



SECOND SESSION OF THE THIRTY-SIXTH PARLIAMENT

**REPORT OF THE
STANDING COMMITTEE ON
ENVIRONMENT AND PUBLIC AFFAIRS
IN RELATION TO THE
ALCOA REFINERY AT WAGERUP INQUIRY**

Presented by Hon Christine Sharp MLC (Chairman)

Report 11
October 2004

STANDING COMMITTEE ON ENVIRONMENT AND PUBLIC AFFAIRS

Date first appointed:

May 24 2001

Terms of Reference:

The following is an extract from Schedule 1 of the Legislative Council Standing Orders:

“3. Environment and Public Affairs Committee

- 3.1 An Environment and Public Affairs Committee is established.
- 3.2 The Committee consists of 7 members.
- 3.3 The functions of the Committee are to inquire into and report on -
 - (a) any public or private policy, practice, scheme, arrangement, or project whose implementation, or intended implementation, within the limits of the State is affecting, or may affect, the environment;
 - (b) any bill referred by the House;
 - (c) petitions.
- 3.4 The Committee, where relevant and appropriate, is to assess the merit of matters or issues arising from an inquiry in accordance with the principles of ecological sustainable development and the minimisation of harm to the environment.
- 3.5 The Committee may refer a petition to another committee where the subject matter of the petition is within the competence of that committee.
- 3.6 In this order “**environment**” has the meaning assigned to it under section 3(1), (2) of the *Environmental Protection Act 1986*.”

Members as at the time of this inquiry:

Hon Christine Sharp MLC (Chairman)	Hon Bruce Donaldson MLC
Hon Kate Doust MLC (Deputy Chairman)	Hon Frank Hough MLC
Hon Robyn McSweeney MLC	Hon Louise Pratt MLC
Hon Jim Scott MLC	

Staff as at the time of this inquiry:

Felicity Mackie, Advisory Officer (Legal)	Mark Warner, Committee Clerk
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Note

The Eleventh Report of the Environment and Public Affairs Committee consists of a Report of the Committee, and a Minority Report of the Hon Christine Sharp MLC and Hon Jim Scott MLC.

The Report of the Committee reflects the unanimous position of the Committee save and except for:

- the dissent expressed by Hon Bruce Donaldson MLC and Hon Robin McSweeney MLC in relation to paragraphs 9.248, 9.249 and 9.250 and Recommendations 27 and 28; and
- the dissent expressed by Hon Christine Sharp MLC and Hon Jim Scott MLC in relation to paragraph 10.95, which dissent is addressed in the Minority



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Government Response

This Report is subject to Standing Order 337:

After tabling, the Clerk shall send a copy of a report recommending action by, or seeking a response from, the Government to the responsible Minister. The Leader of the Government or the Minister (if a Member of the Council) shall report the Government's response within 4 months.

The four-month period commences on the date of tabling.

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Glossary

Adjuvant	A chemical that can make a person more sensitive to other pollutants and environmental contaminants
Alcoa	Alcoa World Alumina Australia, a trading name of Alcoa of Australia Limited, ABN 93 004 879 298
AMWU	Australian Manufacturing Workers' Union
AWN	AWN (Air Water Noise) Consultants. AWN Pty Ltd, ABN 74 083 198 001
AWU	Australian Workers' Union
BEI	Biological Exposure Index
Bellevue Fire Report	Western Australia, Legislative Assembly, Standing Committee on Economics and Industry, <i>Bellevue Hazardous Waste Fire Inquiry</i> , Volume 2, Report No. 2, June 27 2002
Buffer zone	An area of land specifically designed to separate one zoning use from another, such as separating a residential neighbourhood from an industrial area
Carew-Hopkins Review	D Carew-Hopkins, <i>Department of Environmental Protection, Water and Rivers Commission Management and Structure Review 2003</i> , March 2003
CCWA	Chemistry Centre of Western Australia
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTO	Catalytic thermal oxidiser
DAT	Digital audio tape
DEP	Department of Environmental Protection
DMPR	Department of Minerals and Petroleum Resources - formerly the Department of Minerals and Energy (DME)
DoE	Department of Environment. Since the Committee commenced its inquiry in November 2001 a process has commenced to combine the DEP and the Water and Rivers Commission and change the name to the Department of Environment (DoE). The Department of Environment is the name currently being used to describe the

combined entity in an informal way

DoH	Department of Health
DoIR	Department of Industry and Resources. Created by the merging of the Department of Minerals and Petroleum Resources with the industry and trade functions of the Department of Industry and Technology (DoIT)
DoIT	Department of Industry and Technology
Drew Report	R Drew, “ <i>An Assessment of Liquor Burning Odour Emissions at Wagerup</i> ”, draft dated November 25 1997
ECU	Edith Cowan University
EP Act	<i>Environmental Protection Act 1986</i>
ESP	Electrostatic Precipitator
EPA	Environmental Protection Authority
EP Regulations	<i>Environmental Protection Regulations 1987</i>
Health Hazard Index	The ‘hazard index’ is the term employed by the United States Environmental Protection Authority to describe an additive methodology where the cumulative impact of individual chemicals are considered as the sum total risk when the different chemicals involved react in similar ways on the human body. It is usually applied to derive the likelihood of respiratory problems or cancer
Healthwise Cancer and Mortality Report	Monash University and the University of Western Australia, <i>Healthwise Cancer and Mortality Study</i> , First Report, August 2002
Healthwise Respiratory and Pleural Cancer Cases Review	Monash University and the University of Western Australia, <i>Healthwise Review of Incident Respiratory and Pleural Cancer Cases</i> , December 2002
ICD	International Statistical Classification of Diseases and Related Health Problems
Kinhill Report	<i>Wagerup/Yarloop Local Air Quality Assessment, Volume One and Two</i> (Volume One - November 1997 and Volume Two - February 1998) prepared for Alcoa by Kinhill Pty Ltd, ACN 007 660 317
LBF	Liquor burner facility

MCS	Multiple Chemical Sensitivities
Ministerial Council	Ministerial Council on Environment, Health and Industry Sustainability
MSI Act	<i>Mines Safety and Inspection Act 1994</i>
MSI Regulations	<i>Mines Safety and Inspection Regulations 1995</i>
mtpa	million tonnes per annum
Musk and de Klerk Report	<i>“Health Effects from Liquor Burning Unit Emissions in an Alumina Refinery”</i> , April 26 2000
NATA	National Association of Testing Authorities
Noise Regulation 17 application	Application to vary assigned noise levels under Regulation 17 of the <i>Environmental Protection (Noise) Regulations 1997</i>
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997</i>
October 2004 DoE Material	Letter from the Minister for the Environment attaching a 21 page submission and over 600 pages of documents from the Department of Environment
OSH Act	<i>Occupational Safety and Health Act 1984</i>
PAN	Pollution Abatement Notice
PM ₁₀ and PM _{2.5}	Dust particles with a measurement of less than 10 microns and less than 2.5 microns respectively
RDA	Residue disposal area
Robinson Review	Dr Brian Robinson, <i>Review of the Enforcement and Prosecution Guidelines of the Department of Environmental Protection of Western Australia</i> , February 2003
SVOC	Semi volatile organic compound
SVT	SVT Engineering Consultants
TLV	Threshold limit value. TLVs are guidelines (not standards) prepared by the American Conference of Governmental Industrial Hygienists to assist industrial hygienists in making decisions regarding safe levels of exposure to various hazards found in the workplace. A TLV reflects

the level of exposure that the typical worker can experience without an unreasonable risk of disease or injury. TLVs are not quantitative estimates of risk at different exposure levels or by different routes of exposure. <http://www.ilpi.com/msds/ref/tlv.html> (accessed September 18 2003)

Triennial Review	<i>Alcoa's Wagerup Refinery and Bauxite Residue Operations Triennial Environmental Review 2000-2002</i> dated March 2003
TWL	Time weighted limit. For example, say that the eight hour TWL for benzene was 16 milligrams per cubic metre. That amount is the maximum concentration of benzene that a worker should be exposed to over a period of eight hours; that is, the TWL. The time weighted aspect refers to giving more weighting to the longer sample periods used to provide the time weighted average (TWA) exposure for a particular period of time. For example, three measurements may have been taken of the concentration of benzene in the air at a work place over an eight hour period. One measurement was over a thirty minute period, another over one hour and a third over two hours. When calculating the average concentration a formula is used that weights the average towards the concentrations measured over the longer periods of time
VOC	Volatile organic compound
WA	Western Australia
Wagerup Health Survey	<i>Report on Wagerup Health Survey</i>
WCHAG	Alcoa-Wagerup Community Health Awareness Group
WCHAG Working Group	Alcoa-Wagerup Community Health Awareness Group Working Group
WCHAG Working Group Interim Report	WCHAG Working Group Interim Report published in August 2001
WCR Act	<i>Workers Compensation and Rehabilitation Act 1981</i>
Welker Review	Welker Environmental Consultancy, <i>Western Australian Licence Conditions Independent Strategic Report - Final Report</i> , February 2003. Prepared for the Department of Environmental Protection, Perth Western Australia
WHO	World Health Organisation
WMPF	Wagerup Medical Practitioners' Forum

WMPF Recommendation	Wagerup Medical Practitioners' Forum Recommendation
WorkCover WA	WorkCover Western Australia
WorkSafe	WorkSafe Western Australian Commission
WRC	Water and Rivers Commission
YCC	Yarloop Community Clinic
YDCRC	Yarloop and Districts Concerned Residents Committee
YEAP Project	Yarloop, Edith Cowan University, Alcoa Project

Time Line

1978

- The Environmental Protection Authority approved Alcoa's proposal for the construction of an alumina refinery at Wagerup, subject to certain conditions.

1984

- Alcoa's Wagerup alumina refinery was commissioned. Annual production commenced at 470 000 metric tonnes.

1987

- The *Environmental Protection Act 1986* was proclaimed and commenced operation on February 20 1987. It replaced the earlier *Environmental Protection Act 1971*.

1988

- The first liquor burner facility in Western Australia was installed at Alcoa's Kwinana refinery.

1989

- The Environmental Protection Authority approved Alcoa's proposal to raise the production of alumina at the Wagerup refinery from 840 000 tonnes to 1.5 million tonnes annually.

1993

- Annual production of alumina increased from 0.94 million tonnes to 1.53 million tonnes.

1994

- The Healthwise Project began.

1995

- Monitoring of noise levels at fixed locations in the community south of the Alcoa refinery at Wagerup commenced.
- The Environmental Protection Authority approved an expansion of alumina production at Alcoa's Wagerup refinery to 3.3 million tonnes per annum.

1996

- The liquor burner facility was commissioned in October to reduce total organic carbon in the caustic liquor stream.

1997

- Draft Report: Dr Roger Drew: *An Assessment of Liquor Burning Odour Emissions at Wagerup*, commissioned by Alcoa.

