



REPORT OF THE
STANDING COMMITTEE ON
PUBLIC ADMINISTRATION
IN RELATION TO THE

**ADMINISTRATION OF
ENVIRONMENTAL COMPLAINTS RELATING
TO PUBLIC HEALTH: A CASE STUDY**

Presented by the Hon Kim Chance MLC (Chairman)

Report 12

STANDING COMMITTEE ON PUBLIC ADMINISTRATION

Date first appointed:

7 November 1996

Members of the Committee

Hon Kim Chance MLC (Chair)

Hon Barbara Scott MLC (Deputy Chair)

Hon Cheryl Davenport MLC

Hon Dexter Davies MLC

Hon Helen Hodgson MLC

Hon Barry House MLC

Hon Ken Travers MLC (substitute member for Hon Cheryl Davenport from 19 August 1999)

Staff of the Committee

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Terms of Reference

See Appendix 1

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**Report of the Legislative Council
Standing Committee on Public Administration**

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**Administration of environmental complaints relating to public health:
a case study**

1 ORIGINS OF THE INQUIRY

1.1 Introduction

The Committee received correspondence from people living and working in the Wagerup area, detailing alleged serious impacts on the health of people in the district, which were alleged to be the consequence of industrial emissions from the Alcoa refinery at Wagerup. However, the complainants approached the Committee in the belief that they had exhausted their attempts to obtain assistance from State Government agencies in finding out what was causing ill-health in the district. The approach to the Committee was to seek help in dealing with the relevant agencies. The Committee's terms of reference for this report are set out in Appendix 1.

1.2 The Views of the Local Community

1.2.1 Members of the local community in the Wagerup and Waroona area combined with some employees of the Alcoa Wagerup refinery ("the refinery") to form the Wagerup Community Health Action Group ("WCHAG"). The group formed as a response to what the members perceived as the damaging impact on public health of the industrial emissions from the refinery, which is used by Alcoa to extract alumina from bauxite mined by Alcoa in the nearby Darling Scarp.

1.3 The Industrial Process

1.3.1 WCHAG is of the view that the effects of the emissions have become serious since the introduction of a liquor burning unit (LBU) at the refinery in 1996. The LBU has the purpose of burning off the "organics" which are associated with the bauxite in the vicinity of Wagerup. The "organics" are the organic material found in the bauxite ore body. The bauxite cannot be extracted or refined without dealing with the organic

material. Consequent on complaints from the community, Alcoa added a catalytic thermal oxidiser (CTO) at a cost of \$5 million to the LBU, which was recommissioned in December 1997. The purpose of the CTO was to reduce the level of volatile organic carbon (VOC) being released into the air.

- 1.3.2** It is important to note that the bauxite ore body in the Wagerup region contains progressively larger proportions of “organics” as the ore body is extracted, with the result that the residue from the burning off of these compounds steadily increases as a proportion of the emissions from the refinery. It was for that reason that the refinery introduced the LBU in 1996, and followed that with the CTO the following year. It is also noteworthy that Alcoa operates alumina refineries at Kwinana and Pinjarra, as well as the refinery which is the subject of this report. The other two refineries use bauxite ore extracted from sources other than those used for the Wagerup facility. The result is that the residues and emissions from the various refineries are likely to be different, and the result of testing the emissions of one should not be taken as conclusive evidence of the content of emissions at another.

1.4 Complaints laid by WCHAG

- 1.4.1** Members of the local community in Wagerup, both individually and through WCHAG, have been making complaints about the emissions from the refinery, and their impact since at least 1995. These complaints have been registered with both Alcoa and relevant government departments: the Department of Minerals and Energy (“DME”); the Department of Health WA (“HDWA”); and the Department of the Environment (“DEP”).

- 1.4.2** Complaints were laid with each of these departments at different times, and sometimes not directly, but by reference from Alcoa, as is apparent from the letters written to the Committee by the departments concerned, and also the evidence given at a hearing conducted by the Committee.

- 1.4.3** The complaints to Government from WCHAG began with two letters to DME of 23 July 1997 and 8 September 1997, and a letter to HDWA of 9 February 1999.

1.5 Involvement of the Committee

- 1.5.1** The Committee received a letter dated 30 October 1998 from Messrs Van der Pal and Baker, representing employees at the refinery, and a letter dated 2 November 1998 from WCHAG (Ms A. Snow) regarding the impact of emissions from the refinery. The first letter asked the Committee to investigate the alleged inaction of DME in respect

of complaints laid with it, while the second letter asked the Committee to investigate the alleged lack of action by HDWA, and it also requested that the State Government undertake an epidemiological study of the health of the residents of the Wagerup area.

- 1.5.2** The requests satisfy the Committee's terms of reference, in so far as the requests involved aspects of public administration which had a systematic relationship with questions of the regulation of industrial emissions across the State. In response to the letters from the community and employees associated with the refinery, the Committee wrote to DME and HDWA on 30 November 1998, and a letter in similar terms to DEP on 14 December 1998, asking what action had been taken in respect of the complaints about the Alcoa Wagerup plant. The replies to these letters are annexed to this report as Appendix 2.
- 1.5.3** HDWA responded in a letter of 9 December 1998 to the effect that it knew of the complaints only through a Parliamentary question to the Minister for Health. The letter further asserted that matters involving air pollution were the responsibility of DEP, while the health of the workers at the refinery was the responsibility of DME.
- 1.5.4** DME responded on 11 December 1999 with a letter indicating that it had been aware of employee concerns since May 1997, and that DME had responded by asking Alcoa to undertake internal investigation and monitoring. From July 1997 there were numerous attendances on Alcoa by DME officers of the Collie Inspectorate. DME noted the introduction of the LBU and the CTO as responses to the community criticism of the emissions from the refinery. DME stated that it had not set up any independent studies of the content of the emissions, as Alcoa had undertaken their own studies, which had not revealed any major health issues. DME was of the view that if a further health survey were necessary (the existing survey was an ongoing University study of the general health of past and present Alcoa employees), DME would ask Alcoa to set up an independent study. The Committee later found that testing of emissions was being performed for Alcoa by the Chemistry Centre, an organisation within DME.
- 1.5.5** DEP responded on 23 February 1999 implying that it was aware of the complaints against the refinery. The DEP approach was accepting of Alcoa's monitoring of the situation: the CTO was said to leave the liquor burning operation at "best practice". The letter indicated that DEP had had discussions with members of the local community, Alcoa management, and HDWA. There was reference to the establishment of an advisory committee, but it was said that "as the key issue is one of health, the Health Department will have primary carriage of the issue."

- 1.6** These responses displayed a reliance on Alcoa to monitor any possible health impact from its refinery's emissions, as is usual practice, as well as a lack of coordination as to which department was responsible for dealing with the complaints. DME claimed jurisdiction over the site of the presumed source of the emissions the subject of the complaints, but claimed no authority in the matter beyond the gate to the plant, while HDWA and DEP each thought the other was responsible for dealing with any health impact in the community.
- 1.7** In a letter to the Committee of 10 December 1998, Alcoa set out tables detailing quantities of various VOCs emitted by its Wagerup plant and as monitored by Alcoa. Those tables are set out in Appendix 2 at page 28.

2 Site Inspection

- 2.1** The Committee made a site inspection, and heard the views of members of WCHAG and of Alcoa management at Wagerup. On Friday 7 May 1999 a sub-committee, consisting of the Hons Kim Chance, Cheryl Davenport and Helen Hodgson MLCs met at 9.30am at the Waroona Community Centre to hear a presentation by the Wagerup Community Health Action Group. Subsequently, other members of the Committee met with representatives of WCHAG and Mr House met with representatives of Alcoa.
- 2.2** The WCHAG delegation was led by Mr Bill van der Pal, assisted by Ms Cheryl Borserio. The present community health problems were perceived by the WCHAG to arise from the time that Alcoa commissioned a new processor at its alumina refinery at Wagerup. Complaints from the community had been forwarded directly to Alcoa, and to various government departments in respect of respiratory disorders, individual instances of allergic and toxic reactions, spontaneous abortions of farm animals, and tree deaths.
- 2.3** The sub-committee met with Alcoa management at the refinery at 2.00pm on the same day. The Alcoa delegation consisted of the plant manager, Mr David Olney, the plant medical officer, and three other members of management. They explained that the ore body being mined for bauxite to feed the Wagerup refinery was changing in content steadily and noticeably as the extraction process dug deeper into the Darling Scarp. The ore body now contained progressively larger amounts of "organics", which are required to be burned off in the LBU. In the course of discussion with the Alcoa management it became apparent that they did not have a complete analysis of the content of the "organics", or of the residue that would be emitted in the course of refining.

