WAGERUP
ALUMINA
REFINERY

HEALTH ISSUES

Report by Dr Mark Cullen*

Visit to Alcoa World Alumina Australia
West Australian Operations

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INTRODUCTION

As Alcoa's Chief Medical Officer, I have been asked to evaluate at first hand the health issues associated with the Wagerup refinery and, where appropriate, make recommendations on any further actions that might be required to resolve those issues. My assessment was to focus on the diagnosis of Multiple Chemical Sensitivity (MCS) among the Wagerup workforce, based on my work in this field, as well as broader health complaints among workers and members of the nearby community.

The issues range across the Wagerup workforce and the surrounding community. The common factor is the operation of the liquor burner since 1996. The pungent odour given off by the liquor burner alerted employees and the community to the possibility that airborne chemical emissions from the refinery were responsible for symptoms of various illnesses they were experiencing. Engineering work at the refinery has significantly reduced both odour and emissions, but has not proportionately diminished the number or severity of health concerns. These concerns can be categorised as follows:

- **Workplace**
  - mucous membrane irritations - e.g. nasal reactions, sore eyes, sore throat and cough
  - nine employees with diagnoses of continuing health impacts, including five diagnosed with MCS

- **Community**
  - anecdotal evidence of mucous membrane irritation, at various levels of seriousness, attributed to refinery operations since the liquor burner start-up
  - suspicion of health impacts, including MCS and heavy metal exposures, also attributed to plant emissions
  - fear of long term, serious health problems - e.g. cancer, kidney and liver disease

Fear and anger in the workforce and community (albeit to varying degrees), political and regulatory concerns and public debate in the media generated by the health issues and Alcoa's responses were central to my assessment of the situation and the formation of recommendations.
ASSESSMENT PROGRAM

The assessment program consisted of:

- participation in group dialogue sessions with health-affected Wagerup employees and members of the Wagerup community; Prof. D'Arcy Holman’s Wagerup Medical Practitioners Forum; other concerned medical practitioners; State health and environment authorities; union representatives; and Alcoa’s senior management team

- one-on-one discussion with Dr Moira Somers, who has diagnosed chemical injury and MCS among Wagerup employees and who continues to provide care to them

- testimony to the Legislative Council Standing Committee on the Environment and Public Affairs which is inquiring into Wagerup health issues

- discussion with the State Minister for the Environment
OBJECTIVES

The assessment program began with the broad objectives of forming an opinion on what was occurring at Wagerup and to develop a basis for advice on further Alcoa response. As the program unfolded, other objectives emerged:

- to reassure, where appropriate, individuals and groups that there are no long term health risks

- to reassure individuals and groups that Alcoa is seriously addressing Wagerup health issues

- to exchange meaningful information with WA medical practitioners about medical conditions, especially MC8

- to foster a common understanding of the issues among the company, medical practitioners, unions, community representatives and Government regulators so that responses could be co-ordinated and directed towards rehabilitation of those now affected and prevention of further complaints

- to provide a basis for reconciliation between Alcoa and affected people
ALCOA’S RESPONSES TO DATE

Despite widespread scepticism, Alcoa’s West Australian Operations and Wagerup management have in fact addressed many of the health issues linked to the liquor burner. Actions taken to date have been detailed in the company’s submissions and testimony to the Legislative Council Standing Committee on the Environment and Public Affairs, to the Wagerup Medical Practitioners Forum (the Holman group) and to appropriate government authorities.

The company has also accepted the recommendations of the Holman group. It should be noted that the Holman group essentially endorsed what Alcoa has been doing, and plans to do, in response to health issues and the main thrust involves a shift in emphasis rather than many new initiatives.

In summary, responses to date have included:

- Engineering

  - reduction of volatile organic compound (VOC) emissions by about 97% since 1998 through the installation of a catalytic thermal oxidiser and a dehumidifier on the liquor burner
  - odour reduction through fitting of valves to reduce vapour emissions from tank vents, reduction in soluble soda levels in calciner feed, better control, flash tank turnaround, improved heater performance and shutting down of the oxalate kiln
  - operational and equipment upgrades, re-routing of odorous condensate and expansion of the open area in the cooling lakes
  - by the end of June 2002, installation of equipment designed to eliminate odour from the digestion area
  - a proposal to raise the height of the calciner stacks to increase dilution of stack gases and reduce the impact of odour in all surrounding areas and the refinery proper
  - odour level reduction of about 40% from 2000 levels after the digestion project is completed in June 2002
  - odour reduced at the edge of detectability in Yarloop by the implementation of the tall stack project in June 2002

"The company will continue to work towards creating an environment that is not only safe, but also believed to be so. It is critically important to us that the community, our employees and contractors, and the government know that our refineries are safe. We will do whatever it takes to demonstrate that there is no long-term health risk associated with the Wagerup Alumina Refinery."