May

- Department of Minerals and Petroleum Resources stated that it was advised of employee concerns in relation to issues at Wagerup.

November

- The liquor burner facility was shut down while Alcoa found and installed appropriate emissions control equipment.

1998

January

- The *Environmental Protection (Noise) Regulations 1997* came into effect on January 31 1998.

May

- A catalytic thermal oxidiser was installed on the liquor burner facility to reduce emissions and the liquor burner facility was recommissioned.
- The Alcoa-Wagerup Community Health Awareness Group Working Group was established.

1999

February

- The Department of Environmental Protection stated that it became aware of the community's concerns regarding the health effects of emissions from the Wagerup refinery.

June

- The Alcoa-Wagerup Community Health Awareness Group Working Group complaints sheet system was established.

September

- The former Legislative Council Standing Committee on Public Administration tabled its Twelfth Report titled *The Administration of Environmental Complaints Relating to Public Health: A Case Study*.

2000

- Alcoa developed and implemented a new noise reduction program.
- The oxalate kiln was closed down and oxalate waste was transported off site.

April

- Report published: AW Musk and NH de Klerk, *Health Effects from Liquor Burning Unit Emissions in an Alumina Refinery*.

2001

- A Community Development Fund was established by Alcoa.

April

- The *Report on Wagerup Health Survey* was published: Survey Research Centre, Department of Public Health, The University of Western Australia.

June

- Alcoa applied to increase its annual alumina production at Wagerup from 2.2 million tonnes to 2.35 million tonnes, for the licence year ending September 30 2001. The DEP later granted the increase in production. The community lodged appeals against the September 30 2001 to October 1 2002 licence including the amendment to increase annual alumina production.

July

- Alcoa submitted an initial application with the Minister for the Environment for approval to vary its assigned noise level under the *Environmental Protection (Noise) Regulations 1997*.

August

- The Yarloop and Districts Concerned Residents' Committee was elected.
- An Interim Report was published by the WCHAG Working Group.
- The Wagerup Medical Practitioners' Forum was convened on September 19 in Perth and on October 23 in Mandurah.

October

- Alcoa released its Wagerup Land Management Draft Proposal.

November

- The Standing Committee on Environment and Public Affairs resolved to inquire into the issues surrounding the Alcoa refinery at Wagerup on November 8 2001.
- A dehumidifier was installed on the liquor burner facility to further reduce volatile organic compound emissions.
- A Digital Audio Tape recording facility at the noise logging stations commenced operation at the Wagerup refinery late in 2001.

2002

January

- Alcoa commenced sampling as part of a detailed emissions inventory for the Wagerup refinery.
- Alcoa released its Wagerup Land Management Revised Proposal.

February

- The recommendations of the Wagerup Medical Practitioners' Forum were published.
- The Ministerial Council on Environment, Health and Industry Sustainability was established.
- Visit by Dr M Cullen, Alcoa World Alumina's Chief Medical Officer, to Perth and subsequent release of Dr Cullen's report: *Wagerup Alumina Refinery. Health Issues. Visit to Alcoa World Alumina Australia, West Australian Operations*, February 2002.
- Alcoa revised its application for approval to vary its assigned noise level under the *Environmental Protection (Noise) Regulations 1997* and re-submitted it to the Minister for the Environment.
- The community's appeals against Alcoa's October 1 2001 to September 30 2002 licence were upheld by the Minister for the Environment. Alcoa was required to undertake significant emissions reductions programs by June 2002 or reduce its annual production from 2.35 to 2.2 million tonnes. The emission controls included the fitting of a dehumidifier to the liquor burner facility by December 2001. Additional emissions monitoring, reporting and independent auditing requirements were also included in Alcoa's 2001/2002 licence.

March

- The composition of the WCHAG Working Group changed to include the Yarloop and Districts Concerned Residents Committee and the Buffer Response Coordinating Committee. It also changed its name to the Wagerup Community Working Group and changed its terms of reference.
- AWN (Air Water Noise) Consultants were appointed to conduct an independent audit of the Wagerup refinery's emissions monitoring and reduction programs.
- Digestion, evaporation, causticisation and clarification emissions diverted to the powerhouse boilers for destruction.

May

- SVT Engineering Consultants commenced a review of environmental noise emissions from Alcoa's Wagerup refinery.

June

- The concept paper on the Environmental Health Foundation was agreed to by the Ministerial Council on June 24.
- Alcoa's tall stack project was completed. The height of the LBF and Calcliner stacks were increased from 60 meters and approximately 49 meters respectively to 100 meters.

August

- The First Report of the Healthwise Cancer and Mortality Study was published. This study is part of the Healthwise Project which began in 1994 and is being conducted by medical researchers at Monash University in Melbourne and the University of Western Australia. It was commissioned by Alcoa. The Healthwise Cancer and Mortality Study addresses the question of whether or not work in the aluminium industry is associated with increases in risk of death or risk of developing cancer.

September

- The Government Response to the Recommendations of the Wagerup Medical Practitioners' Forum was released.
- Alcoa completed the *Wagerup Refinery Air Emissions Inventory, Final Report*. The inventory identified all emission sources and detailed the types of emissions produced by each source.
- The DEP issued a new licence to Alcoa Wagerup on September 27 2002 (effective October 1 2002).
- The DEP reviewed and restructured Alcoa's September 30 2002 to October 2003 licence with the main aim of putting limits on all major emissions sources and chemicals likely to contribute to health impacts. This included a requirement for continuous monitoring of key organic parameters from all significant sources. This licence did not permit the operation of the oxalate kiln.

October

- Yarloop Community Clinic established.

December

- The *Healthwise Respiratory and Pleural Cancer Cases Review* was published.

2003

- SVT Engineering Consultant's review titled *Review of Environmental Noise Emissions from Alcoa Wagerup Refinery for Department of Environmental Protection*, February 2003 was released.

March

- Alcoa's *Wagerup Refinery and Bauxite Residue Operations Triennial Environmental Review 2000-2002* was published.

April

- AWN (Air Water Noise) Consultants presented the *Environmental Audit Alcoa World Alumina Australia Wagerup Refinery, April 2002 - May 2003*, final report.

June

- The Yarloop Sustainability Project was implemented.
- Edith Cowan University began working with Alcoa with a broad brief to enable constructive relationships with local leaders and Alcoa, with a view to finding workable strategies to shared issues. This resulted in a report by Dr Dyann Ross, Edith Cowan University, *Reviewing the Land Management Issues: Some Common Ground at a Point in the Process - A Report on the Collaboration between Alcoa, Wagerup and Yarloop/Hamel*.

August

- The Health Department initiated tender specifications for carriage of the Environmental Health Foundation.
- The Wagerup Community Working Group again amended its terms of reference.

September

- Alcoa's September 30 2003 to October 1 2004 licence retained most of the conditions set in previous licences including the annual alumina production ceiling of 2.35 million tonnes, emissions limits, continuous monitoring of some emissions, increased reporting requirements and no permission to operate the oxalate kiln. In addition recommendations from the independent auditor's report on the Wagerup refinery were also included.
- As a result of collaborative meetings between ECU, local leaders and Alcoa, Alcoa considered key recommendations negotiated between the parties. At a specially convened meeting in September 2003, Alcoa informed the community members that although it agreed to all the other recommendations, it was unwilling to uphold the underwriting option for people in Area B, being an area defined in Alcoa's Land Management Strategy.

Ongoing

- The DEP (now DoE) is developing a tripartite consultation process involving the State Government, local community and Alcoa.

MAP SHOWING LOCATION OF ALCOA REFINERY AT WAGERUP



REFERENCE NOTE

The Committee alerts readers to the way it has referred to the Department of Environmental Protection (**DEP**) and the Department of Minerals and Petroleum Resources (**DMPR**) throughout this report.

Department of Environmental Protection

Since the Committee commenced its inquiry in November 2001 a process has commenced to combine the DEP and the Water and Rivers Commission and change the name to the Department of Environment (**DoE**). The Department of Environment is the name currently being used to describe the combined entity in an informal way.

The Committee has used the names DEP and DoE interchangeably throughout this report in the context where they are most applicable.

Department of Mineral and Petroleum Resources

The Committee alerts readers that the DMPR has merged with the industry and trade functions of the Department of Industry and Technology to become the Department of Industry and Resources (**DoIR**).

The Committee has used the names DMPR and DoIR interchangeably throughout this report in the context where they are most applicable.

EXECUTIVE SUMMARY AND RECOMMENDATIONS

EXECUTIVE SUMMARY

- 1 Many industrial facilities and chemical processes have been introduced with great economic benefit to the State of Western Australia, providing employment and economic returns to companies, government and in turn the community of Western Australia.
- 2 In recent years the social and environmental costs and benefits of these projects have been widely debated in local communities, the wider community, Parliament and the media.
- 3 There has been growing community concern in various locations throughout WA about potential health impacts to workers and local communities of a wide range of industrial emissions and waste management processes. In particular concerns have emerged from employees of, and the communities around, Alcoa's refinery at Wagerup, with people experiencing negative health and social impacts.
- 4 In November 2001 Hon Jim Scott MLC noted those concerns had been brought to his attention. Significant health and environmental impacts were being reported in and around Alcoa's Wagerup refinery, despite the recorded levels of individual chemicals not exceeding permissible levels.
- 5 The Committee resolved on November 8 2001 to commence an inquiry into the Alcoa refinery at Wagerup. Terms of reference specific to the issues at Wagerup ensured the scope of the inquiry remained focused.
- 6 The Committee's inquiry considered several key issues:
 - the operations and impacts of Alcoa's Wagerup refinery;
 - the adequacy of responses from government departments and agencies to the problems at Wagerup;
 - Alcoa's recognition of, and responses to, the issues relating to the refinery;
 - as to whether those issues have now been resolved;
 - lessons to be learned from the Wagerup experience;
 - issues for the consideration of the Western Australian government; and
 - the future for Alcoa's Wagerup refinery.