- 2.4** The other important factor was that the quantity of alumina to be produced by the refinery was projected to increase by 50% over the next 5 years, so that any problems inherent in the plant's emissions, and compounded by the changing nature of the ore body, would also be increasing in volume in the near future.
- 2.5** It was apparent to the Committee that Alcoa were genuinely concerned about the allegations and were working diligently and cooperatively to investigate them.

3 Evidence from Agencies

- 3.1** Following the site inspection the Committee resolved to conduct a hearing into the response of DME, HDWA and DEP to the complaints from the Wagerup community, and accordingly, evidence was taken at an open hearing of the Committee on 16 June 1999.
- 3.2** Mr Robert Sherwood, the Collie District Inspector of Mines, and Mr Michael Rowe, the Manager, Occupational Health for DME represented DME. The evidence which they tendered confirmed the material in DME's letter of 11 December 1998 (see 1.5.4 above), to the effect that monitoring of the emissions, as is usual in these cases, was left by DME to Alcoa to perform, and there had been only piecemeal contact with HDWA and DEP as to the complaints emerging from the Wagerup community. The evidence showed a strong demarcation between the roles of DME within the confines of a mine (including refinery) site, and the work of DEP where the general community were involved. The DME representatives also indicated that they could not identify the content of the emissions with absolute precision, as the emissions consisted of a "suite" of compounds produced in the liquor burning process.
- 3.3** Dr Paul Psaila-Savona, Executive Director, Public Health, and Dr Martin Matison, Senior Toxicologist, represented HDWA. Dr Psaila-Savona was of the view that the complaints about community health in the Wagerup area were inherently difficult to pin to a particular cause. The variety of symptoms did not fit any known epidemiological pattern, and a study by survey would require the presence of a control group, which was not possible in this case as the number of people affected was relatively small. The thrust of Dr Psaila-Savona's presentation on this topic identified the difficulty of ascertaining what factors were causing the ill-health in the community by focusing on the symptoms of the people affected. Dr Psaila-Savona saw little opportunity for involvement by HDWA, as he saw the analytical process of testing for contaminants in the air as a matter for DEP. Evidence was given that both the witnesses had had meetings with community representatives and Alcoa to lay down the

basis for a future survey. Dr Psaila-Savona also noted that there had been interaction in this matter between HDWA and DEP, but not between HDWA and DME.

3.4 DEP were represented by Mr Peter Skitmore, Director, Regional Services, and Mr Guy Watson, Manager, South West Regional Office. Mr Skitmore tabled a survey and an action plan devised by DEP. The health survey provided a basis for analysing symptoms in the Wagerup community by reference to date and time, the weather, events at the relevant time at the refinery, and the validation of those events by Alcoa, or other witnesses. The action plan, a copy of which had been sent to the Committee on 11 June 1999, provided for the taking of samples of body tissues from people in the affected area, together with the taking of samples of rainwater and air in the area, and testing them for the obvious likely industrial contaminants which might be both produced by the refinery, and be the cause of the community health issues.¹

3.5 Mr Skitmore gave evidence of the intensity with which he intended to pursue the action plan, for which DEP is responsible. He was asked why DEP took a completely different attitude now to the issue, compared with the response in the letter to the Committee of 23 February 1999 (see 1.5.5 above). He said that it was only after he had met with some of the complainants in February 1999 that DEP started to develop a response that went beyond assuming that HDWA would handle the matter. Mr Skitmore also displayed an understanding that the events in Wagerup might not necessarily fit the known pattern of cause and effect regarding emissions and public health, and that that might affect the administrative response to the issue. He noted that DEP was accustomed to dealing with emission situations which could be tested against accepted national and international standards. The situation at Wagerup, in which the testing done for Alcoa by the Chemistry Centre could not detect the nature of the possible low level harmful content in the emissions, nor assure that there was no harmful content, caused Mr Skitmore to say:

“In circumstances in which the emissions are well within those [national and international] standards and we still have health implications, which is the case in this instance, and where there is a significant difference between the standard and what we are measuring in the environment and what we believe is in the environment, we will seek advice from the Health

¹ See Appendix 3, Action Plan provided by DEP under letter of Mr P Skitmore of 11 June 1999.

Department about what is causing this problem, because the standards are indicating that there is a problem.”²

- 3.6** Mr Skitmore also indicated that DEP kept a complaints register, which had grown in respect of Wagerup after he had pointed out to Wagerup residents in February 1999 that DEP could not be expected to take action if they complained to Alcoa, without passing on a copy of their complaint to DEP.

4 The Views of the Committee

- 4.1** The Committee was of the view that there had been a disjointed response on the part of government agencies to the concerns of the community in Wagerup.

- 4.2** DME was restricted by its statutory charter to inspection and regulation of mine and refinery sites, and it was common practice to accept self-regulation and monitoring by mine and refinery employers. For the first seven months of the Committee’s preliminary enquiries into this matter, HDWA and DEP each asserted that the other was responsible for any action that ought to be taken at Wagerup. This occurred on the basis that the problem, if there was a problem, was caused on the one hand by air pollution, but on the other hand, it was said that the issue at stake was one of community health. It was only in the week leading up to the public hearings conducted by the Committee, that DEP produced an Action Plan, attempting the sort of speculative tissue and particle analysis which HDWA had said would not be feasible. There was apparently no formal process of consultation between these departments to coordinate administrative response.

- 4.3** The Committee accordingly makes recommendations not merely with a view to the situation at Wagerup, but about industrial emissions affecting public health being made anywhere within the State.

5 RECOMMENDATIONS

- 5.1** That there be a Working Party of senior officers from a level no less than the CEO or their deputy representing DEP, HDWA, DME and WorkSafe which meets not less than every six months to discuss the coordination of administrative response to community

² Transcript 16 June 1999, p.24

complaints regarding environmental issues adversely affecting the health of workers or the community.

- 5.2** That the meetings of the Working Party:
- i. ensure coordination for investigations of complaints of the nature referred to in 5.1 originating in the community; and
 - ii. review progress on current investigations.
- 5.3** That the members of the Working Party meet in response to particular community health complaints as they arise to coordinate an administrative response.
- 5.4** That DEP function as the department charged with coordinating the Working Party, and that DEP keep a register of all complaints received from the public regarding environmental issues adversely affecting the health of workers or the community. Any Department or statutory body on receiving such complaint is to file a copy with the register of complaints kept by DEP.
- 5.5** That DEP be able to involve other government agencies as required.

Hon Kim Chance MLC
Chairman

Date: 14 September 1999

APPENDIX 1**Terms of Reference for the Standing Committee on Public Administration**

Schedule 1 of the Standing Orders establishes the Standing Committee on Public Administration. The Terms of Reference for the Standing Committee are:

- "1. A Standing Committee on Public Administration is established.
2. The Committee consists of 6 members.
3. The functions of the Committee are:
 - (1) to inquire into and report to the House on the means of establishing agencies, the roles, functions, efficiency, effectiveness, and accountability of agencies and, generally, the conduct of public administration by or through agencies, including the relevance and effectiveness of applicable law and administrative practises;
 - (2) to consider and report on any bill referred to it by the House providing for the creation, alteration or abolition of an agency, including abolition or alteration by reason of privatization; and
 - (3) except as provided in Standing Order 339(c), the Committee shall not proceed to an inquiry whose sole or principal object would involve consideration of matters that fall within the purview, or are a function, of another Committee.
4. In this order:

"Agency" means-

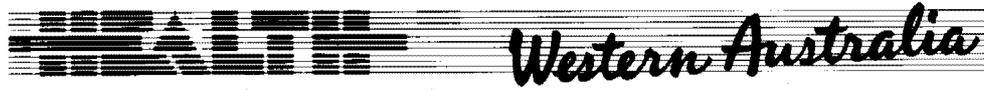
 - (a) an agent or instrumentality of the State Government, established for the purpose of developing, implementing or administering any program or policy with a public purpose or any such program or policy that relies substantially for its development, implementation or administration on public monies or revenue;
 - (b) any person empowered by a written law to make a decision enforceable at law whether by that person or otherwise,

and, where appropriate, includes any agency officer or employee acting, or having ostensible authority to act, as the agent or delegate of the agency, but does not include:

