

A LOCAL PARTNERSHIP: RIO TINTO ALCAN AND GHD DELIVER ENVIRONMENTAL AND ENGINEERING SERVICES AT RTA'S YARWUN REFINERY

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Abstract

Rio Tinto Alcan's Yarwun Alumina Refinery (RTAY) has been operating since 2004, however, their partnership with GHD Pty Ltd (GHD), a professional services firm, was developed before the refinery was built. GHD was involved during siting and design of the Residue Management Area (RMA), including an extensive geotechnical mapping program and installation of a groundwater monitoring network. GHD is now involved on an ongoing basis with the provision of engineering support for the RMA and provide a range of environmental services to support the RTAY HSEC Team, including noise monitoring, groundwater monitoring and investigation of environmental incidents.

While, in essence, RTAY is a client and GHD is a consultant, the relationship that has been developed since GHD's involvement began in 2002, is one that goes beyond the provision of and payment for professional services. RTAY views GHD as a part of their team and inform GHD of the driving factors behind each project. In turn, GHD is aware that its long association with the site means that its staff have a valuable and detailed background knowledge that is of assistance to RTAY.

Also of value is that, while many of GHD's specialist skills such as geotechnical engineering are provided by Brisbane-based staff, RTAY value the permanent presence of a local GHD office and senior staff who can respond at short notice. This is of particular value when environmental issues need immediate investigation and advice.

GHD and RTAY are committed to open communication so that all parties are aware of issues that arise during routine monitoring work. This is vital, because while GHD undertakes the work, it is RTAY's management team who must report on and respond to issues, including informing regulators and upper management as required. Each party also brings a unique point of view to discussion of issues and opportunities for improvements.

This paper presents case studies that highlight the value of this partnership.

1. Introduction

The Rio Tinto Alcan Yarwun Alumina Refinery is located approximately 560 kilometres north of Brisbane near Gladstone, Central Queensland. The refinery is located 10 km northwest of Gladstone and was commissioned in late 2004. The Residue Management Area (RMA) is located approximately 10 km west of the refinery.

RTAY is a provider of bauxite, alumina and primary aluminium to Australia, New Zealand and export markets. RTAY is committed to sustainable development and the core purpose of the company is "To create the most sustainable value from our resources and relationships". To ensure the RTAY Alumina Refinery has minimal impact on the surrounding sensitive environments, RTAY implemented a series of routine monitoring programs to assess compliance to Development Approval conditions and other relevant guidelines. RTAY also undertakes once-off investigations to enable responsible management of the refinery and RMA.

The RTAY Health, Safety, Environment and Communities Team includes a Specialist – Environment, Advisor – Environment and Graduate – Environment, with the team overseen by the HSEC Manager. The current team has come together over the past 18 months and during that time has begun to build a relationship with GHD.

GHD has achieved over 80 years of service to the community and comprises more than 6,000 staff in over 80 offices across Australia, New Zealand, South East Asia, the Middle East, the UK and the Americas covering all facets of project management, planning, engineering, design, maintenance and asset management. GHD established an office in Gladstone in 2001

and since then has provided consulting services in a wide range of planning, engineering and environmental disciplines, either directly through the local office or via the resources of the greater GHD.

GHD's involvement with the Yarwun Refinery commenced during the site selection and design phase when GHD's Tailings group undertook the siting study and detailed design for the Residue Management Area (RMA), including an extensive geotechnical mapping program and installation of a groundwater monitoring network. Since the commissioning of the refinery in 2004, GHD has undertaken long-term engineering support for the RMA operations through their Hydrogeology and Geotechnical Engineering groups, with many of the people involved in the design still providing ongoing advice including interpretation of monthly survey and piezometer monitoring data, annual dam integrity inspections and input into long term planning. GHD's local Gladstone office staff are regularly involved in undertaking site inspections and additional monitoring in support of these services.

GHD's Gladstone-based Environment Services Group consists of three environmental scientists and one GIS specialist. Through a combination of their local skills and drawing on specialist skills in GHD's other offices (including Hobart, Brisbane and Newcastle), GHD currently provides RTAY with environmental consulting services in the areas of noise, groundwater, surface water, dust and contaminated land. Project management and client liaison is all provided through Joanna Lee, who manages the Gladstone Environment Services Team.