- 7 Since the commencement of the inquiry in 2001 the Committee received 71 written submissions and conducted more than 20 hearings. The Committee would like to thank the many individuals, government agencies, departments, and companies that provided information to the Committee during the course of its inquiry. The Committee requested a large volume of information during the course of this complex and technical inquiry from a number of stakeholders, and it wishes to acknowledge the assistance provided to it in this respect. In particular, the Committee expresses its thanks to Alcoa for its co-operation and assistance in providing a large volume of complex information.
- 8 The issues surrounding the Alcoa refinery at Wagerup are highly complex, emotive and divisive. During the inquiry the Committee heard evidence from many people who shared their very personal experiences. The Committee greatly appreciated this.
- 9 Due to the emotive nature of some matters raised during the inquiry, a number of witnesses made statements and provided submissions of their opinion regarding certain matters that contradicted other evidence received. The Committee has included these contradictory statements to illustrate the complexity of the issues raised. Where appropriate, counter-balancing responses to these statements have been obtained from relevant parties.
- 10 The Committee's role is not to adjudicate as a court of law on the issues raised during this inquiry. The Committee's approach in this report has been to focus on the response by Alcoa and government departments and agencies to the issues raised. The Committee has examined the evidence and made recommendations to help prevent similar problems occurring in the future in Western Australia.
- 11 The role of a parliamentary committee is to inquire on behalf of, and report to, the Parliament (in this case the Legislative Council) with recommendations for consideration by the Legislative Council and Government. Accordingly, as Alcoa is a private non-government entity, the Committee has not directed recommendations to Alcoa. The Committee has, however, made various findings relevant to that company's activities.
- 12 In making its findings and recommendations, the Committee has been mindful of the considerable benefits provided by Alcoa's Wagerup refinery to the State and its people, as well as the potential risks to workers and residents in nearby communities through unintended consequences. The Committee notes that, despite the weight of concerns expressed to the Committee by many witnesses, the cause or causes of the health impacts has not been scientifically identified. This does not in any way, however, undermine the recognition and significance of the very real impacts experienced by many people.

- 13 One of the most significant findings of the Committee's inquiry is with regard to Alcoa's efforts to establish an informal buffer zone around the refinery. The Committee, whilst recognising Alcoa's good intentions, has found that Alcoa's current land management strategy is inequitable. The Committee encourages Alcoa to consider other options as outlined in Chapter 7 to resolve this issue in a manner which is perceived to be fairer to all involved.
- 14 Other important findings and observations can be found at:
- Chapter 2 (Background to Alcoa, The Alumina Process and the Issues Associated with the Wagerup refinery), paragraphs 2.104 to 2.108;
 - Chapter 3 (Community Complaints), paragraphs 3.61 to 3.67;
 - Chapter 4 (Public Health), paragraphs 4.410 to 4.439;
 - Chapter 5 (Occupational Health and Safety and Compensation and Rehabilitation), paragraphs 5.92 to 5.101;
 - Chapter 6 (Environmental Impacts), paragraphs 6.248 to 6.266;
 - Chapter 7 (Loss of Amenity), paragraphs 7.213 to 7.224;
 - Chapter 8 (Social Impacts), paragraphs 8.191 to 8.201;
 - Chapter 9 (Adequacy of Regulatory Mechanisms), paragraphs 9.222 to 9.252; and
 - Chapter 10 (The Past, Present and Future for Alcoa's Wagerup refinery).
- 15 The Committee emphasises that this report is an assessment of the matters relating to the Alcoa refinery at Wagerup until approximately July 2004. On October 5 2004, one week before the Committee was scheduled to finalise its report, a letter from the Minister for the Environment attaching a 21 page submission and over 600 pages of documents from the Department of Environment was delivered to the offices of the Committee in response to matters raised by the Committee in March 2004 and again in May 2004. The Committee considered that it was highly desirable that its report not be delayed by virtue of this late material and was concerned that its report be finalised and tabled to ensure that the matters covered would be publicly reported without further delay. Accordingly the Committee accepted the material and has endeavoured to note within the report where the material may have relevance. This matter is discussed further at paragraphs 1.19 to 1.20 of this report.

RECOMMENDATIONS

16 Recommendations are grouped as they appear in the text at the page number indicated:

Page 31

Recommendation 1: The Committee recommends that Government agencies and regulatory authorities should use the term ‘emissions’ rather than ‘odours’ to describe general emissions from the refining process.

Page 46

Recommendation 2: The Committee recommends that the Department of Environment establish a more readily accessible and transparent complaint handling system which includes formal acknowledgment when a complaint is registered.

Page 135

Recommendation 3: The Committee recommends that the Department of Health, as a matter of priority, establish a discrete, organised public health response to the situation at Wagerup. This should comprise, in part:

- **a long-term health surveillance program, backdated to 1996, and include current and former employees at the Alcoa refinery at Wagerup, current and former contractors at the Alcoa refinery at Wagerup and current and former members of the local communities of Yarloop, Hamel and Cookernup;**
- **a health audit of the total population of Yarloop. This health audit should be repeated in five years time; and**
- **counselling and referral to appropriate health services being made available.**

Page 136

Recommendation 4: The Committee recommends that the Government review its decision to close the Yarloop Community Clinic.

Page 136

Recommendation 5: The Committee recommends that the Government give immediate priority to the establishment and long-term funding of an Environmental Health Foundation, to be independent from Government but required to report to the Minister for the Environment and the Minister for Health.

Page 136

Recommendation 6: The Committee recommends that the Government should cause all reports received from the Environmental Health Foundation to be tabled before each House of Parliament.

Page 136

Recommendation 7: The Committee recommends that the membership of the Environmental Health Foundation include community representation.

Page 136

Recommendation 8: The Committee recommends that that the Environmental Health Foundation report to Government on, among other things:

- diagnostic tools available for cases of multiple chemical sensitivities; for example, the use of chromosome testing;
- treatment options for managing the condition of people who have multiple chemical sensitivities;
- methodologies for the carriage of health surveillance programs;
- methodologies for the carriage of health impact assessments; and
- reviewing the current exposure standards for arsenic and bringing them in line with international standards.

Page 137

Recommendation 9: The Committee recommends that the Government facilitate the development of the study of environmental health in Western Australia, particularly in the area of environmental toxicology to ensure the availability of fully qualified, experienced and independent toxicologists.

Page 137

Recommendation 10: The Committee recommends that the Department of Health should ensure access to appropriate medical expertise and diagnostic health and support services for people with multiple chemical sensitivities and other chemical injuries.

Page 164

Recommendation 11: The Committee recommends that the Government consider amending the *Workers Compensation and Rehabilitation Act 1981* in relation to the recognition of cover for those people who may have symptoms of multiple chemical sensitivities and in so doing to seek advice from the proposed Environmental Health Foundation and other relevant stakeholders.

Page 225

Recommendation 12: The Committee recommends that the proposed CSIRO Wagerup Air Quality Research Program be undertaken as a priority.

Page 225

Recommendation 13: The Committee recommends that the Department of Environment work with Alcoa to take immediate action to remediate contaminated ground water at Alcoa's refinery at Wagerup.

Page 225

Recommendation 14: The Committee recommends that the Department of Environment investigate methods of extraction of water from the Harvey River to ensure that water being extracted by Alcoa occurs only during periods of peak nutrient levels.

Page 225

Recommendation 15: The Committee recommends that at the planning stage for new industries and for the expansion of existing facilities in Western Australia, the Department of Environment should require emissions dispersion modelling to use site specific data rather than generic meteorological data unless a specific exemption is warranted.

Page 225

Recommendation 16: The Committee recommends that the Department of Environment should assess licensed industrial premises in Western Australia to determine the appropriateness, in each case, of requiring continuous emissions monitoring.

Page 225

Recommendation 17: The Committee recommends that the Department of Environment, as a matter of priority, cause an effective dust suppression program to be implemented at the residue disposal areas at the Alcoa refinery at Wagerup.

Page 308

Recommendation 18: The Committee recommends that the State Government take critical note of current breaches of the existing noise limits for Alcoa's Wagerup refinery in its consideration of the proposal to increase production from the refinery.

Page 365

Recommendation 19: The Committee recommends that significant increased funding be provided by the State Government to the Department of Environment in line with funding in other States to enable it to adequately carry out its regulatory role.

Page 365

Recommendation 20: The Committee recommends that the Government, as a matter of priority, develop and finalise air emission guidelines specific to Western Australia and that these should include volatile organic compounds (VOCs) and standards for multiple chemical exposure.

Page 365

Recommendation 21: The Committee recommends that the Department of Environment requires Alcoa, as a licence condition, to inform the Department of Industry and Resources as well as the Department of Environment, when emission events occur.

Page 365

Recommendation 22: The Committee recommends that the Department of Health, as a matter of priority, derive a hazard index for locations near to Wagerup in order to assess the health risks caused by the cumulative impact of the very high number of chemicals mixed together in the emissions from Alcoa's refinery at Wagerup.

Page 366

Recommendation 23: The Committee recommends that the regulatory regimes and practices relating to the:

- Department of Industry and Resources;
- Department of Environment; and
- Department of Health,

be reviewed to ensure that action is taken when worker or public health is harmed, or is likely to be harmed, by emissions from industrial facilities and that the exercise of such powers not be dependent on whether or not regulations, guidelines or licence conditions are being breached.

Page 366

Recommendation 24: The Committee recommends that the regular recording and auditing of workplace accidents and emission incidents be made a part of the safety and health regime of the Department of Industry and Resources. This information should be used for early identification of safety and health problems and for identifying whether existing safety and emission regulations are effective. The information should be publicly available.

Page 366

Recommendation 25: The Committee recommends that the Department of Industry and Resources be adequately funded to undertake the responsibilities referred to in Recommendation 24.

Page 366

Recommendation 26: The Committee recommends that the Government carry out a review of legislation and administrative procedures governing the engagement of consultants by government agencies to reduce the potential for conflict of interest.

Page 366

Recommendation 27: The majority of the Committee recommends that the Government review and report on the role of the Department of Industry and Resources as both regulator of mine safety and facilitator of mine developments with a view to determining whether such roles might be better addressed in separated agencies. The report of any review should be tabled in Parliament. Hons Bruce Donaldson and Robyn McSweeney MLCs dissented from this Recommendation.

Page 367

Recommendation 28: The majority of the Committee recommends that, in addition to the proposed amendments to the *Mines Safety and Inspection Act 1994* and the *Occupational Safety and Health Act 1984* (refer to paragraphs 9.214 to 9.221 of this report), the Government amend the legislative regime to require that all occupational safety and health matters in Western Australia come under one Act, namely the *Occupational Safety and Health Act 1984*. Hons Bruce Donaldson and Robyn McSweeney MLCs dissented from this Recommendation.

Page 367

Recommendation 29: The Committee recommends that the Government review legislation and make necessary amendments to ensure that the Department of Health has a formal role in advising the Environmental Protection Authority in relation to the assessment of projects that may impact on public health.