- (c) a House of the Parliament, or any Committee or member of either House, or any officer or employee of a department of the Parliament;
- (d) a court of law or a court of record, or a judge or other member of either court;
- (e) any person whose functions are solely of an advisory nature and the failure to obtain or act in accordance with advice given by that person does not invalidate or make voidable a decision made by another person;
- (f) a police officer or other person in the course of exercising a power conferred by a written law to arrest or charge a person with the commission of an offence, or to enter premises and seize or detain any object or thing;
- (g) a local government within the meaning of the Local Government Act 1995;"

APPENDIX 2

CORRESPONDENCE FROM GOVERNMENT AGENCIES

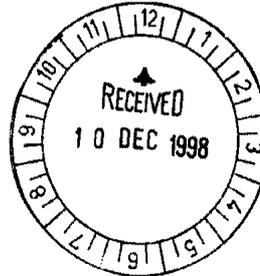


Health Department of Western Australia

Executive Director
Public Health

Your ref
Our ref
Enquiries

PBCR3501
6243/95
Dr Psaila-Savona



Hon Kim Chance MLC
Chairman
Parliament House
PERTH WA 6000

Dear Hon Chance

ALCOA WAGERUP ALUMINA REFINERY

Thank you for your letter of 30 November informing me of the Standing Committee's interest in the issue relating to the Refinery.

Before answering your specific questions, I wish to make the following comments.

1. The Health Department is not the department responsible for the management of air pollution matters. This is a responsibility of the Department of Environmental Protection which has the statutory authority to require pollution matters to be investigated and addressed. The health of the employees at the Refinery comes within the responsibility of the Departments of Minerals and Energy and Worksafe.
2. The Health Department, of course, has an interest in any matter which seriously impacts on the health of the community and, wherever and whenever possible, it takes the appropriate steps to advise the community how to deal with such issues.
3. No complaints of a health nature have been received by the Health Department from any member of the community relating to the Wagerup Alumina Refinery. A request was made by Mr John Bradshaw in regard to expert medical consultants able to investigate "Multiple Chemical Sensitivities". A copy of the Minister's letter to Mr Bradshaw is attached. A question without notice (PQ319) was asked by the Hon Jim Scott of the Minister for Health on 21 October, 1998.

I provide answers to your specific questions:

1. The Health Department has not been approached by any community member to investigate the air pollution issue at Wagerup. The most appropriate procedure would be for such individuals to be assessed by their own medical practitioner. The Health Department will provide support as necessary.
2. Only in providing advice on multiple chemical sensitivities.

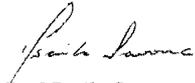
189 Royal St East Perth WA 6004 Tel (08) 9222 2295 Fax (08) 9222 2322
Letters PO Box 8172 Stirling St Perth 6849

The Health Department of Western Australia – promoting a smoke-free environment

3. The Health Department is not conducting any epidemiological study or survey to ascertain the exact cause of the health problems. This would not be a satisfactory method of investigating and managing air pollution issues.

I would be happy to assist your Committee in any way I can if you decide to conduct an inquiry.

Yours sincerely



Paul Psaila-Savona
**EXECUTIVE DIRECTOR
PUBLIC HEALTH**

9 December 1998

812041pps.doc



MINISTER FOR HEALTH

Our Ref: 36655

20 OCT 1998

Mr John Bradshaw MLA
Member for Murray-Wellington
PO Box 140
HARVEY WA 6220

Dear John

Thank you for your letter of 15 September 1998 regarding Alcoa Wagerup emissions and your request for assistance with residents with multiple chemical sensitivity.

Multiple chemical sensitivity syndrome is characterised by multiple symptoms in relation to various environmental pollutants, including chemicals in food, as well as common environmental irritants such as perfume, cigarette smoke and household cleaners. The critical aspect of the syndrome is the disparate number of chemicals which may trigger the symptoms at exposure levels well below acceptable limits of exposure set by regulatory agencies. Attached is a reprint which may be useful for you.

The syndrome is difficult to categorise, although a number of explanations have been proposed, including hypersensitivity responses to chemicals. However, there remains considerable controversy as to a cause-and-effect relationship and there are no population based data about the prevalence of the syndrome. In addition, it is difficult to verify the syndrome with analytical tests.

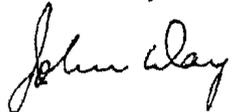
Multiple chemical sensitivity syndrome is generally managed by clinical ecologists, medical practitioners with an interest in the effects of environmental chemicals. I am advised that there are a number of general practitioners in Perth with an interest in this area. However, it may be more appropriate for the residents of Wagerup to consult a specialist medical practitioner.

13th Floor, 2 Havelock Street, West Perth, Western Australia 6005
Telephone: (08) 9213 6600 Facsimile: (08) 9213 6601
Internet Address: <http://www.wa.gov.au/cabinet/day/index.html>

Depending on the details of the cases, an immunologist, dermatologist, specialist physician, respiratory physician, or occupational health physician, may be the most appropriate specialist. A general practitioner should be consulted in the first instance as they would be in the best position to refer the patient to the most appropriate specialist. The Australian Medical Association (08 9273 3000) or the Royal Australian College of General Practitioners (08 9381 8937) also may be able to provide a list of specialists in these areas.

I trust this addresses the concerns of your constituents.

Yours sincerely

A handwritten signature in black ink, appearing to read "John Day". The signature is written in a cursive, flowing style.

JOHN DAY
Minister for Health

Enc.



Your Ref: GAPB/PBCR98113006.PBD
 Our Ref: LCR:JH
 Enquiries: Mr L C Ranford
 Telephone: 9222 3233
 Facsimile: 9222 3510

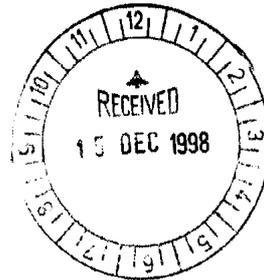


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The Chairman
 Legislative Council Standing Committee on
 Public Administration
 Parliament House
 PERTH WA 6000

Attention: Hon Kim Chance MLC



Dear Mr Chance,

ALCOA WAGERUP ALUMINA REFINERY

Thank you for your letter of 30 November 1998 to the State Mining Engineer regarding a possible inquiry by the Standing Committee on Public Administration into issues raised with regard to the Alcoa Wagerup Alumina Refinery. As the matters dealt with in your letter relate to the Department of Minerals and Energy, I have thought it appropriate that I should respond on behalf of the Department and I would be grateful if any further correspondence on this matter could be directed to myself.

Before I turn to the specific questions posed in your letter, it may be of use to provide you with some background information that may assist the Standing Committee in its deliberations.

Alcoa of Australia operates three alumina refineries in Western Australia, situated at Kwinana, Pinjarra and Wagerup which treat bauxite from various mines in the Darling Range. Bauxite contains material such as soil, tree roots etc, resulting in a gradual build up of organic matter called total organic carbon (TOC) in the process liquor stream. Much of the TOC is removed as sodium oxalate during processing of the bauxite, but further TOC remains which cannot be readily removed from solution. Increased levels of TOC can reduce both the yield and quality of alumina produced.

In 1988 the Kwinana Refinery became the first of the Alcoa plants to install a liquor burning unit (LBU) to reduce levels of TOC in the liquor stream. The procedure basically involves blending a side stream of the alkaline Bayer process liquor with alumina fines, which is then dried and burnt in a kiln (a process known as calcining) to destroy the organics. The burnt material is then added to spent process liquor and water, where the caustic soda is regenerated and returned to the process.

In 1996 Wagerup installed a LBU, essentially based on the design of the Kwinana LBU.

The Pinjarra Refinery does not yet require a LBU, although as TOC levels increase in the process liquor stream, this is seen as a future possibility.

The State's other major bauxite/alumina producer, Worsley Alumina has had discussions with Alcoa and is considering installing a LBU, based on the Alcoa design, at its own operation.

Some problems were experienced during the early stages of the operation of the Kwinana LBU, but recently, only an occasional and limited problem with dust has occurred within the plant boundaries. Alcoa advise that no Kwinana employees have registered any long term health effects associated with the operation of the LBU.

