data. The site is obliged to respond to any such request. • Annual return - Site completes annual return every year. • National Pollutant Inventory - Report submitted every year.
	Does Yarwun make the results public and, if so, how can people access them?	The site's total air emissions is reported annually in the National Pollutant Inventory (NPI). This data is available online at www.npi.gov.au. The site is: http://www.npi.gov.au/cgi-bin/npireport.pl?proc=facility_report;instance=public;year=2008;loc_lga=Gladstone%20Regional;loc_type=lga;loc_state=QLD;jur_fac_id=46715
Breaches	What happens if Yarwun exceeds their licence conditions?	The process involves notification of relevant site personal and DERM.
	What is the external and internal process used by Yarwun to report and rectify exceedances?	If a licence condition is breached, an incident investigation is undertaken by technical experts to identify the root causes behind the exceedance. Corrective actions to prevent the issue from occurring in the future are developed from the investigation and submitted to DERM for approval. Comments from DERM are included in the corrective actions and once agreed, the actions are implemented. On a case by case basis, a report of the incident investigation may be released.
Internal Targets	Does Yarwun have internal standards or targets?	Yes. Yarwun's policy of continual environmental improvement which means that the Gladstone plant has a series of internal targets and objectives. Legal compliance is the minimum requirement for these targets.

	Are Yarwun's standards or internal targets tougher than regulation and, if so, in what ways?	The site has a variety of internal standards and targets that promote compliance and continual improvement. Yarwun is required to adopt Rio Tinto's Health, Safety, Environment and Community standards across the site. As a minimum, these standards require each site to comply with the relevant legislation, as well as a number of comprehensive requirements that align with world best practice.
Emission Reduction	What work practices or strategies does Yarwun use to reduce emissions. Is this risk-based?	Improvements completed by Yarwun include: · relocation of 400 endemic grasstree specimens during the construction of the refinery, · reduced energy intensity from 16.2 to 9.0 gigajoules per tonne of alumina produced which was a 75% performance improvement, · reduced greenhouse gas intensity from 1.31 to 0.8 tonnes of carbon dioxide equivalent per tonne of alumina produced which as a 40% performance improvement, · reduced nitrogen oxides emissions by 25% improvement through calciner modifications, improved the refinery's neutralisation and effluent management systems, and · installed continuous monitors for particulate and oxides of nitrogen emissions in the boiler and calciner stacks.
	What projects has Yarwun completed in the last five years to reduce air emissions?	Major environmental improvement projects completed in the past five years include: · refinery design that uses tube digestion units which increases heat recovery and reduces energy consumption · collection and transportation of non-condensable gases to the boilers which destroys Volatile Organic Compounds (VOC's) created in digestion · installation of low NOx burners in the calciners; reducing NOx emissions · use of baghouses on the Calciners and Boilers; reducing particulate emissions · incorporation of enclosed transfer towers with baghouses, wind guards and a telescopic ship loading shute on the alumina conveyor which reduces particulate emissions. · widespread use of heat recovery technology to reduce heat losses during the process (e.g. Barriquands, counter current heating etc)
	What budgeted projects has Yarwun planned to reduce air emissions?	Budgetary approval has not been given for any major new environmental projects.

Other	Other Information	Yarwun has also: · increased data accuracy associated with the sites air emissions by the use of direct measurement over engineering calculations and the completion of process mass balance checks; · developed and implemented several Energy Efficiency Opportunity projects, for example calciner dust collection system improvements (currently underway), adjustment and installation of variable speed blowers and replacement of on-site unleaded vehicles with electric carts. · installed calciner baghouse bag trial to increase the life of the calciner baghouse bags and thereby reduce particulate emissions (currently underway); · installed low nitrogen oxide burners on calciners.