CHAPTER 1

INTRODUCTION

BACKGROUND TO THE INQUIRY AND TERMS OF REFERENCE

- 1.1 In November 2001 Hon Jim Scott MLC noted that a number of concerns about the Alcoa refinery at Wagerup had been brought to his attention by members of the public living in the vicinity of the refinery. The concerns were that significant health and environmental impacts were being reported in and around the Alcoa refinery at Wagerup, despite the recorded ambient levels of individual chemicals not exceeding permissible levels.
- 1.2 Hon Jim Scott raised these issues at a Committee meeting under paragraph 3.3(a) of the Committee's terms of reference.
- 1.3 On November 8 2001 the Committee resolved to inquire into the Alcoa refinery at Wagerup. The terms of reference for the inquiry are:

To investigate concerns regarding the Alcoa refinery at Wagerup with specific regard to:

- 1. environmental impacts;*
- 2. occupational health and safety;*
- 3. public health;*
- 4. loss of amenity;*
- 5. social impacts; and*
- 6. the adequacy of regulatory mechanisms covering these issues.*

COMPLAINTS FROM ALCOA EMPLOYEES AND MEMBERS OF THE COMMUNITIES IN THE VICINITY OF ALCOA'S WAGERUP REFINERY

- 1.4 Hon Jim Scott advised the Committee that the main concerns of Alcoa employees and members of the communities in the vicinity of Alcoa's Wagerup refinery related to:
- adverse health effects;
 - excessive noise;
 - unpleasant odour; and

- Alcoa's Wagerup land management strategy.
- 1.5 Hon Jim Scott also noted that a number of people had expressed their concern to him about the methods by which worker and community complaints were recorded and acted upon.
- 1.6 Discussion is provided in this report on the evidence the Committee received in relation to these concerns, together with responses from Alcoa and the relevant Government departments and agencies. The Committee has also provided comment on the number of complaints over time, the reasons for the complaints, complainants and the methods by which complaints were recorded and responded to.
- 1.7 Much evidence provided to the Committee referred to 'emissions', 'odours' or 'odours and emissions' when describing the substances emitted from Alcoa's Wagerup refinery. The Committee has used the term emissions as much as possible throughout this report to describe all the substances coming from the refinery; for example, dust and particulates, vapours, gases, condensates, liquids and odours.

INQUIRY PROCEDURE

- 1.8 Having resolved to inquire into the Alcoa refinery at Wagerup, the Committee also resolved on November 8 2001 to conduct a site visit of the refinery and to hold a public hearing.
- 1.9 On November 21 2001 Committee members and staff met with representatives from Alcoa who conducted them on a site visit of the refinery.
- 1.10 After the site visit the Committee conducted a hearing at the Waroona Shire Offices. It held a series of further hearings in Perth between November 28 2001 and September 8 2003. A list of witnesses who appeared before the Committee is set out in Appendix 1 of this report.
- 1.11 Details of the inquiry were also placed on the parliamentary website at: www.parliament.wa.gov.au.
- 1.12 A list of the submissions received is set out in Appendix 2 of this report.
- 1.13 The Committee would like to thank the many individuals, government agencies and departments and companies that provided information to the Committee during the course of its inquiry. The Committee requested a large volume of information during the course of this complex and technical inquiry from a number of stakeholders, and it wishes to acknowledge the assistance provided to it in this respect. In particular, the Committee expresses its thanks to Alcoa for its co-operation and assistance in providing a large volume of complex information.

- 1.14 The Committee heard evidence from many people during this inquiry who shared their very personal experiences. The Committee greatly appreciated this.

COMMITTEE COMMENT

- 1.15 The Committee's role is not to adjudicate as a court of law on the issues raised during this inquiry.
- 1.16 The Committee's approach in this report has been to focus on the response by Alcoa and Government departments and agencies to the issues raised. It has also provided comment on the situation at Wagerup as at the time of tabling this report. The Committee has examined the evidence with a view to making recommendations to help prevent similar problems occurring in the future in WA.
- 1.17 The Committee considers that its inquiry has increased public awareness of the issues concerning the Alcoa refinery at Wagerup and notes that many initiatives, which are discussed in this report, were commenced during the inquiry.
- 1.18 A communications flow chart in relation to the Alcoa Wagerup issue provided to the Committee by the DEP (now DoE) is attached as Appendix 3 of this report.
- 1.19 The Committee emphasises that this report is an assessment of the matters relating to the Alcoa refinery at Wagerup until approximately July 2004. On October 5 2004, one week before the Committee was scheduled to finalise its report, a letter from the Minister for the Environment attaching a 21 page submission and over 600 pages of documents from the Department of Environment was delivered to the offices of the Committee (**October 2004 DoE Material**). The October 2004 DoE Material is said to relate to information that the Committee had been seeking since March and May 2004 and which had not been provided, as well as providing additional information. The Committee is disappointed that the material was provided at such a late stage in the Committee's inquiry.
- 1.20 Throughout its inquiry the Committee has emphasised the need to ensure that relevant information is readily and publicly available. Accordingly rather than refuse to accept the late material the Committee formally received the material as public on October 12 2004.¹ As the Committee was finalising its inquiries on that day it was not in a position to examine, in detail, the effect (if any) that the October 2004 DoE Material may have on the report. The Committee considered that it was highly desirable that its report not be delayed by virtue of this late material and was concerned that its report be finalised and tabled to ensure that the matters covered would be publicly reported without further delay. Accordingly the Committee has endeavoured to note within the report where the October 2004 DoE Material may have relevance. The

¹ Some of the attachments have been received by the Committee as private.

Committee notes that the material includes a summary of the 2004/2005 licence (issued on August 12 2004 for one year) for the Alcoa refinery at Wagerup and a summary of the new licence conditions. A copy of the 21 page submission and a list of the accompanying appendices is attached as Appendix 16 of this report.

CHAPTER 2

BACKGROUND TO ALCOA, THE ALUMINA PROCESS AND THE ISSUES ASSOCIATED WITH THE WAGERUP REFINERY

OVERVIEW OF CHAPTER

2.1 In this chapter the Committee has provided background information on the following:

- Alcoa's worldwide, Australian and Western Australian operations;
- the legal basis of Alcoa's operations at Wagerup;
- the government departments responsible for overseeing health, safety and environmental management with regard to the Wagerup refinery;
- a step by step description of the alumina production process and the emissions emitted at each stage of the process;
- why a liquor burner facility (**LBF**) is required as part of the alumina production process and Alcoa's experience with its LBF at Kwinana;
- the major impacts of liquor burning and other factors at the Wagerup refinery; and
- a chronology of the major items of Alcoa's emissions reduction program at Wagerup.

ALCOA'S WORLD WIDE OPERATIONS

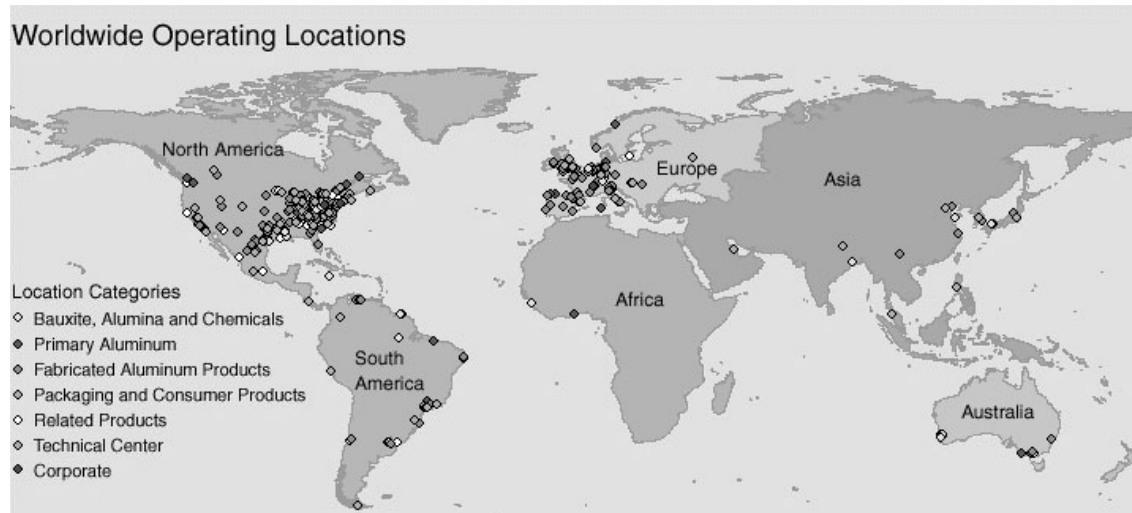
2.2 The 2002 Alcoa Annual Report provides the following information on Alcoa's world wide operations (all amounts are in United States of America millions of dollars). Alcoa had:

- revenue of \$20 263;
- assets totalling \$29 810; and
- 127 000 employees in more than 350 locations in 41 countries.

- 2.3 Alcoa is the world's leading producer of primary aluminium, fabricated aluminium, and alumina. Worldwide, it has nine refineries and 28 smelters.²

Figure 2.1

Alcoa's worldwide operating locations (courtesy of Alcoa)



Alcoa's Values

- 2.4 Alcoa states on its website that its values include integrity, environment, health and safety, the customer, excellence, people, profitability and accountability.³

ALCOA'S AUSTRALIAN OPERATIONS

History

- 2.5 A brief history of Alcoa's Australian operations is set out below. Much of this information was obtained from Alcoa's website at www.alcoa.com.⁴
- 2.6 In 1957 Western Mining Corporation Limited began exploring for bauxite in the Darling Range east of Perth, Western Australia, to confirm and map what appeared to be extensive reserves. Within a year the deposits had been delineated and encouraging results prompted Western Mining Corporation Limited to invite two other Australian mining companies, Broken Hill South Ltd and North Broken Hill Ltd, to join the venture. A new company, Western Aluminium N.L. was formed to develop an integrated aluminium industry.

² Information obtained from Alcoa's website: <http://www.alcoa.com/australia/en/home.asp> (accessed October 2003).

³ Ibid.

⁴ Accessed January 14 2004.

- 2.7 An undertaking of this size needed a very large capital input and a background in technology that was not at that time available in Australia. The Aluminium Company of America (now Alcoa Incorporated) was approached, with the Australian companies offering a partnership in exchange for the necessary capital and technological support. Alcoa of Australia was formed in June 1961 as a result of these negotiations, and was granted a 12 619 square kilometre bauxite mining lease by the Western Australian Government.
- 2.8 Alcoa of Australia Limited is now the world's leading producer of alumina from its three refineries in Western Australia and it is a major world producer of aluminium from its two smelters in Victoria. Alumina is exported worldwide from shipping terminals at Kwinana and Bunbury.
- 2.9 Alcoa employs approximately 1 500 people in Victoria and 3 700 in Western Australia. Alcoa's Wagerup alumina refinery workforce numbers 646 and at any given time approximately 275 contractors.⁵ Apart from refining and smelting, Alcoa operates bauxite mines at Huntly and Willowdale in the Darling Range south of Perth, which supply the three refineries with alumina.

Economics

- 2.10 Alcoa's Annual Report for 2003 states that its revenue in Australia for 2003 was US\$1 615 million.⁶
- 2.11 Three of Alcoa's refineries are in Western Australia; at Kwinana, Pinjarra and Wagerup with a combined capacity in 2003 of 7.3 million metric tonnes a year, equivalent to some 15 percent of world production.⁷
- 2.12 Alcoa sells alumina and aluminium in Australia and overseas. It also purchases goods and materials and pays interest and dividends in Australia and overseas. Alcoa's exports have contributed more than \$14 billion to net national income over the past decade, and the net contribution to Australia's balance of payments has averaged \$4 million every day of the year for those ten years.⁸
- 2.13 With the multiplier effect on employment in service jobs, the bauxite-alumina-aluminium industry has a high impact on employment in Australia's regional centres - the South West of Western Australia, Geelong, and the western districts of Victoria. It

⁵ Submission No. 16 from Mr Marc Bell, Manager Workers' Compensation and Employee Benefits, Alcoa, February 18 2002, p3.