Alcoa Wagerup employees and sections of the local community apparently complained of noise and an uncomfortable odour soon after LBU commissioning. The noise problem was soon eliminated due to installation of additional silencers in the exhaust stack. Reported health effects included dryness and/or burning of nose and throat, chest tightness, eye irritation and coughing.

Turning to the questions raised in your letter, I will take your queries in order

1. The Position Taken by the Department of Minerals and Energy (DME) in Relation to the Issue.

The Department administers, through its Mining Operations Division, the Mines Safety and Inspection Act 1994, which deals principally with the safety and health of persons who are employed at mines and mining operations. The Department's concern throughout its dealings with this matter has been to ensure that compliance is achieved with this legislation and with the national and international occupational atmospheric contaminant exposure and health standards which it invokes.

2. Has DME Taken Any Steps to Respond to the Issue?

The Department was first advised of employee concerns in May 1997. Within three days the District Inspector of Mines (who is based in the DME Collie office) had requested that Alcoa establish a committee to resolve the issues, undertake gas and vapour monitoring, investigate the complaints and take appropriate steps to reduce employee exposure.

One Alcoa measure was to install wind direction alarms to ensure odour was carried away from the community. For 27 days in June 1997 the LBU was either closed down or on standby. Extensive sampling for atmospheric contaminants was also undertaken by Alcoa around the plant and reviewed in conjunction with DME. On no occasion were results above the relevant occupational exposure standards. Progress made by Alcoa to resolve the problem was closely monitored during further site visits by Department officers.

In late July 1997 officers from both the Collie and Perth offices visited Wagerup and held a meeting with Alcoa representatives. At this July meeting, Alcoa advised that stack sampling and testing had identified organic compounds, which they believed were responsible for much of the odour. As a result, installation of a catalytic thermal oxidiser (CTO) was being considered. Officers from the Collie Inspectorate continued with site visits to Wagerup, with discussions being held between Alcoa, site employees and the Department.

The CTO, which is basically an afterburner, was installed and first operated in May 1998. Departmental officers from Perth and Collie attended an on site meeting of the Alcoa Liquor Burning Monitoring Committee in June 1998. At this meeting, items discussed included the operation of the CTO and a review of the atmospheric and in stack sampling program conducted by Alcoa and external consultants from Curtin University. Levels of contaminants measured by both Alcoa and Curtin were again reported as very low.

The Department held a further on site review of the liquor burning risk program in July 1998. All the sampling and survey results generated by Alcoa and Curtin were readily available to the employees. As a result of consultation with employees, the inspectorate formed the view that they were satisfied with the progress of the program.

Fume levels have decreased noticeably since installation of the CTO. Alcoa employees have also advised the Department there has been a significant reduction in LBU emissions. Latest advice from Alcoa is that the company is still addressing some remaining technical problems with the pre CTO burner.

Because of continued employee concerns reported by one of the forty-one safety and health representatives at the Wagerup site, the State Mining Engineer and other Departmental officers held two meetings in May and August 1998 with some of these representatives and members of the workforce. At these meetings all issues were thoroughly discussed. Inspectors from the Collie DME office have continued to make visits to the site to monitor progress and to discuss the matter directly with employees and company representatives.

3. Is DME Conducting or Involved in an Epidemiological Study and/or Survey into Both the On-Site Workers and the General Public in and Around the Wagerup Refinery to Ascertain the Exact Cause of the Health Problems?

Alcoa has recognised the concern of employees and local residents regarding the possibility of health effects from exposure to LBU emissions at Wagerup. Solving the complex technical problems associated with the LBU has been a slow and iterative process. Installation of the CTO and operational changes by Alcoa are positive steps to further reduce the already low atmospheric contaminant levels and reduce the potential for exposure of employees and the general public. Up to this point, DME efforts have been concentrated on resolving any problems at their source and not in conducting health studies or surveys.

Should such measures be deemed necessary, it would be the Department's intention to require Alcoa to set up an appropriate and independent study to canvass the exact nature and extent of any health issues and to seek to determine their cause. Under section 45 of the Mines Safety and Inspection Act 1994, the State mining engineer is empowered to require the principal employer to have conducted an independent study concerning safety and health generally at a mine or in some specified respect. There are no powers under the Act to initiate action in respect of such a study of the general population in the Wagerup area.

No action has currently been taken by DME to initiate a study process under the Act, as Alcoa has already set in train a number of health monitoring initiatives, both amongst its workforce and amongst the general community in the area adjacent to the Wagerup refinery.

The Department of Minerals and Energy is aware that Monash University and the University of Western Australia are conducting, on behalf of Alcoa, an Australia-wide assessment of present and former Alcoa employees (known as the "Healthwise" study) to try to determine whether there is evidence of any abnormal medical conditions being more prevalent among those who are working or have worked for Alcoa than in the general population. This study is on-going, however, the Department understands that there have been no indications since 1994 (when the study commenced) that there is any excess experience of medical problems.

In the case of Wagerup employees in particular, Alcoa has offered those reporting health concerns in relation to the LBU the opportunity to receive specialist medical advice from a Professor of Respiratory Medicine. Alcoa has informed the Department that among the thirty or so employees who took up this opportunity, a single case of asthma has been found and no other long-term respiratory conditions have been apparent. Given the number of persons examined, the single case of asthma is not viewed as an unusually high incidence.

With regard to studies of possible health effects on the general community around Wagerup, Alcoa is currently working with the members of the recently formed Wagerup Community Health Awareness Group (WCHAG) to investigate concerns and has offered to fund and give support to a survey of the community around the refinery in order to determine whether there may be a link between its operations and any symptoms which may be exhibited by neighbouring residents. WCHAG representatives have proposed forming an Advisory Committee to oversee this health survey and this proposal has been supported by Alcoa.

4. What Steps has DME Taken to Enforce the Mines Safety and Inspection Act 1995 in Relation to the Wagerup Refinery?

Details of specific action with regard to the matter of emissions from the liquor burning unit have already been covered in response to point 2 above. The mines inspectorate is not aware of any specific breach of the legislation which might warrant its enforcement.

I trust that this information is sufficient for the Standing Committee to determine whether further inquiry into the issues raised is required. If I can provide any further assistance, please contact me.

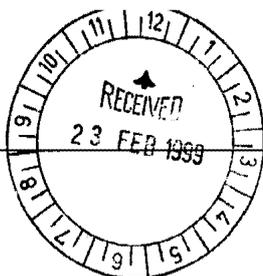
Yours sincerely,



L C Ranford
DIRECTOR GENERAL

11 December 1998

CED401TA



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Hon Kim Chance, MLC
 Chairman
 Standing Committee on Public Administration
 Parliament House
 PERTH WA 6000

Your Ref PBCR3501
 Our Ref L80/83 V6
 Enquiries Peter Skitmore

Dear Mr Chance

ALCOA WAGERUP ALUMINA REFINERY

I refer to your letter of 14 December 1998, in which you sought information on the above. I apologise for the delay in responding to you on this matter. The delay has been partly due to the need to meet with Mr John Bradshaw, MLA, the local Member, to determine the best means of proceeding with this matter from the community's viewpoint.

Your request has been brought to the attention of the Minister for the Environment. The Minister has requested regular briefings on the matter, and specifically on progress made by the Department of Environmental Protection and Health Department, to address the community's health concerns.

The Environmental Protection Authority (EPA) is not directly involved in this matter, as the licensing of industry is a matter dealt with by the Department of Environmental Protection (DEP); accordingly my comments refer to the department rather than the EPA.

The answer to your questions are as follows:

1. The position taken by the Environmental Protection Authority (EPA) in relation to the issue.

The DEP's position in this matter is one of regulator of industry via the licensing system established under the *Environmental Protection Act 1986* and Regulations. Using this process, the DEP controls the operations of Alcoa and has the power to set standards relating to the emissions of waste or ambient air quality levels associated with these emissions.

Based on available information (primarily from Alcoa's monitoring) on ambient air quality and other sampling, levels of volatile organic compounds (VOC's) in the air are significantly within accepted standards and would not justify the DEP requiring further reductions (if, in fact, this was possible). It should be noted, that with the newly commissioned catalytic thermal oxidising air pollution control equipment, the liquor burning operation is arguably operating at "best practice"



Occupational health issues at Alcoa are the responsibility of the Department of Minerals and Energy and community health is a matter for the Health Department. If there was a demonstrated link between the health of individuals in the community and the emissions from Alcoa, DEP would then be able to take the appropriate action.