Wayne Osborn, President, Alcoa World Alumina Australia
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- also by June 2002, 40% reduction of emissions of nitrogen oxides (NOx) from the Wagerup powerhouse — aimed at possible low level irritant effects in Yarloop.

- extensive air emission sampling including measurements of organics (including VOCs, semi-VOCs and many other organic compound group), inorganics, and metals from all major emission points, as well as odour levels on and off Alcoa property

- Workplace

  - implementation of an individualised rehabilitation program on the advice of an expert external rehabilitation provider focusing on rehabilitation of individuals, offering placement into a choice of different roles and environs

  - employee choice of external rehabilitation provider, in consultation with employee’s own doctor

  - continuation of full pay for affected employees

  - acceptance of the recommendations of the Wagerup Medical Practitioners Forum (the Holman group) that applied to employees

- Community

  - implementation of the Land Management Strategy at Wagerup to widen the buffer zone while protecting property values, supporting the nature and quality of the community, both encouraging people to stay and making it easy for those who wish to leave to sell their properties

  - acceptance of Holman group recommendations that applied to the community

  - formal and informal soundings of community attitudes to Wagerup operations

  - continued personal contacts with individuals affected by refinery operations

“Health Department discussions on MCS which included the Holman group, local community groups, medical practitioners, employees, unions and government officials were very beneficial, enabling a better understanding of the problem and approaches to treatment and resolutions of people’s concerns.”

Mark Cullen, GMG, Alcoa Inc.
OUTCOMES

It became clear early in my discussions that addressing the social dimension of the physical manifestations of Wagerup health issues was at least as important as (entirely necessary) medical and engineering solutions. The company has by no means ignored the social dimension but appears to have placed greater emphasis on the latter.

Thus, Alcoa took some time to conclude that it should focus on rehabilitation of MCS-diagnosed employees rather than further investigating the continuing mystery of what specific aspects have caused their symptoms. Community members have believed that, until recently, Alcoa was being dismissive about their anxiety over their health and the effects on their homes and businesses.

Rehabilitation

Alcoa is implementing an improved rehabilitation regime for employees diagnosed with MCS or other health impacts, plus alternatives for those who cannot return to work.

This is based on establishment of a close working relationship between Alcoa professionals and physicians currently involved with their treatment. In my view, such a relationship is well justified and consistent with best occupational health practice.

I have put the view that, based on an attributable set of interactions with underlying physical symptoms, any rehabilitation program would be rendered ineffective without an acknowledgement that the company believes its employees are sincere about their disabilities.

Plant Safety

It is my opinion, based on the known effects of plant emissions and existing data and patterns of existing data, that the threat of serious illness from the refinery is negligible.

If I held any other view I would recommend the immediate closure of the facility – in line with Alcoa values.

There has been no long term health risk to the vast majority of Wagerup employees and, when plant emissions have been reduced as per plan, the incidence of short term irritation and other chemical sensitivities should also be negligible.

Based on information from "Healthwise" – the company's long-term health study managed by the Universities of Monash and Western Australia - real time safety data systems and meetings with the unions, I remain confident that control of health and safety in the plant is at the highest level, consistent with Alcoa values.
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Through its ongoing support of "Healthwise" and its worldwide health protocols, the company remains committed to continuous evaluation and improvement of the work environment.

Community

The anger of the community needs to be addressed through an acknowledgement that the plant has intruded on the community at a physical level, in terms of emissions exposures and other measurable annoyances such as noise.

It is my belief, and that of Alcoa, that neighbours have a reasonable expectation to live without intrusion by the plant into their daily lives. Their expectation – which Alcoa has committed to address – is that the company will reduce or eliminate, where technologically possible, these intrusions in the shortest possible time. The company has committed the technical, financial and human resources to achieve that.

The objective is to provide the certainty that the community's environment is a safe one. The community must be assured that, as the company abates exposures, their health and safety is not at risk, nor their general amenity.

Land Management Strategy

The Land Management Strategy that Alcoa has implemented at Wagerup is having some testing problems. Some community members believe anomalies in the scheme are inequitable. THEY ARE!!

Given that this scheme is part of Alcoa's response to community concerns about health issues, it is appropriate to address testing problems within that context and to reflect on community concerns about broader economic impacts of health issues on the community.

Ongoing complaints about health issues to an extent reflect underlying anxiety about economic and social issues – for example, the belief that people are either leaving the district voluntarily or are being driven away, thus affecting local businesses and threatening the provision of community infrastructure such as the local school.

Extended Holman Expert Group

As stated above, I believe the threat of serious illness from the refinery is negligible. However, fears about health risks and concerns about living in the adjacent areas continue to be expressed in the workforce and community.

Therefore, I support the recommendation of the Holman group, the Health Department, other government agencies, the community and Alcoa that the work of the Holman group be extended into a broader based expert group to review all current data and any new data deemed necessary to evaluate and validate independently my conclusions.