2. Routine Monitoring – A partnership approach

The relationship between RTAY's HSEC team and GHD's Gladstone-based Environment Team commenced when GHD were awarded the tender for conducting RTAY's routine groundwater monitoring program. Shortly afterward GHD also formally tendered and were awarded the routine surface water monitoring program. Therefore, the relationship between the two organisations was initially only through formal contracted work. However, as the relationship developed, the level of understanding of each others requirements and the level of trust between the two parties increased. The nature of the projects being undertaken has also changed from formal contracted, routine works, to a variety of short- and long-term projects that cover many environmental disciplines.

This relationship has developed over time to the point where GHD considers RTAY to be a key client for their Gladstone and Queensland practice and RTAY has come to rely on GHD on a daily basis for advice and information. The development of this relationship was something that was not initially anticipated but has been of significant value to both parties.

An example of this relationship is that, after tender award, RTAY expressed a desire to alter the surface water monitoring program to increase its value to their operations. While the proposed changes represented a substantial deviation from the original tender and took a few months to resolve, GHD agreed to take the progressive modifications on board in a working partnership with RTAY. The GHD and RTAY GIS specialists have also worked together and shared information as RTAY has developed their GIS system and GHD has established a database of information on the RTAY site.

The benefits to both parties of such a relationship is that works outside the formal contract scope can proceed at short notice and monitoring programs can continue to be improved on a month to month basis without the need for lengthy negotiations. RTAY have also been able to communicate to GHD what their drivers and goals are for specific projects so that GHD can tailor their investigations and deliverables to better meet RTAY's needs.

GHD has also drawn on the specialist input from other GHD offices to deliver services to RTAY. The Brisbane- and Hobart-based hydrogeologists who developed the groundwater monitoring network and groundwater model for the RMA provide review and advice in relation to the results of groundwater monitoring, which is undertaken by Gladstone based staff. After undertaking routine annual noise monitoring, RTAY requested that GHD provide a scope of works for further noise monitoring and modelling. As a result, GHD's noise specialists, who are based in Newcastle, are currently undertaking a modelling exercise to develop a noise signature for the RTAY refinery.

3. Incident Investigation and 'Once off' Projects – Value Adding

While many of GHD's specialist skills, such as noise modelling and hydrogeology, are provided by people who are not based in Gladstone, RTAY has come to value the permanent presence of a local GHD office and senior staff who can respond at short notice to undertake a variety of investigations.

This is of particular value when environmental issues need immediate investigation and advice. GHD have undertaken a number of site visits to investigate and provide sampling and advice to RTAY staff when environmental incidents have occurred. On both these occasions, RTAY staff responded effectively and efficiently to the incident and GHD prepared a close out report suitable for all relevant stakeholders. This provided an independent third party review of RTAY's response to the incident and the Environmental Protection Agency were pleased with

this process. GHD have also undertaken a number of "once off" sampling programs for potentially contaminated sites and provided advice on the management of the material.

As GHD people are fully inducted at RTAY, they are able to gain access to site and obtain the required permits to work without lengthy delays and are also able to operate without supervision within the refinery, further enhancing their ability to efficiently deliver services to RTAY at short notice.

During a recent ISO14001:2000 re-certification audit of the Yarwun Refinery, GHD was audited as an RTAY sub-consultant. The outcome of this audit was pleasing to both parties as the auditor did not raise any non-conformances and was impressed with the level of quality control GHD undertook on the work being undertaken for RTAY.

4. Open Communication and Rapid Reporting

All project management is undertaken through RTAY's Specialist Environment and GHD's Gladstone Environment Team Manager. This ensures a single point of contact for both parties and rapid response as specific issues arise. As the number of projects being conducted increased, RTAY suggested a monthly meeting be held between the two managers to provide mutual updates on the progress of projects and address any issues that arise. GHD developed a monthly report template that is updated prior to each meeting and provides the main means of tracking all projects.

A brief report in table form is provided following completion of the fieldwork for the groundwater and surface water monitoring programs. This allows RTAY to be informed immediately if there are non-compliances to licence conditions, trends of concern or any health, safety or environment incidents during the conduct of fieldwork.