A community health survey has been proposed (by others) and may provide some additional information on this matter. However, advice from the Health Department, indicates that such a survey is unlikely to resolve the issue.

An Advisory Committee is being established to overview the survey, and DEP will participate in this group, as will a representative of the Health Department. However, as the key issue is one of health, the Health Department will have primary carriage of the issue.

The DEP takes the community concerns seriously and will continue to respond to any complaints.

2. Has the EPA taken any steps to respond to the issue? If so, what are the details and the objective of those steps?

The DEP has had ongoing discussions with both the community and Alcoa. The company voluntarily undertook to shut down the burner in 1997 and install 'state-of-the-art' equipment to further reduce the emissions of VOCs. This process was managed by the DEP under the Works Approval process and upon completion, approval was given to operate the equipment.

The DEP has reviewed monitoring undertaken by Alcoa and found the VOC levels to be significantly below accepted threshold levels. Given the monitoring results, the DEP has no basis upon which to require Alcoa to take further action.

The DEP has met with the Minister of Health, Alcoa and representatives of the Health Department to discuss the best means of resolving this matter and the community's concerns. The department will participate in the Advisory Committee to overview further investigations. Any future action will depend on the results of these studies.

The DEP will work with stakeholders to address the issues raised, within its legislative framework. Its objective is to ensure that the operation of Alcoa's facility does not cause or contribute to pollution or unacceptable reduction in environmental values of the area within which Alcoa operates.

Because of Alcoa's willingness to address this issue, the DEP to date has not been required to take coercive action.

Following a recent meeting between Mr John Bradshaw MLA, and officers of the DEP and the Health Department, a community meeting was held in Waroona on Friday 19 February to discuss the community's concerns and possible further investigations which might be undertaken to address these concerns. The meeting was generally positive, and assisted in improving the level of mutual understanding.

The department, in conjunction with the Health Department, proposes to develop an action plan to deal with the various issues raised. This plan will be discussed with Alcoa and the community group

3. *Is the EPA conducting or involved in a study and/or survey to ascertain whether emissions from the refinery are within "safe levels."*

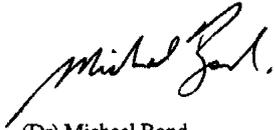
The DEP is not conducting monitoring of emissions or ambient air; this is being undertaken by Alcoa. Alcoa has contracted the WA Chemistry Centre to validate its methods and equipment and to provide independent monitoring for comparative purposes. This monitoring approach is acceptable to the department

A comparison of monitoring results with either occupational or Victorian EPA ambient standards indicates that air quality parameters in and around the refinery are well within the standards. The department is currently researching other standards for the compounds involved for comparison.

Attached for your information is a copy of an information kit provided by Alcoa. I believe that it provides useful background and other material on the matter from the company's perspective. Section 6 of the package was updated on 30 December 1998 and a copy of the update is also provided.

I trust that this response provides sufficient information for the Committee. Should you require further information or clarification, please contact me direct.

Yours sincerely



(Dr) Michael Bond
A/CHIEF EXECUTIVE OFFICER

23 February 1999

Enc

4 Liquor Burner Recommissioned

- 4.1 The Liquor Burner was recommissioned in May 1998. Prior to its recommissioning, Alcoa worked with independent experts, including SHE Pacific, HRL and the Chemistry Centre of WA and workforce representatives to develop a comprehensive monitoring and health surveillance program to measure the success of the modifications. Curtin University was engaged at the request of an on-site union (MEWU) to conduct an internal health survey. Several of our 45 on-site safety representatives were involved in this process. No statistically significant link was found between plant operations, health symptoms and weather patterns.
- 4.2 Alcoa's method of sampling and analyses has also been audited by Dr Verheyen from HRL Technologies Pty Ltd (a research and Quality Assurance laboratory). He said "the high level of quality control measures incorporated into the Alcoa VOC test methodology enables me to have full confidence in the integrity of the results obtained."

5 Health

- 5.1 Monash University and the University of Western Australia are conducting an assessment of past and present employees to determine if there are any abnormal patterns of disease among Alcoa employees Australia-wide. The "Healthwise" study (which commenced in 1994) is ongoing, however results to date show no abnormal medical conditions among current or former Alcoa employees in comparison with the general population.
- 5.2 In line with Alcoa's recording protocols any employee reporting health symptoms must visit the medical centre, where an Accident/Incident report will be raised on each occasion.
- 5.3 Thirty-one Alcoa employees, who have reported health concerns to varying degrees, have been given the opportunity to receive specialist medical advice.
- 5.4 The majority were interviewed by a Professor of Respiratory Medicine, and apart from one case of asthma, which is to be expected given the number interviewed, none have been found to have any other long-term respiratory condition.
- 5.5 One employee, Mr Pinzone, has taken district court action against the company for an illness that he claims is caused by exposure to Liquor Burning fumes. Alcoa strongly refutes this claim and will vigorously defend the action.
- 5.6 A suburban Perth-based doctor, we understand recommended by Mr Pinzone's advisers, has diagnosed Mr Pinzone as sensitive to refinery emissions. He is currently away from work and is receiving worker's compensation. Four other employees have since been diagnosed by this doctor as sensitive. Three have returned to work and one is currently away from work and is receiving workers compensation.
- 5.7 Although these people are currently off site, they have been supported continuously to ensure that their pay and conditions have been maintained.
- 5.8 No compound present at the levels measured is known to cause any adverse health effects. Medical assessment and advice leads us to believe that there are no adverse health impacts associated with Liquor Burning.

6 Community

- 6.1 Since July 1997, Wagerup Management has met with a group of neighbours on several occasions. Their discussions have included health concerns and the possibility of health surveys.
- 6.2 During his September visit to WA, Alcoa Chief Executive Officer, Paul O'Neill met with representatives of the recently formed Wagerup Community Health Awareness Group (WCHAG) and re-assured them that Alcoa would continue to investigate their concerns.
- 6.3 As a result of ongoing discussions with refinery neighbours, Alcoa has offered to fund and support a survey of the local community to determine whether or not there is a link between the health symptoms exhibited by some neighbours and the proximity of Wagerup Refinery.
- 6.4 Although the data gives us confidence that there is no causal linkage between refinery emissions and adverse health impacts, Alcoa continues to seek independent advice and work with representatives of the WCHAG to resolve the issue.

- 6.5 Representatives from WCHAG have proposed forming an Advisory Committee to oversee the health survey. Alcoa supports this proposal and would welcome representation from the Department of Environmental Protection and the Health Department of WA on the Advisory Committee.

Frequently Asked Questions

1. What is Liquor Burning?

The Liquor Burner is an important addition to the alumina refining process. The bauxite supplied to Wagerup contains organic impurities, most of which either break down or are removed with the residue. The remainder builds up in the liquor stream, causing a progressive reduction in alumina yield and lowering product quality.

In June 1996 the Liquor Burner was commissioned as the best technology available to reduce these organic impurities. It operates somewhat like a kidney dialysis machine by removing organic impurities from about 1% of the circulating liquor stream. Without it, the level of organic impurities in the liquor stream would be a threat to the long-term viability of the refinery.

2. Is there any other way to manage these organics?

Other methods have been investigated and some implemented to remove organic material from the bauxite at the mine. These include modifications to mining methods such as secondary overburden removal, where remaining pockets of dirt on the caprock are scraped out using excavators, however this cannot remove enough of the organics. Another expensive method is to dump liquor and add more caustic, but this is not environmentally sustainable in the long term. The Liquor Burner was identified as the best and most cost-effective method of removing impurities from the liquor stream.

3. Does liquor burning cause any adverse health effects?

Extensive monitoring by both internal and external parties and advice from medical experts has been unable to identify any foreseeable adverse health impacts from Liquor Burning.

The combustion organics in liquor burning generate a mixture of volatile organic compounds (VOCs), which are produced in many combustion processes, such as in bushfires, wood heaters, incense oil burners, barbecues and motor vehicles. Approximately 90% of these VOCs are destroyed in the catalytic thermal oxidiser (CTO) which was added to the plant in May 1998.

Ambient air quality monitoring conducted in and around the refinery shows there has been no noticeable change in air quality, either in the refinery or in the local community, when the liquor burner is on or off line. Stack and ambient air quality monitoring shows that all emission levels are well below accepted national and international air quality standards and guidelines and occupational exposure standards.