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"If I held any other view I would recommend the immediate closure of the facility - in line with Alcoa values." Mark Cullen, CMO, Alcoa Inc.
Health Survey Proposal

The Legislative Council Standing Committee on Environment and Public Affairs and the community-based Yarloop Advisory Group proposed that a broad-based (100%) community health survey be considered. The Busselton survey was offered as a potential model.

While I am sympathetic to the ambition to better understand health effects or underlying causes that may exist, my judgement is that the likelihood of being able to conduct a valid study or survey is remote. Under the most ideal circumstances such environmental studies are difficult, in an atmosphere charged with acrimony and distrust, impossible.
RECOMMENDATIONS

* General recommendations

1. In view of current relations and Alcoa values, the company should make clear to its work force, the surrounding community, appropriate government agencies and all involved parties, that it accepts full responsibility for complete and effective remediation of environmental problems at Wagerup.

2. To accomplish the above it is crucial that the company takes all necessary steps to achieve an open relationship with the relevant parties based on bilateral trust and respect.

3. Essential from Alcoa's perspective is that all actions the company takes to solve the ongoing problem are done in a way that is completely transparent.

4. As a preferred means to assure openness and transparency and to provide the highest level guarantee of its sincerity, Alcoa needs to support the expansion of the Holman group that has been proposed by many of the concerned parties to review all data and provide independent public commentary.

* Workplace

1. The aggressive program for rehabilitation of previously affected workers needs to go forward with all deliberate speed.

2. Achievement of best results requires open and active cooperation with treating physicians chosen by affected individuals and their representatives.

3. As noted previously, acknowledgment by the company of its responsibility for the best outcome, as well as expression of regret for perceived delays and diversions which may have occurred, is essential.

4. All health problems and complaints, notwithstanding, it is crucial that Alcoa effectively communicate to its workforce that the Wagerup Refinery is, and has always been, a very well run facility with levels of injury and complaints due to chemicals used in the refining process at, or exceeding, the high standards set by Alcoa for its refineries worldwide. Furthermore, although the liquor burning facility created previously unrecognized odours and irritation because of the unique nature of the bauxite mined in the region, careful assessment of the many dozens of organic chemicals involved in liquor burning emissions, as well as extensive sampling throughout the plant of the levels of these emissions, shows that under no circumstances could these be expected to cause long term harm, such as cancer or injury to major organs."

Mark Cullen, CMC, Alcoa Inc.
circumstances would these be expected to cause long term harm, such as cancer or injury to major organs, despite the odour and irritation problems which have occurred. Such reassurance, as validated to the extent necessary by the Holman group, is essential for successful abatement of the current situation.

- Community

1. As expeditiously as humanly possible, the company must complete all emissions abatement measures currently planned. Moreover, at the completion of these measures, a full environmental assessment must be undertaken to document that the predictions of the models for substantial reduction in all emission levels are substantiated in fact. Furthermore, complete sharing of this data with the Holman group, and timely provision of additional data as requested by members of that group, is also essential to assure independent confirmation of the success of the abatement. Should measured levels, or the Holman group itself, or members of any governmental agency suggest the need to institute additional abatement strategies, consideration of these and the optimal technical means for achieving them must be given the highest priority by professional staff and engineers of the company.

2. The additional plan already introduced for land management must be fine-tuned to achieve not only its originally stated goals, but also the perception of fairness and equity for the affected parties. Additional efforts that the company can undertake to support further the infrastructure of the community, such as its education or health resources, would be beneficial.

3. As with the rehabilitation of affected workers, full acknowledgment of Alcoa’s roles and responsibility for effective abatement is essential. As long as it is perceived by any in the community that Alcoa has shirked that responsibility or shunted responsibility to other parties, such as governmental agencies, successful resolution will be negatively impacted.

4. As with successful rehabilitation of workers, it is essential that all members of the community, whether affected or not, be reassured that none of the emissions from the plant poses significant long-term health risks. This is based, in my opinion, on knowledge of the toxicology of all chemicals involved which have been carefully speculated, but also knowledge of the doses of these chemicals which fall far below those with toxic effects other than odour and irritation. As with the work force, the role of the Holman group in independently confirming this information is essential to assure the highest level of trust.
5. Although it would appear to many involved that the conduct of a health survey by members of the Holman group would increase our overall knowledge of the situation and lead to a better understanding of what aspect of the emissions may have contributed to various symptoms, my considered recommendation is that at the present time such a study not be undertaken. The basis for this is my belief that conditions are adverse for the conduct of a valid study, given the high level of distrust and acrimony. However, if it is the conclusion of appropriate experts on the Holman group that a health study be considered, I would be personally prepared to participate collegially in such considerations and, if appropriate, its design and conduct to assure the best possible study, with full company cooperation.