⁶ Alcoa Annual Report 2003, obtained from Alcoa's website: <http://www.alcoa.com> (accessed June 1 2004).

⁷ Information obtained from Alcoa's website: <http://www.alcoa.com/australia/en/home.asp> (accessed October 2003).

⁸ Ibid.

is estimated by Alcoa that at least four Australians are employed indirectly as a result of each direct job in the industry.⁹

- 2.14 The alumina industry is very energy intensive. Currently the alumina industry in Western Australia has rights to the allocation of around fifty percent of the State's gas supply,¹⁰ this share of the resource being used increasingly to co-generate electricity for the public grid, as well as to power the Bayer process at the refineries. (For a discussion on the Bayer process refer to paragraph 2.24 and following of this report). In this way Alcoa is able to expand its production whilst reducing its tally of greenhouse gas emissions. However the alumina industry is very vulnerable in the longer term to public policy initiatives such as the Kyoto Treaty, which set energy conservation targets. For instance, the Allen Consulting Group reported to a Federal Parliamentary Inquiry that if Australia were to ratify the Kyoto Treaty this would cause the Australian aluminium industry to contract by 24 percent. It would be one of the worst affected industries in the country.¹¹

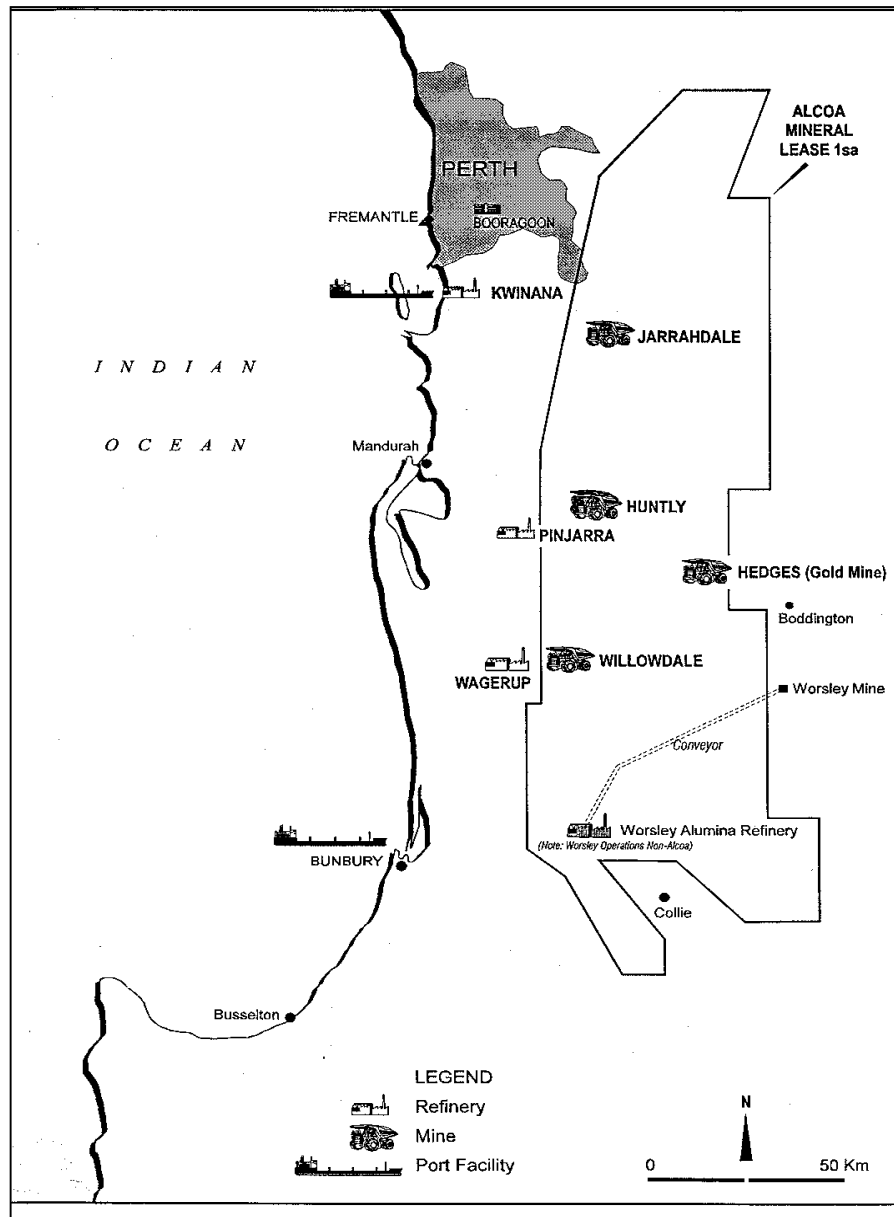
LOCATION OF ALCOA'S WAGERUP REFINERY

- 2.15 Alcoa's Wagerup alumina refinery and its associated residue storage facilities are located approximately 120 kilometres south of Perth in Western Australia, two kilometres from the northern boundary of the Yarloop townsite and 7.5 kilometres south of Waroona. Figure 2.2 shows the location of the refinery.

⁹ Ibid.

¹⁰ Conservation Council of Western Australia Inc. media release, *Alumina industry uses most of our gas while rest of industry and public suffer*, February 18 2004.

¹¹ The Parliament of the Commonwealth of Australia, Joint Standing Committee on Treaties, *Report 38: The Kyoto Protocol - Discussion Paper*, April 2001, p22.

Figure 2.2**Geographical Relationship between Wagerup and Perth, Bunbury, Pinjarra and Kwinana**

- 2.16 The refinery and residue area are on flat land approximately two kilometres west of the foot of the Darling Range, which rises to approximately 300 metres and from Wagerup and runs approximately 200 kilometres northwards and 150 kilometres southwards. The refinery is separated from the residue storage area by the South West Highway and the Perth-Bunbury railway line. Figure 2.3 shows the aerial view from

the west of the Wagerup refinery looking east to the Darling Range escarpment. The escarpment commences at the forested area in the background of the photograph.

Figure 2.3

Wagerup Refinery looking east to the Darling Escarpment



- 2.17 Bauxite is supplied to the refinery by overland conveyor from the Willowdale Mine located 15 kilometres to the east. Caustic soda used in the refining process is imported, and alumina powder produced at Wagerup is transported by rail and exported through the Alcoa shipping terminal at Bunbury.
- 2.18 The refinery and residue storage operation are contained within freehold land owned by Alcoa. Land uses on the non-industrial land and on adjacent properties are primarily agricultural - mainly cattle grazing on dry land or irrigated pasture.

LEGAL BASIS OF ALCOA'S OPERATIONS AT WAGERUP

State Agreement Acts

- 2.19 State Agreement Acts are non-compulsory binding agreements that can be negotiated between Government and a developer. The Agreements are ratified by Parliament and

set down the obligations of both parties throughout the life of a significant development project.

2.20 Alcoa's operations are subject to a number of State Agreement Acts.¹²

Alcoa's Licence under the *Environmental Protection Act 1986*

2.21 Alcoa operates its Wagerup refinery under licence issued by the DEP (now DoE) under the provisions of the *Environmental Protection Act 1986 (EP Act)*.¹³

AGENCIES RESPONSIBLE FOR OVERSEEING HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT

2.22 The Government agencies with direct responsibility for overseeing health, safety and environmental management at the Wagerup refinery are:¹⁴

- The Department of Environmental Protection (now called the Department of Environment (**DoE**)). The Committee has mainly referred to the Department as the DEP throughout this report. The (now) DoE is responsible for the administration of the EP Act, which is the principal environmental legislation governing the environment in Western Australia.
- The Department of Minerals and Petroleum Resources (**DMPR**). The DMPR has recently been merged with the industry and trade functions of the Department of Industry and Technology to form the Department of Industry and Resources (**DoIR**). The Committee has mainly referred to the department as the DMPR throughout this report. The (now) DoIR is responsible for the administration of the *Mines Safety and Inspection Act 1994 (MSI Act)*, which includes prevention of environmental hazards that will impact adversely on the health and safety of employees of a mine. The Wagerup refinery is defined as part of a mine.
- The Department of Health (**DoH**). The DoH is responsible for administering health legislation,¹⁵ which includes addressing public health concerns.

2.23 For information on Western Australian Government initiatives that have been implemented as a result of the issues at Wagerup, refer to Chapter 9 of this report.

¹² For further information refer to the DoIR website:
<http://www.doir.wa.gov.au/investment/5e68c9b8d33f4d79a47bdcc433f420eb.asp> (accessed January 28 2004).

¹³ As at January 2004, the licence number for Alcoa's Wagerup refinery is 6217/7; issued September 30 2003 and due to expire August 12 2004.

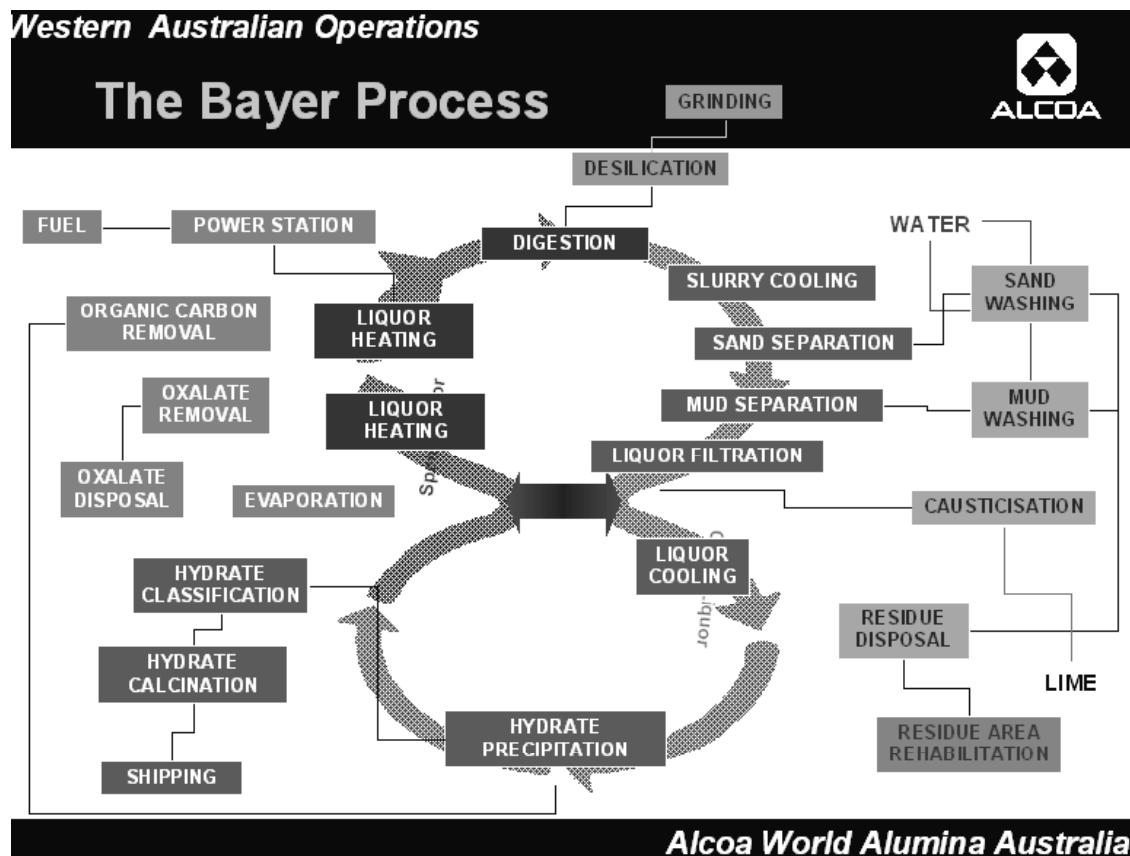
¹⁴ The relationship between these agencies is set out in the flow chart in Appendix 3 of this report.