4. How many people have reported health symptoms?

Thirty-one Alcoa employees who have reported health concerns to varying degrees have been given the opportunity to receive specialist medical advice. The majority were interviewed by a Professor of Respiratory Medicine, and apart from one case of asthma, which is to be expected given the number interviewed, none were found to have any other long-term respiratory condition. One employee, Mr Pinzone, has taken district court action against the company for an illness that he claims is caused by exposure to Liquor Burning fumes. Alcoa strongly refutes this claim and will vigorously defend the action. A suburban Perth-based doctor, we understand recommended by Mr Pinzone's advisers, has diagnosed Mr Pinzone as sensitive to refinery emissions. He is currently away from work, and is receiving workers compensation. Four other employees have since been diagnosed by this doctor as sensitive. Three have returned to work and one is currently away from work and is receiving worker's compensation.

5. What is Alcoa doing to help these people?

Alcoa is supplying ongoing and continuous support to those people who have reported health symptoms. The medical centre staff and company doctor checks on the individual's health on a regular basis and helps arrange referrals to specialists and counselling according to their needs. Alcoa has provided support to these people to ensure that their pay and conditions are maintained.

6. I have heard the term "Multiple Chemical Sensitivity" around lately. What exactly is it?

Multiple Chemical Sensitivity (MCS) is the name given to a loose collection of symptoms in which people believe they are sensitive to very small quantities of substances - often everyday substances such as perfumes and cooking odours. Exposure to these substances results in the onset of a wide variety of symptoms. Because its diagnosis, its cause and its treatment have not yet been scientifically validated, MCS is not yet generally accepted by the medical profession.

7. Some months ago I participated in a study run by Curtin University where we were selected at random to complete a questionnaire where we finished our shift. What was the result of the survey?

The Health Surveillance Survey was run by Curtin University, who Alcoa engaged to undertake the study at the request of an on-site union, the MEWU. The study ran for 69 days during which the liquor burning building and the new CTO (Catalytic Thermal Oxidiser) were in operation intermittently. The study's objectives included monitoring employees and environmental conditions to see if there were any health effects attributable to the Liquor Burning Building with CTO in operation under a variety of atmospheric conditions and to identify any potential 'hot spots' for odour or other effects within the refinery.

There have been delays in collecting all the data and having it analysed - some was sent to Sweden for interpretation - and just within the last week an incomplete draft of the final report has arrived from Curtin. Many ailments such as onset of colds and other minor complaints commonly occur when people are at work in any conditions. This has made the interpretation of reported health effects complicated. The results of the survey are inconclusive as to evidence of increase in health effects such as sore throats or dry eyes due to anything associated with the Liquor Burning Building with the CTO operating.

At this stage the company is waiting for the completed final report.

8. I have heard some community members complain about Alcoa in the media. What are we doing to address community concerns?

Some neighbours close to Wagerup claim they are affected by general refinery emissions and have reported health symptoms ranging from nausea and headaches to increased sensitivity to chemicals. As a result of ongoing discussions with refinery neighbours, Alcoa has offered to fund and support a survey of the local community to determine whether or not there is a link between the health symptoms exhibited by some neighbours and the proximity of the Wagerup Refinery. Alcoa is keen to resolve this issue as soon as possible, and is in the process of setting up an independent framework in conjunction with neighbour representatives.

9. Why isn't Alcoa defending itself in the public arena?

It is not Alcoa's policy to conduct a public debate in the media and the company has no intention of entering into one. However, our response to media coverage will be reviewed as required.

**Environmental Monitoring – Volatile Organic Compounds
Ambient Concentration (milligrams) mg/m³**

Compound	1997	1998 Post CTO	Worksafe Standard	EPAV Ambient Air Quality Standard	Service Station
Acetone	Not measured	.0054	1185	-	-
Benzene	.003	.0029	16	1	1.3
Biphenyl	.001	.0000	1.3	.033	-
Ethyl Benzene	.001	.0021	434	-	.05
Naphthalene	.001	.0002	52	-	-
Pyridine	.0024	.0010	16	.013	.2
Styrene	.001	.0015	213	.210	.007
Toluene	.005	.0018	377	.650	2
1,2 Xylene	.001	.0013	350	.350	-

**Environmental Monitoring – Other Compounds
Ambient Concentration (milligrams) mg/m³**

Compound	1997	1998 Post CTO	Worksafe Standard	EPAV Ambient Air Quality Standard
Carbon Monoxide	Not measured	0	25	30
Nitrogen Oxide	Not measured	0	31	.15
Dust (total)	0.06	0	10	.12
Sodium Aluminate	0.03	0	2	-

- EPAV = Environmental Protection Authority of Victoria
- Worksafe standards represent 8 hour time weighted average occupational exposure limit Reference Exposure Standards for Atmospheric Contaminants, Worksafe Australia, May 1995.

File: u:\managem\admin\community\ambient monitoring summary.doc

Author: RJStone, Dec 7, 1998

Comparison of Results generated by Alcoa Analysts and W.A. Government Chemistry Centre Analysts

Samples were collected from the same location at the same time (May 20, 1998)

Location	security			Bldg.45			Bldg.35			Vehicle Garage			Bldg.26		
Compound	Alcoa Result	Govt. Chem Centre Result													
acetone	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
hexatriene	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0001	0.0000	0.0000	0.0000	0.0000	
benzene	0.0016	0.0011	0.0017	0.0001	0.0001	0.0006	0.0021	0.0019	0.0000	0.0021	0.0018	0.0011	0.0008	0.0010	
pyridine	0.0002	0.0072	0.0030	0.0025	0.0022	0.0013	0.0003	0.0000	0.0012	0.0000	0.0000	0.0020	0.0007	0.0075	
toluene	0.0003	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0003	0.0000	
ethylbenzene	0.0017	0.0014	<0.001	0.0000	0.0000	<0.001	0.0000	0.0000	<0.001	0.0000	0.0000	<0.001	0.0016	0.0014	
1,3-xylene	0.0017	0.0009	0.0015	0.0000	0.0000	0.0010	0.0000	0.0000	0.0010	0.0015	0.0015	0.0012	0.0013	0.0007	
ethynylbenzene	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.0000	0.0001	0.0001	0.0000	
styrene	0.0006	0.0004	<0.001	0.0002	0.0002	<0.001	0.0012	0.0011	<0.001	0.0012	0.0012	<0.001	0.0006	0.0005	
1,2-xylene	0.0007	0.0004	<0.001	0.0012	0.0011	<0.001	0.0024	0.0024	<0.001	0.0024	0.0024	<0.001	0.0005	0.0003	
benzaldehyde	0.0015	0.0013	0.0000	0.0000	0.0000	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0016	0.0011	0.0000	
1,3,5-trimethylbenzene	0.0004	0.0002	0.0014	0.0000	0.0000	0.0010	0.0008	0.0008	0.0011	0.0009	0.0009	0.0011	0.0003	0.0002	
benzotrile	0.0003	0.0003	0.0008	0.0008	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	
benzofuran	0.0001	0.0001	0.0002	0.0002	0.0010	0.0012	0.0019	0.0015	0.0019	0.0015	0.0001	0.0001	0.0001	0.0001	
acetophenone	0.0000	0.0000	0.0012	0.0015	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000	0.0000	
naphthalene	0.0003	0.0001	0.0002	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0001	0.0000	
quinoline	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
1H-indole	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
2-methylnaphthalene	0.0003	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0001	0.0000	0.0002	0.0001	0.0000	
1-methylnaphthalene	0.0001	0.0001	0.0000	0.0000	0.0000	0.0002	0.0000	0.0002	0.0001	0.0001	0.0000	0.0001	0.0000	0.0000	
biphenyl	0.0001	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
acenaphthylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
acenaphthene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
dibenzofuran	0.0001	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
9H-fluorene	0.0000	0.0000	0.0002	0.0000	0.0001	0.0005	0.0001	0.0005	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	
9H-fluoren-9-one	0.0007	0.0000	0.0001	0.0001	0.0000	0.0003	0.0000	0.0003	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	
phenanthrene	0.0001	0.0000	0.0001	0.0000	0.0000	0.0001	0.0000	0.0001	0.0012	0.0002	0.0000	0.0000	0.0000	0.0000	
fluoranthene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001	0.0013	0.0003	0.0000	0.0000	0.0000	0.0000	
pyrene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

4. Liquor Burner Recommissioned

- 4.1 The Liquor Burner was recommissioned in May 1998. Prior to its recommissioning, Alcoa worked with independent experts, including SHE Pacific, HRL and the Chemistry Centre of WA and workforce representatives to develop a comprehensive monitoring and health surveillance program to measure the success of the modifications. Curtin University was engaged at the request of an on-site union (MEWU) to conduct an internal health survey. Several of the 45 on-site safety representatives were involved in this process. No statistically significant link was found between plant operations, health symptoms and weather patterns.
- 4.2 Alcoa's method of sampling and analyses has also been audited by Dr Vorhoyen from HRL Technologies Pty Ltd (a research and Quality Assurance laboratory). He said "the high level of quality control measures incorporated into the Alcoa VOC test methodology enables me to have full confidence in the integrity of the results obtained."