5. Case Studies

Case Study A – Caustic Bladder Groundwater

Routine monitoring identified several groundwater results surrounding the caustic storage bladder and employee car park, both downstream of the refinery with metals concentrations in the groundwater exceeding adopted guidelines. Over 50 bores are monitored at the red mud disposal area (RMA), refinery and caustic bladder. Quarterly monitoring is undertaken for groundwater level, physicochemical parameters and a suite of metals.

The potentially contaminated groundwater was identified by several Health, Safety and Environment auditors and was of concern to the Manager HSE and indeed the General Manager. The refinery had only been operating two years, but is located in a coastal landscape adjacent to a significant migratory wader bird habitat, seagrass beds and the Great Barrier Reef Marine Park's Dugong Protection Area.

RTA Yarwun commenced several parallel projects immediately to understand the extent, if any, of groundwater contamination. RTA accessed consultant hydrogeologists within GHD directly. The GHD Gladstone Environment Team mobilised to take bore samples and manage the analysis and assess the risk of groundwater contamination.

Results confirmed the groundwater pH was low (less than 6). Sulphides were evident in the marine muds suggesting that metals in the underlying geology were present in bore samples due to the acid sulphate soils, and not refinery effluent. A more detailed hydrogeological and acid sulfate soil survey is currently underway to map hydrogeology and soils onto bore locations and produce a 3D map.

Case Study B – Disused Cattle Dip identified in waterway

Prior to commencement of the refinery expansion, the earthworks team identified a small concrete walled cattle dip on the site. Previous owners confirmed the dip was constructed in the 1970s and as such is not likely to have contained any arsenic or organo-chloride residues. However, the community risk assessment suggested that there was good reason to remove the dip and remediate the site as it was highly visible from the main highway and also not aligned with the RTA way of managing the land.

GHD was the only environmental consultancy available in Gladstone at short notice, and with appropriate levels of public liability and professional indemnity insurance, to undertake the environmental investigation and report to the Environmental Protection Agency.

Together, RTA Yarwun and GHD developed a site assessment plan. RTAY submitted the site assessment plan to the EPA who approved it prior to the removal of the dip structure. The soil was placed on site in stockpiles for sampling and analysis according to the Plan. Analysis is currently underway to confirm the presence or absence of arsenic and/or organo-chloride contaminants and any risk to the adjacent waterway.

The analytical report will be submitted to the EPA with an approved remediation plan based on analytical results. Likely options include backfilling with uncontaminated soil and making the area safe, or applying for an off-site soil permit to place the soil, concrete and timber into the registered waste disposal area at the RMA. The land-use stewardship management plan will be reviewed and updated as a consequence of the remediation.

Case Study C – Residue Management Planning 20+ years

In 2006, the consistency and quality of the residue from the refinery to the thickeners were identified as requiring sulphuric acid addition to control the pH. Sufficient seawater is not available to the Yarwun refinery and so when sulphuric acid was added, the risk was to the integrity of the dam walls, to the effluent quality on the land and groundwater and to the receiving environment of Port Curtis.

The tailings specialists in GHD, who were involved with the original design, were commissioned to undertake significant investigations. Additional piezometer bore sampling and analysis occurred, and extensive consultation to present to the Environment Protection Agency that the clay lined earth dam designed to treat semi-solid residue, would in fact hold liquid, without impacting the dam.

Intensive monitoring of the north wall continues. However, the EPA is satisfied that the dam will hold additional weight of the unneutralised mud up to at least October 2010 when the full seawater upgrade will be provided and dry stacking of mud returned.

The operating plan to 2018 has now been drafted and the long range plan post 2018 is in progress. The EPA will be provided both plans early in 2009 for approval to construct the next stage raising, and to extend the residue management area at Yarwun Waste Storage facility.

6. Conclusions

The development of a partnership approach to the delivery of environmental services at the RTAY Refinery has involved RTAY's HSEC team viewing GHD as a part of their team and GHD going above and beyond the strict requirements of the contract and scope of works. While not initially anticipated or planned, the relationship between the two teams has developed into something that extends far beyond the formal execution of contracted works and is highly valued by both the Environment Teams and their respective management teams.

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