THE PROCESS OF ALUMINA PRODUCTION AT ALCOA'S WAGERUP REFINERY

- 2.24 At its refinery at Wagerup, Alcoa produces smelter-grade alumina for refining into aluminium, which is used to make products such as cans, aeroplanes, building materials and marine vessels. The alumina extraction process is called the Bayer process after its inventor Karl Bayer, who also founded the Bayer Chemical Company. Figure 2.4 (provided courtesy of Alcoa) shows how the Bayer process operates.

Figure 2.4

The Bayer process



- 2.25 Alcoa's Wagerup refinery makes alumina (aluminium oxide) – a fine white powder that is obtained from bauxite. The bauxite ore is mined at Alcoa's Willowdale minesite in the Darling Range (approximately 13 kilometres east of Wagerup) and transported by conveyor to the refinery.
- 2.26 In order to assist the reader's understanding of the alumina production process that occurs at Alcoa's Wagerup refinery, the Committee has set out below a brief

¹⁵ This includes the *Health Act 1911* and numerous other Acts. (Refer to the Health Department Annual Report 2002 for a list of the Acts).

explanation of each stage of the process, together with a summary of the emissions produced.

- 2.27 The emissions are generally taken from the *Wagerup Air Emissions Inventory*. The Committee notes that the emission levels referred to in that document are generally the levels the refinery was emitting after the major emission reduction programs were completed in July 2002. These are lower than the emissions levels recorded when concerns about the refinery referred to in paragraph 1.1 began to increase.¹⁶

Bauxite mining

- 2.28 Bauxite is mined at the Willowdale mine site from isolated pockets (average size 20 hectares) using an open cut method of mining. Each site is cleared of vegetation, topsoil and caprock before the bauxite is removed by front-end loaders and large trucks which carry the ore to the primary crusher at the mine. The total area cleared by Alcoa for bauxite mining in Western Australia at the end of 2003 was 14 100 hectares.¹⁷
- 2.29 The primary crushed ore is then transported via conveyor to the Wagerup Refinery. When all the bauxite has been taken from the mine, it is rehabilitated to restore the ecology of the mined areas. Trees are planted and seeds from native plants are spread to start a new forest.
- 2.30 The bauxite ore from the Darling Range is considered to be low grade by world standards and is contaminated with organic material that must be removed in the refining process.¹⁸ The ore also contains a number of ‘impurities’.¹⁹

Emissions produced from bauxite mining

- 2.31 Emissions produced from open cut bauxite mining include dust and noise.

Refinery power

- 2.32 Power used in the refinery process is generated by the Wagerup powerhouse. This produces approximately 62 megawatts of electrical energy using natural gas from the North West Shelf as the fuel source. The resulting steam runs turbines to generate

¹⁶ Alcoa, *Emissions from Wagerup’s Liquor Burning Facility - October 1996 to December 2002*, May 2003.

¹⁷ Answer to Parliamentary Question on Notice, asked by Hon Christine Sharp MLC, May 11 2004.

¹⁸ Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, *Transcript of Evidence*, September 8 2003, p13.

¹⁹ These include ferrous oxide (14 to 17 percent), silicon oxide (21 to 25 percent), oxalate (0.19 percent) and carbonate (0.6 percent) as well as traces of gallium, sodium, potassium, sulphur, magnesium and phosphate: Letter from Ms Ann Whitty, Alcoa Wagerup Refinery Manager, November 5 2002.

power and is also used in the refinery process. The Committee was informed that this makes the powerhouse more efficient and reduces greenhouse gas emissions.²⁰

Emissions produced from the refinery powerhouse

2.33 The main emissions produced by the refinery powerhouse include:²¹

- combustion products - for example carbon dioxide, carbon monoxide and nitrogen oxides; and
- small amounts of methane, acetone and five volatile organic compounds (VOCs) all with reported in-stack concentrations below the workplace threshold limit values (TLVs).

Bauxite stockpiles

2.34 Bauxite ore, which contains the alumina, is received from the minesite and stacked on one of two stockpiles at the Wagerup refinery.

Emissions produced from bauxite stockpiles

2.35 Dust can emanate from the bauxite stockpiles when they are worked or during windy conditions.

Mills/grinding/storage

2.36 Bauxite ore is ground in the mills to the consistency of beach sand. Caustic liquid is added to produce bauxite slurry.

2.37 The bauxite slurry is then stored in large tanks and lime is added to assist in extracting inorganic material, particularly silica. This improves the quality of the alumina.

Emissions produced from mills/grinding/storage

2.38 Mill vent emissions include:²²

- ammonia;
- 13 semi-volatile organic compounds (SVOCs), three VOCs and six aldehydes and ketones all with reported in-stack concentrations below workplace TLVs; and

²⁰ Attachment to the letter from Ms Ann Whitty, Alcoa Wagerup Refinery Manager, January 23 2003,.

²¹ Alcoa World Alumina Australia, *Wagerup Air Emissions Inventory*, September 25 2002, p84.

²² Ibid, pp 79-80.

- ten metals with reported in-stack concentrations below workplace TLVs.

Digestion

- 2.39 The bauxite slurry is pumped from the storage tanks to the digesters where more caustic liquor is added to form digestion slurry. The digestion slurry is heated to approximately 145 degrees celcius in larger pressure vessels to dissolve the alumina out of the bauxite ore. This produces a green liquor slurry that is then cooled ready for further processing.

Emissions produced from digestion

- 2.40 The main emissions produced by the digester come from the containment tank blow-off and include:²³
- 27 SVOCs, with reported in-stack concentrations below workplace TLVs;
 - 12 VOCs with reported in-stack concentrations below workplace TLVs - for example acetone, benzene, toluene;
 - eight aldehydes and ketones with reported in-stack concentrations below workplace TLVs;
 - significant levels of ammonia,
 - fluoride and chloride; and
 - ten metals all with reported in-stack concentrations below workplace TLVs, except cadmium.
- 2.41 Since 2002 the emissions from the digester have been directed to the powerhouse boilers for destruction, which has been shown to be effective.²⁴ The October 2004 DoE Material contains a copy of a review by Alcoa of *Emissions Reductions Achieved by the Installation of Vapour Condensers in the Digestions Area of the Wagerup Refinery*²⁵ and a peer review on that report.²⁶

²³ Ibid, pp50-51. See also the very low mass emission rates for the digestion vacuum pump, ibid, pp57-58.

²⁴ Letter from the Acting Director, Environmental Management Division, DoE, February 25 2004, Attachment - *Wagerup Refinery Emissions Reduction Program. Project Evaluation Report Reduction of Odorous Non-condensable Emissions from the Digestion Area by Thermal Oxidation in the Powerhouse Boilers*. Second Edition, July 2003. Alcoa Technical Department, Alcoa World Alumina Australia, 2003.

²⁵ Alcoa, *Emissions Reductions Achieved by the Installation of Vapour Condensers in the Digestions Area of the Wagerup Refinery*, February 2004, Revision 2, referred to in submission from the DoE, p21, attached to letter from the Minister for the Environment, October 5 2004.

²⁶ Letter from HRL Technology Pty Ltd to Mr Colin Scrimshaw, DOE dated February 6 2004, referred to in submission from the DoE, p21, attached to letter the Minister for the Environment, October 5 2004.

Clarification

- 2.42 Clarification occurs when the bulk of the solid impurities are extracted from the green liquor slurry. The thickened mud is washed to reduce the caustic soda content by approximately 94 percent before it is pumped to the residue disposal area. The caustic liquid is recycled back to the main process.

Emissions produced from clarification

- 2.43 Since 2002 emissions from the clarification tank vents have been directed to the powerhouse boilers for destruction. Emissions include SVOCs, aldehydes and ketones, with acetone, acetaldehyde, butenal and benzaldehyde occurring at reported in-stack levels above their workplace TLVs.²⁷

Filtration

- 2.44 The remaining traces of solid material are removed through cloth filters, which improves the quality of the alumina. The result is green liquor. No emissions are produced during filtration.

Heat exchange

- 2.45 Heat exchange reuses heat within the liquor circuit to conserve energy. It cools the green liquor stream to the correct precipitation feed conditions. No emissions are produced during heat exchange.

Precipitation

- 2.46 During the precipitation phase, the green liquor is cooled and fine hydrate is added to remove as much alumina from the liquid as possible. The fine hydrate acts as a surface on which the alumina crystals grow. Aluminatrichydrate is produced in the precipitation process. The hydrate slurry is sent to the calcination building and the remaining liquor, known as 'spent liquor', is recycled back into the refining process.

Emissions produced from precipitation

- 2.47 As a result of precipitation the following emissions are emitted from the cooling tower:²⁸
- four VOCs with reported concentrations lower than the workplace TLVs; and

²⁷ Alcoa World Alumina Australia, *Wagerup Air Emissions Inventory*, September 25 2002, pp37 and 41-42.

²⁸ Ibid, pp46-47.

- two halides and halogens and two aldehydes and ketones all with reported concentrations below the workplace TLVs.

Calcination

2.48 The hydrated alumina slurry is washed with water on vacuum filters to remove the caustic liquor, then dried and heated to approximately 1 000 degrees celcius in the calciners. This removes the water in the crystalline structure of the alumina. The dry white alumina powder is then sent to the alumina storage bin ready for transporting to the Bunbury Port. The calciners are specially designed to conserve heat energy.