5 Health

- 5.1 Monash University and the University of Western Australia are conducting an assessment of past and present employees to determine if there are any abnormal health patterns among Alcoa employees Australia-wide. The "Healthwise" study (which commenced in 1994) is ongoing, however results to date show no abnormal medical conditions among current or former Alcoa employees in comparison with the general population.
- 5.2 In line with Alcoa's recording protocols any employee reporting health symptoms must visit the medical centre, where an Accident/Incident report will be raised on each occasion.
- 5.3 All Alcoa employees who reported health concerns to varying degrees were given the opportunity to receive specialist medical advice.
- 5.4 About 30 employees took up the opportunity and were interviewed by a Professor of Respiratory Medicine. Apart from one case of asthma, which is to be expected given the number interviewed, none have been found to have any other long-term respiratory condition.
- 5.5 One employee, Mr Pinzone, has taken district court action against the company for an illness that he claims is caused by exposure to Liquor Burning fumes. Alcoa strongly refutes this claim and will vigorously defend the action.
- 5.6 A suburban Perth-based doctor, who was recommended by Mr Pinzone's advisers, has diagnosed Mr Pinzone as sensitive to refinery emissions. He is currently away from work and is receiving worker's compensation. Four other employees have since been diagnosed by this doctor as sensitive. Of that four, three have returned to work. One other remains away from work and is receiving workers compensation.
- 5.7 Although two people are currently off site, they have been supported continuously to ensure that their pay and conditions have been maintained.
- 5.8 No compound present at the levels measured is known to cause any adverse health effects. Medical assessment and advice suggests that there are no adverse health impacts associated with Liquor Burning.

6 Community

- 6.1 Early in 1996, prior to commissioning of the Liquor Burning unit, air samples were obtained at four locations outside Wagerup Refinery, including two properties in Yarloop, one to the south-west and the other to the south of the refinery. The samples were analysed for eight different Volatile Organic Compounds (VOCs) that were considered to be more prevalent, as well as for total VOCs. This sampling was repeated following start up of the Liquor Burning unit. No significant difference in the results was detected.
- 6.2 Monitoring for sodium was undertaken at one property in 1996, again using an air sampler, to ascertain whether caustic mist may have been a factor in the resident's health concerns. The resident initiated the sampling when she "felt an effect". No sodium could be detected.
- 6.3 In July 1997, neighbouring families were invited to submit samples of rainwater for analysis. Samples from three properties in Yarloop were collected by an independent consultant (Hydrochem Consulting) and analysed by the Chemistry Centre (WA) for six organic compounds known to exist in Liquor Burning emissions. The laboratory was "unable to detect any of the specified substances in the water supplied".
- 6.4 In January 1998, two samples of milk from a Yarloop dairy farm were analysed by the Chemistry Centre (WA) for aluminium, arsenic, cadmium, lead and mercury. A control sample from a carton

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ALCOA CORP RELATIONS 08 93165166

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- of milk purchased from a Waroona supermarket was also analysed. None of these "heavy metals" was detected in any of the milk samples.
- 6.5 In late 1998, odour-sampling equipment was established at one property and the residents trained in how to operate the equipment. This equipment remained at the property for approximately four weeks but was not triggered by the residents.
 - 6.6 Since July 1997, Wagerup Management has met with a group of neighbours on several occasions. Their discussions have included health concerns, monitoring results, and the possibility of health surveys.
 - 6.7 During his September visit to WA, Alcoa Chief Executive Officer, Paul O'Neill met with representatives of the recently formed Wagerup Community Health Awareness Group (WCHAG) and re-assured them that Alcoa would continue to investigate their concerns.
 - 6.8 As a result of ongoing discussions with refinery neighbours, Alcoa has offered to fund and support a survey of the local community to determine whether or not there is a link between the health symptoms exhibited by some neighbours and the proximity of Wagerup Refinery.
 - 6.9 Although the data gives us confidence that there is no causal linkage between refinery emissions and adverse health impacts, Alcoa continues to seek independent advice and work with representatives of the WCHAG to resolve the issue.
 - 6.10 Representatives from WCHAG have proposed forming an Advisory Committee to oversee the health survey. Alcoa supports this proposal and would welcome representation from the Department of Environmental Protection and the Health Department of WA on the Advisory Committee.
 - 6.11 Representatives from Alcoa and the Wagerup Community Health Awareness Group are currently working through a process to appoint an independent person to chair the proposed Advisory Committee.

APPENDIX 3

DEP ACTION PLAN

DEPARTMENT OF ENVIRONMENTAL PROTECTION ACTION PLAN TO ADDRESS COMMUNITY CONCERNS AT WAGERUP

14 June 1999

	ISSUE/CONCERN	OBJECTIVE	ACTION	OUTCOME	
1	Oxalate emissions	Determine if these emissions are a causal factor by sampling and if so to address	<ul style="list-style-type: none"> ● Sample for oxalate in water supply ● Sample for oxalate in urine ● Sample for oxalate in roof gutter sediment ● Sample Bancell Brook for oxalate ● Sample for oxalate particulate in air when odour/symptoms occur ● Sample blood for depressed calcium levels 	<ul style="list-style-type: none"> ● samples taken & awaiting results " " ● undertake sampling in the week of 14 June ● await above results before proceeding " " 	
2	Arsenic emissions	Determine if these emissions are a causal factor by sampling and if so to address	<ul style="list-style-type: none"> ● Sample for arsenic in urine ● Sample for arsenic in hair ● Sample for arsenic in nails ● Sample for arsenic in water supply ● Sample for arsenic in roof gutter sediment ● Sample Bancell Brook for arsenic 	<ul style="list-style-type: none"> ● samples taken & awaiting results " " " " ● undertake sampling in the week of 14 June 	

3	Volatile Organic Compounds. Alcoa's sampling may not be indicative of plume strike concentrations	Determine if ambient levels are elevated (and thus a causal factor) by sampling and if so to address	<ul style="list-style-type: none"> ● Sample for VOC's in air when odour/symptoms occur ● Sample for VOC's in air when wind is from SW (as background ambient) ● Alcoa agreed to total of 3 event samples to ensure adequate representative samples. 	<ul style="list-style-type: none"> ● Sample taken by Cheryll Borserio when experiencing symptoms, awaiting results ● additional samples to be taken (1 Summa provided already) 	
4	Heavy metals	Determine if these are present in the environment at elevated levels and if so to determine source and address	<ul style="list-style-type: none"> ● Sample for HM's water supply ● Sample for HM's in roof gutter sediment ● Sample for HM's in hair ● Sample for HM's in nails ● Sample Bancell Brook for heavy metals 	<ul style="list-style-type: none"> ● samples taken and awaiting results " " " ● undertake sampling in the week of 14 June 	
5	Alumina	Determine if levels are elevated by sampling and if so to address	<ul style="list-style-type: none"> ● Sample for alumina in roof gutter sediment ● Sample for aluminium in rainwater supply ● Sample Bancell Brook for aluminium 	<ul style="list-style-type: none"> ● Samples taken and awaiting results " " ● undertake sampling in the week of 14 June 	
6	Dust	Determine if levels at residential premises are elevated and if so determine the source and address	<ul style="list-style-type: none"> ● Install hivol samplers at residences on complaint 	<ul style="list-style-type: none"> ● Offer made to WCHAG awaiting request and location 	
7	Odour (non health)	To reduce odour emissions to an acceptable level at residential premises	<ul style="list-style-type: none"> ● Monitor progress on Alcoa's odour reduction program and number of complaints on odour. ● Odour assessment could assist in quantifying odour levels and contours if warranted 	<ul style="list-style-type: none"> ● Await advice on completion and assess results, either by complaint levels or odour assessment 	(Alcoa will refine its programme on this and some other items on this list)

