

LIGHTNING PROXIMITY ALERTS

RIO TINTO YARWUN, QUEENSLAND, AUSTRALIA

Rio Tinto Yarwun is a world-class alumina refinery situated north-west of Gladstone in central Queensland. Construction began in 2002 and the first shipment of alumina followed in late 2004. The refinery was the first greenfield refinery built in the western world in 20 years.

Aluminium ore (bauxite) is transported from Rio Tinto's mining operations in Weipa on Western Cape York and processed into alumina at the Yarwun refinery.

Health & safety in the field

The commitment to the safety of employees and contractors and the protection of the environment are integral to the values of the Rio Tinto's operations.

The refinery operates under the principle 'The Goal is Zero', which envisions creating a workplace free from incidents and injuries. The Yarwun refinery currently employs around 550 people.

One workplace threat identified in the Rio Tinto health & safety and environment manifest is the potential for cloud-to-ground lightning strikes at the refinery site.

Lightning is one of the most dangerous and frequently encountered weather hazards in Australia. There are on average 5-10 deaths and over 100 severe injuries caused by lightning in Australia year-on-year. Lightning can severely harm or take the lives of workers. It has the potential to disrupt operations through damage to communications and plant infrastructure, generate fire and ignition risks, and downtime on sites until the lightning threat has passed.

The Rio Tinto Emergency Action Plan includes a lightning safety protocol that has been aligned with the lightning detection and alerting services provided to Rio Tinto by MetraWeather (Australia) Pty Ltd.

In Australia, MetraWeather partners with USA headquartered TOA Systems Inc., a pre-eminent manufacturer of integrated lightning networks, and Indji Systems, providers of a web-based geospatial hazard monitoring platform.

Over the past 10 years, TOA Systems has installed more than 600 lightning location sensors in over 50 countries. It owns and operates the Australian Global Positioning and Tracking Systems Pty. Ltd. (GPATS) network incorporating over 100 sensors. MetraWeather uses the data derived from GPATS in its proximity alerting services.

Weather dashboards with integrated lightning alerts

MetraWeather provides weather dashboards for Rio Tinto that display:

- Near real-time lightning observations
- Forecast lightning zones expected over the following hour
- Enhanced near real-time rain radar
- Accumulated hourly and 24-hourly rainfall
- Imagery from the Himawari-8 weather satellite
- Visual site-specific lightning proximity alerts

In conjunction with the dashboards, MetraWeather provides Rio Tinto employees with email and SMS SmartAlerts advising of lightning proximity to specified latitudes and longitudes within a radius of 10 kilometres.



The accuracy of the observations of lightning strikes and the trust placed in the detection network and communications channels mean that Rio Tinto has been able to not only successfully safeguard its workforce, but has also been able to reduce stand-down time from an average of 4 hours to just 20 minutes.

These alerts form the basis of a cease work instruction and evacuations to predetermined 'safe' sites. The same communication channels also advise employees when the lightning threat has passed and it is safe to return to work.

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This has been in large part due to the work that Sam (Samantha) Van der Erf, Security & Emergency Response for Rio Tinto and her team at Yarwun have put into the HS&E processes linked to the alerts.

"We have seen not only productivity gains when lightning events have disrupted production at the refinery, but also improved efficiencies and increased output at the site.

"There is no guesswork now about the likelihood of further lightning strikes. Our staff and management are confident of their safety and that the lightning threat is being carefully managed based on clear and accurate scientific monitoring with built-in redundancy and proven reporting protocols," says Sam.

The success of Rio Tinto's lightning programme to ensuring a workplace free from incidents and injuries is testimony to the effectiveness of the solution and communications channels that have been deployed.

MetraWeather is a specialist global weather insights company and provider of professional meteorological and lightning proximity applications for the transport, media, industrial and energy sectors.

MetraWeather is backed by the scientific and meteorological expertise of parent company, MetService, the WMO-accredited New Zealand national meteorological service.

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