Emissions produced from calcination

2.49 Emissions produced by the calciners (stack, tank vent, vacuum pump vent) include:²⁹

- products of combustion - carbon dioxide, sulphur dioxide, nitrogen oxides, all of which were reported to have in-stack concentrations above the workplace TLVs;
- SVOCs, VOCs, and aldehydes and ketones all with reported in-stack concentrations below workplace TLVs;
- three metals all with reported concentrations below the workplace TLVs; and
- particulates (dust) with reported concentrations below the DEP licence limit.

2.50 The Committee notes that in June 2002 Alcoa increased the height of its calciner stacks from 43 metres and 49 metres to 100 metres as its emissions modelling estimated that the extra height would provide greater dilution of emissions before they came to ground.³⁰ For more information in relation to this matter refer to paragraph 6.114 of this report.

Evaporation

2.51 During this process excess water is evaporated from the caustic liquor circuit. This water is reused in the process resulting in little water being discharged from the refinery.

²⁹ Ibid, pp18-36.

³⁰ Submission No. 56 from Alcoa, September 24 2002, Attachment - Sinclair Knight Mertz, *Wagerup Refinery Odour Assessment, Final February 2002*, p19; and Submission No. 51 from Alcoa, March 4 2003, p3.

Emissions produced from evaporation

2.52 Emissions produced from the evaporation vacuum pump include:³¹

- 23 SVOCs - only bis(2-Ethylhexy)phthalate was reported to have had an in-stack concentration slightly above the workplace TLV;
- 20 VOCs and six aldehydes and ketones with reported in-stack concentrations below workplace TLVs; and
- ten metals - mercury had a reported in-stack concentration above the workplace TLV.

Oxalate Removal

2.53 Oxalate is a specific impurity in the liquor stream, which is caused by leaf litter and root matter from the forest in which the bauxite ore is mined. Oxalate inhibits the precipitation process and hence reduces the yield of alumina if it is not removed. Prior to 2000 oxalate was removed in the oxalate building and incinerated on site at Wagerup in the oxalate kiln. In 2000 the oxalate kiln was closed down and oxalate was transported offsite from Wagerup to be used in another industrial process.

2.54 Alcoa advised in a letter dated October 6 2003 that during 2003 the offsite destination for the oxalate was no longer available. Since then, Alcoa has been storing it on-site at Wagerup in a purpose built containment pit in the residue area. Alcoa also advised that the pit has been constructed with an impermeable lining to prevent leaching of any material. Approximately 37 tonnes of sodium oxalate per day is removed from the process and stored in the containment area. Alcoa also advised that it planned to reclaim this material in the longer term.³²

Emissions produced during oxalate removal

2.55 During operation of the oxalate kiln (prior to 2000), emissions included odour, particulates and VOCs.³³

Liquor Burning

2.56 Liquor burning removes other non-oxalate, organic material in the liquor stream. It cleans the liquor stream, improving the precipitation process (and hence alumina yield) and reduces energy consumption.

³¹ Alcoa World Alumina Australia, *Wagerup Air Emissions Inventory*, September 25 2002, pp65-66.

³² Letter from Mr Bill Knight, Wagerup Refinery Manager, October 6 2003.

³³ Submission No. 53 from the DEP, April 9 2002, p33 and Appendix 8 of Submission No. 2 from Alcoa, November 21 2001.

- 2.57 The Committee notes that bauxite ore supplied to Alcoa's Wagerup refinery has a high organic content which can reduce the quality and quantity of alumina produced unless it is removed in the liquor burning process. This organic material is a significant source of VOC emissions.
- 2.58 The Committee notes that Alcoa has made some significant changes to the liquor burner facility (**LBF**) to reduce the concentration and alter the composition of emissions. These changes are summarised in paragraph 2.100 of this report.

Emissions produced from liquor burning

- 2.59 The following emissions are produced from liquor burning:³⁴
- 26 SVOCs, 27 VOCs, eight aldehydes and ketones and ten metals were identified in the LBF emission, all with reported in-stack concentrations below relevant workplace TLVs;
 - toxic dioxins and furans were below the limit of detection;
 - combustion products carbon monoxide, sulphur dioxide and nitrogen oxides had reported in-stack concentrations above workplace TLVs; and
 - methane.

Residue Storage

- 2.60 From every three tonnes of bauxite, approximately two tonnes of residue and one tonne of alumina are generated.
- 2.61 The residue sand is used as the building material in the residue area. Residue mud is de-watered then spread in shallow layers to allow drying. Caustic liquor is recovered and recycled back into the refining process.

Emissions produced from residue storage

- 2.62 Emissions from the residue storage include dust and three VOCs. Only toluene (the likely source being heavy vehicle exhausts) had a reasonable concentration, which was still reported at below the workplace TLV.³⁵
- 2.63 The Committee notes comments made by an independent auditor that total emissions from the residue drying/storage area and the cooling lake were not calculated.³⁶

³⁴ Alcoa World Alumina Australia, *Wagerup Air Emissions Inventory*, September 25 2002, pp71-73.

³⁵ Ibid, pp104-105.

³⁶ AWN, *Environmental Audit*, AWN Pty Ltd, Ferntree Gully Victoria, May 19 2003, p13.3.

Total emissions

- 2.64 Details of the types and levels of chemical compounds in the emissions from the Wagerup Refinery were provided by Alcoa in its September 2002 *Wagerup Refinery Emissions Inventory Report*.³⁷ The Committee has provided some of this information in Appendix 4. The Committee notes that the level of emissions reported by Alcoa at that time (2002) would be significantly lower than the levels of emissions produced by the refinery prior to the fitting of pollution control equipment (for example the CTO on the LBF in 1998) and the completion of the major emissions reduction programs in June 2002.

ALUMINA

- 2.65 The end product of the refining process outlined above is aluminium oxide. By way of background information, the Committee has set out below a brief description of this substance.
- 2.66 Aluminium oxide is a fine white crystalline powder that at low concentrations can cause irritation to the skin, eyes, nose and throat. If breathed in at high concentrations it can irritate the lungs and cause coughing, wheezing and shortness of breath.³⁸
- 2.67 Aluminium oxide is also a known adjuvant, a chemical that can make a person more sensitive to other environmental contaminants, both natural (for example pollen) and man made (for example VOCs or air pollutants generally) and to asthma and allergies.³⁹

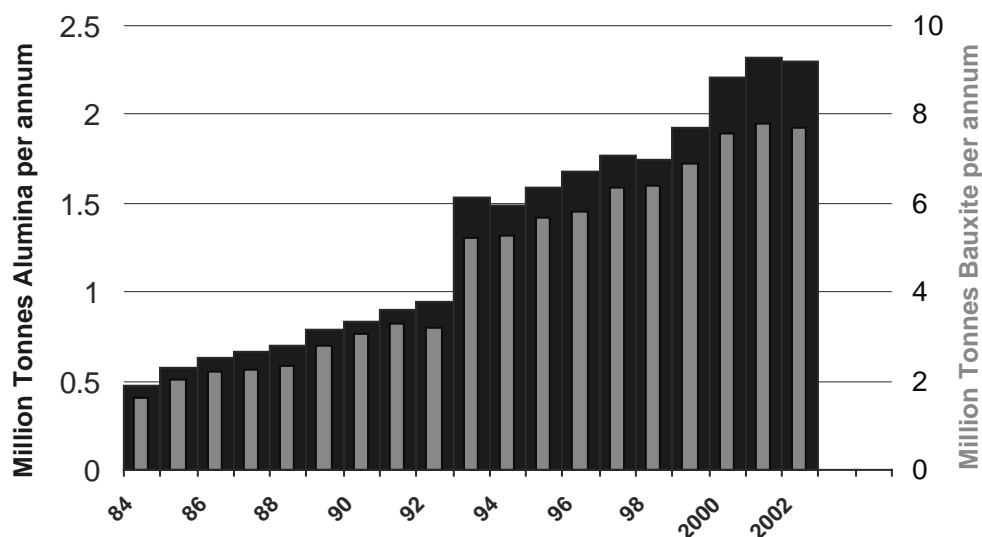
LEVELS OF ALUMINA PRODUCTION AND BAUXITE USE AT ALCOA'S WAGERUP REFINERY

- 2.68 Figure 2.5 shows the levels of alumina production and bauxite use at Alcoa's Wagerup refinery from 1984 to 2002 inclusive. The graph was provided courtesy of Alcoa.

³⁷ Alcoa World Alumina Australia, *Wagerup Air Emissions Inventory*, September 25 2002.

³⁸ New Jersey Department of Health and Senior Services, *Hazardous Substance Fact Sheet*, Aluminium Oxide: <http://www.state.nj.us/health/eoh/rtkweb/2891.pdf> (accessed June 1 2004).

³⁹ The Committee's consultant Dr P Dingle.

Figure 2.5**Levels of Alumina Production**

84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02
0.47	0.57	0.63	0.66	0.70	0.79	0.83	0.9	0.94	1.53	1.48	1.58	1.68	1.76	1.8	1.9	2.2	2.3	2.3
1.62	2.01	2.19	2.23	2.34	2.81	3.06	3.28	3.2	5.24	5.28	5.68	5.83	6.34	6.38	6.91	7.56	7.78	7.7

2.69 As shown in Figure 2.5, annual alumina production at Alcoa's Wagerup refinery has increased from 470 000 tonnes in 1984 to 2.3 million tonnes in 2002, an increase of 1.83 million tonnes (389 percent). The Committee notes that a substantial increase in alumina production occurred in 1993.

2.70 Figure 2.5 also indicates a similar increase in bauxite use during the same period.

LIQUOR BURNER TECHNOLOGY AND INSTALLATION

Requirement for liquor burning in Western Australia

2.71 As previously noted the bauxite deposits of the Darling Range in Western Australia contain high levels of carbon compared to other commercial bauxite deposits around the world. Alcoa's mining is progressing in a southerly direction into ore bodies that have progressively higher carbon levels. The carbon contaminates the caustic soda liquor stream that is used to dissolve the raw bauxite, and hence reduces the effectiveness of the aluminium oxide (alumina) crystal precipitation process.⁴⁰

⁴⁰ Letter from Alcoa, October 28 2003.

- 2.72 Over time the total carbon levels in the liquor stream increase along with the concentration of oxalate. Both carbon and oxalate compete with the alumina in the liquor for sites on the alumina hydrate, which is used in the precipitation process. Alumina yield per tonne of bauxite therefore declines. Alcoa advised the Committee that there are no known feasible options to reduce the carbon level at the source; that is, at the raw material stage.⁴¹
- 2.73 The LBF is designed to reduce the level of total organic carbon contamination in the caustic liquor stream. Some of the caustic liquor is diverted from the main alumina process through the LBF. The liquor is heated in the LBF and the carbon is burnt off mainly in the form of carbon dioxide, water and carbon monoxide, however emissions also contain VOCs.⁴²
- 2.74 Alcoa's liquor burning technology was purchased from Showa Denko in Japan in 1987 and scaled up to suit the larger production at the Kwinana and Wagerup refineries, both of which have LBFs.