8	Noise	Determine if noise levels from Alcoa's operations are in excess of the assigned levels under the Noise Regulations and if so to reduce as required	<ul style="list-style-type: none"> ● Set up noise monitors at premises where residents believe that noise levels are exceeding the regulations 	<ul style="list-style-type: none"> ● Offer made to WCHAG, awaiting response and location 	
9	Quality of rainwater or surface water for drinking	Determine if compounds from Alcoa's operations are present in water supplies at levels in excess of relevant standards and if so to reduce accordingly	<ul style="list-style-type: none"> ● Sample rainwater (see # 1,2,3) 	<ul style="list-style-type: none"> ● Samples taken & awaiting results 	
10	Possible impacts on livestock	Determine if compounds from Alcoa's operations are in excess of human health standards and if so to address	<ul style="list-style-type: none"> ● Sample program above 	<ul style="list-style-type: none"> ● Samples taken & awaiting results before taking action 	

11	<p>DEP to provide appropriate environmental protection services and a high level of customer service</p>	<p>The environment is protected to an appropriate standards and its customers are satisfied with the level of services provided.</p>	<ul style="list-style-type: none"> ● DEP Director Regional Services made responsible and is personally managing this issue ● Regular phone contact with WCHAG ● Copies of all complaints to Alcoa sent to DEP + Alcoa's response ● Meetings with WCHAG to listen to concerns ● Meetings with Alcoa ● DEP representative on Advisory Group to Working Group ● DEP close liaison with Health Dept ● DEP response including on site visits (where appropriate) to community complaints ● DEP to assess customer satisfaction via standard Customer Service Review questionnaire 	<ul style="list-style-type: none"> ● Good relationship with WCHAG established ● Regular phone contact established ● Action taken on areas of community concern ● DEP open to investigate any other issues ● Advice provided to others direct and via Advisory Group ● Comprehensive file notes kept ● FMIS code created for this project to track time and \$ ● DEP has allocated resources, is committed to investigate concerns and complaints, goals set for tasks and timeframe ● DEP has completed a customer service review (9/6/99) 	
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12	Alcoa should be doing all it can to ensure it's operations are not adversely impacting on the environment or the community	Ensure that Alcoa is taking all appropriate action to minimise its emissions to the environment	<ul style="list-style-type: none"> ● DEP to review all Alcoa's action to reduce emissions ● DEP to require additional action where shown to be warranted 		
13	Areas of stressed vegetation	Determine cause of stress and if possible remove the stress	<ul style="list-style-type: none"> ● DEP discussions with CALM experts ● DEP to facilitate CALM inspection of 2 areas of stressed vegetation ● DEP to facilitate follow up inspection after 5 months 	<ul style="list-style-type: none"> ● The two areas identified by WCHAG were inspected by a CALM officer ● Finding was that stress likely due to shallow soils and water stress on the scarp site ● Finding was that fungus likely cause of stress on site near railway. ● DEP to request follow up inspection in writing 	
14	DEP is aware of all of Alcoa's emissions and their quantity	All emissions are known and quantified	<ul style="list-style-type: none"> ● DEP to seek further emission information from Alcoa in terms of range and quantities ● Sample ambient air as audit of emissions (see sampling program) 	<ul style="list-style-type: none"> ● Two packages sought and provided, need assessment ● Await results 	

15	Alcoa's operational protocols may contribute to occasionally higher emission rates	To review protocols and their implications on emissions, and where possible change them to minimise/emissions in order to minimise possible impact on the community	<ul style="list-style-type: none"> ● DEP to seek details of startup and shutdown protocols for the Oxalate Kiln, Liquor Burner and Catalytic Thermal Oxidiser ● DEP to establish if emission levels are significantly greater during any startup or shutdowns ● DEP to determine if protocols should be changed so as to minimise emissions during startup and shutdown operations ● DEP to require Alcoa to provide times (1999) of startup and shutdowns of these facilities ● DEP to compare complaints to startup and shut down times. 	<ul style="list-style-type: none"> ● DEP has sought protocols from Alcoa ● DEP to determine ● Yet to be determined ● DEP has sought times from Alcoa ● DEP awaiting data 	
16	Alcoa's emissions should either comply with or be better than US EPA and VIC EPA ambient standards.	Ambient air quality should be equal or better	<ul style="list-style-type: none"> ● DEP to assess ambient air results against VIC EPA stds ● DEP to compare ambient air results against VOC air quality survey currently underway in Perth ● DEP to compare with US EPA stds 	<ul style="list-style-type: none"> ● Await sampling results ● In meantime DEP to obtain relevant stds. 	

17	Alcoa's emissions should either comply with or be better than ANZECC emission standards.	Determine emissions and where necessary reduce to comply/better the standard	<ul style="list-style-type: none"> ● DEP to compare emissions data from Alcoa with ANZECC emission standards where applicable ● DEP to require emissions reduced if relevant ANZECC standards are exceeded ● DEP to encourage Alcoa towards best practice with respect to emissions levels 		
18	Alcoa's meteorological data is not the same as at complainant's properties due to effects of the Scarp	Determine meteorological data at the complainant's property and compare with Alcoa's data	<ul style="list-style-type: none"> ● DEP to install meteorological station at Borserio property ● DEP to compare Alcoa and DEP's data ● If Alcoa's data not applicable at complainants location, DEP to require action to address situation ● DEP to compare complaints register from Borserio to its own meteorological data to see if pattern 	<ul style="list-style-type: none"> ● Met station installed, data acquired and currently being assessed 	
18a	Adverse meteorological conditions may increase the 'problems'	Refinery operations should not impact on the community regardless of meteorological conditions (esp inversions)	<ul style="list-style-type: none"> ● DEP to assess Alcoa's investigations into atmospheric conditions (inversions) to identify if this is a potential mechanism which may cause an increase in 'problems' ● DEP to assess Alcoa's comparison of inversion events against its complaint data base for last 12 months. 	<ul style="list-style-type: none"> ● DEP requested information - await completion of study ● DEP requested information - await completion of study 	

19	A broad based community health study should be undertaken	To determine how many people are experiencing (and what) health affects in proximity to the refinery (10km?)	<ul style="list-style-type: none">● DEP does not oppose such a survey and is providing input via the Advisory group.● DEP is cautious about such a survey as its value in providing more information to help resolve this issue is questionable● DEP has offered the use of its GPS instruments, to enable the location of respondents to be plotted on a Geographic Information System database to assist in maximising the value of the survey● Alcoa has agreed to finance the study subject to costing estimate	<ul style="list-style-type: none">● DEP to provide input as required● Await survey and results	
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20	<p>A detailed investigation of the medical records be undertaken of those members of the community who believe that the emissions from Alcoa's operations at Wagerup have affected their health</p>	<p>To obtain a better understanding of the health impacts on the community which they attribute to Alcoa's operations, based on the individual's GP and specialist advice of their medical condition . Timing and commonality of symptoms may assist in understanding causes or indicate additional ambient or body residue sampling</p>	<ul style="list-style-type: none"> ● DEP has suggested this study via the Advisory Group ● The Working Group has supported the idea ● Health Dept should advise on appropriate form and expertise required for such a study ● Individuals to be interviewed should be put forward by WCHAG ● The necessary releases obtained for access to medical advisers and personal records. ● Alcoa has agreed to finance the study subject to costing estimate 	<ul style="list-style-type: none"> ● DEP to provide advice as required ● DEP to liaise closely with Health Dept. on the issue in an advisory capacity. ● Await survey and results ● DEP to take further samples or action as may be indicated by survey results. 	
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Notes:

- Issues/concerns are those identified by either the WCHAG or DEP
- Issues/concerns have been broken out to specific items rather than treated as broad issues such as health, amenity, lifestyle etc
- The overall objective is to establish what is causing the immediate health reactions and to remove/ameliorate those causes.
- The agreed timetable between DEP, WCHAG and Alcoa for completion of investigations and plan to resolve this matter is 12 months (approx May 2000).
- Investigations should be on all refinery emissions and not just on the liquor burning plant.
- A connection between refinery emissions and immediate health reactions on some community members is assumed and accordingly investigations will focus on refinery operations rather than any other potential causes.
- In the absence of any other complainants, DEP will undertake all ambient and body residue testing at Cheryl Borserio's premises.