The liquor burner facility at Kwinana

- 2.75 The Committee was provided with information from a number of sources claiming that there had been concerns about emissions from the LBF at Kwinana and the serious health impacts those emissions were allegedly having on the employees at the refinery. The health concerns at Kwinana were said to date back to the early 1990s. This was prior to the commissioning of the LBF at Wagerup in 1996.⁴³
- 2.76 According to the evidence the Committee received from Alcoa, during the 14 year period when the LBF was operational at Kwinana (from 1988 to early 2002), there were some problems with odour, one employee was diagnosed with multiple chemical sensitivity (MCS) and there were 23 reported incidents of employees suffering short term health impacts.⁴⁴

⁴¹ Ibid.

⁴² Ibid.

⁴³ Mr William van der Pal, Alcoa employee and safety representative, Wagerup Refinery, *Transcript of Evidence*, November 28 2001, p5;

Submissions No. 10 and No. 13 from Mr William van der Pal, Alcoa employee and safety representative, Wagerup Refinery, November 28 2001 and December 4 2001 respectively;

Submission No. 33, private, July 5 2002; and

Appendix 11 of Submission No. 15 from Alcoa, February 18 2002.

⁴⁴ Mr Marc Bell, Manager Workers' Compensation and Employee Benefits, Alcoa World Alumina Australia, *Transcript of Evidence*, February 18 2002, p4.

Mr Ron Stone, Environmental Health and Safety Manager, Alcoa World Alumina Australia, *Transcript of Evidence*, November 21 2001, p12.

- 2.77 The Committee notes that the DoH is reported as agreeing, on April 28 2004, to an investigation of cancers and other illnesses such as heart problems, chronic fatigue, chemical sensitivity, acute depression and vertigo in former and current Alcoa employees who worked in an area of the Kwinana refinery known as K58.⁴⁵ K58 consists of several processing buildings, which include an oxalate kiln and liquor burner.
- 2.78 Media reports noted that the investigation is to be conducted by a panel of medical experts and that Alcoa is expected to be represented on the panel.⁴⁶
- 2.79 Media reports further noted that the DoH agreed to conduct the investigation after reviewing a report by Dr Harper, an occupational physician who carried out an exploratory study funded under a grant from WA's Cancer Foundation to the Alumina Widow and Workers Action Group.⁴⁷ Dr Harper's study is reported to have found unusual groupings of particular cancers such as leukaemia, lymphoma and brain cancers.⁴⁸
- 2.80 An Alcoa spokesman is reported to have said that Alcoa was committed to the safety of its refineries and placed paramount importance on the safety and health of its workers. Alcoa was reported as saying that:⁴⁹
- a study by Healthwise found no difference between cancer rates among workers at the Kwinana plant and those in the wider community; and
 - the Healthwise report did not support claims of unusual groupings and clusters of cancers among its workers. For information about the Healthwise Project refer to paragraph 4.176 and following of this report.

The liquor burner facility at Wagerup

- 2.81 Reduction of total organic carbon in the liquor stream at the Wagerup refinery enables improved yield, reduced liquor viscosity, production of higher value bright product, (known as B30), increased production rate at lower cost, product quality improvement and improved environmental performance (for example, less power and less caustic soda consumed).

⁴⁵ Carmelo Amalfi, "Alcoa faces fresh cancer inquiry", *The West Australian* newspaper, April 29 2004, p81.

⁴⁶ Ibid.

⁴⁷ Ibid and Carmelo Amalfi, "Alcoa cancer study urged", *The West Australian* newspaper, April 28 2004, p12.

⁴⁸ Carmelo Amalfi, "Alcoa cancer study urged", *The West Australian* newspaper, April 28 2004, p12.

⁴⁹ Carmelo Amalfi, "Other Alcoa sites may face health probe", *The West Australian* newspaper, April 30 2004, p12.

2.82 The Committee received evidence from Alcoa that:⁵⁰

We were aware of the emissions and odours being generated at the Kwinana liquor burner unit. We made substantial design changes to the plant and had confidence they would give us lower odour and emissions levels than we ended up getting. When we started the plant and with the effects that were being felt by people throughout 1996 and 1997, not only within the plant but also outside the plant, we then had to search for some technology that would reduce those emissions. At the end of 1997 we shut down the plant [LBF] while we chased the technology, which we found in Europe.

THE IMPACT OF THE LIQUOR BURNER FACILITY AT WAGERUP

2.83 The Committee has set out below a summary of some of the evidence it received in relation to the impacts of the Wagerup refinery on Alcoa employees and members of the local communities prior to, during and after the installation of the LBF in 1996.

Prior to the installation of the LBF

2.84 The Committee received evidence in 2001 that “Prior to the installation of the liquor burner, Alcoa would receive approximately 20 complaints from the community a year, and perhaps 20 from the workforce. However, that number has jumped, and we are now looking at 1 000 complaints a year as opposed to 40 a year. That has happened since the advent of the liquor burner.”⁵¹ The Committee heard evidence that up until the installation of the LBF concerns mainly centred on noise and odour emissions problems.⁵²

2.85 A major expansion of the Wagerup refinery was completed in 1993. As previously noted, alumina production increased significantly in the same year. At that time the DEP did not require Alcoa to install emission control equipment to reduce VOCs on the calciners or the oxalate kiln.⁵³

2.86 The Committee notes that complaints regarding emissions from Alcoa’s Wagerup refinery and particularly their health impacts increased markedly after the LBF was commissioned in 1996. Residents of the local community advised the Committee that they experienced adverse impacts from refinery operations and believed the emissions

⁵⁰ Mr Ron Stone, Environment, Health and Safety Manager, Alcoa World Alumina Australia, *Transcript of Evidence*, November 21 2001, p12.

⁵¹ Mr William van der Pal, Alcoa employee and safety representative, *Transcript of Evidence*, November 21 2001, p9.

⁵² Ibid, p2; Mrs Cheryl Borserio, Chairperson, Wagerup Community Health Awareness Group, *Transcript of Evidence*, November 21 2001, p3 and Submission No. 53 from the DEP, April 9 2002, p7.

⁵³ Letter from Acting Director, Environmental Regulation Division, DEP, May 26 2003.

began causing human health problems soon after the refinery was established in 1984.⁵⁴

- 2.87 The Committee understands that with a large increase in alumina production (for example in 1993), emissions would have increased significantly.⁵⁵ For example, Alcoa estimates that the level of VOC emissions from each individual calciner stack would have been greater than from the LBF when it was commissioned in 1996.⁵⁶
- 2.88 Alcoa undertook modelling of emissions dispersion prior to the construction of the LBF at Wagerup in 1996. Modelling was based on Alcoa's experience with the LBF at Kwinana and the associated emissions issues.
- 2.89 The Committee was advised that emission reduction values that were used in the modelling were not achieved when the LBF at Wagerup was commissioned in November 1996.⁵⁷ The Committee was also advised that ambient emissions concentrations from the Wagerup LBF were predicted to be below environmental limits even without incorporating the potential emission reductions due to design changes.⁵⁸

During the installation of the LBF

- 2.90 As previously noted, the LBF was installed at Alcoa's Wagerup refinery in 1996. Concerns and complaints from workers and nearby residents increased significantly at this time.⁵⁹

After the installation of the LBF

- 2.91 A long commissioning period ensued during 1997 when Alcoa attempted to adjust the LBF to perform to original specifications. This produced noise and emissions, which had adverse impacts on employees and the community.⁶⁰ In this respect, the

⁵⁴ Ibid; *Interim report of the Alcoa-Wagerup Community Health Awareness Group Working Group*, August 2001, pp3-5; Mr William van der Pal, Alcoa employee and safety representative, *Transcript of Evidence*, November 21 2001, pp1 and 9; and Submission No. 10 from Mr William van der Pal, Alcoa employee and safety representative, November 28 2001.

⁵⁵ Submission No. 2 from Alcoa, November 21 2001, *Report to Alcoa on Issues Related to Wagerup Refinery Emissions*, by Mr Barry Carbon, October 2001, p8; Submission No. 51 from Alcoa, April 3 2003, p4 and the Committee's consultant Dr P Dingle, p2.

⁵⁶ Submission No. 61 from Alcoa, April 10 2003, *Explanatory Information*; and Submission No. 51 from Alcoa dated March 4 2003 p13.

⁵⁷ Ibid, and Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, *Transcript of Evidence*, September 8 2003, p3.

⁵⁸ Ibid.

⁵⁹ Appendix 5 and 13 of Submission No. 15 from Alcoa, February 18 2002.

⁶⁰ Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, *Transcript of Evidence*, September 8 2003, p3.

Committee notes evidence it received that “*Maximum community impacts typically relate to short duration events, not long term average emissions.*”⁶¹

- 2.92 To address worker and community concerns that the health impacts being experienced might be linked to the LBF, Alcoa closed the LBF in November 1997, while emissions control equipment was fitted.⁶²
- 2.93 The Committee notes that reports from Alcoa’s workforce registering an emissions event that affected them increased from one in 1995 to ten in 1996 and peaked at 70 in 1997. The number then dropped to 19 in 1998 after the LBF was closed down in November 1997, but increased again to 51 in 1999, after the LBF was recommissioned in May 1998.⁶³ For further details refer to Figure 5.1 at paragraph 5.27 of this report.
- 2.94 The Committee received evidence that emission event reports registered by Alcoa’s workforce at Wagerup often involved a number of people, however the event would only be recorded as a single incident. The number of workers actually affected would therefore have been greater than the number of registered events.⁶⁴
- 2.95 The Committee also received evidence that from the time the LBF was commissioned, there was a steep rise in claims by employees for damage (etching) to the windscreens and paint-work of their vehicles. Figure 2.6 shows vehicle damage claims from 1994 to 2001.⁶⁵

⁶¹ AWN, *Environmental Audit Alcoa World Alumina Australia Wagerup Refinery, April 2002 - May 2003*, AWN Pty Ltd, Ferntree Gully Victoria, May 19 2003, p6.22.

⁶² Submission No. 51 from Alcoa, March 4 2003 - *Emissions reductions at Wagerup: Current state of play, 4 March 2003*, p1, and Mr Ron Stone, Environmental Health and Safety Manager, Alcoa World Alumina Australia, *Transcript of Evidence*, November 21 2001, p12.

⁶³ Appendix 13 of Submission No. 15 from Alcoa, February 18 2002.

⁶⁴ Mr William van der Pal, Alcoa employee and safety representative, *Transcript of Evidence*, November 28 2001, p3.

⁶⁵ Appendix 3 of Submission No. 31 from Alcoa, June 13 2002.

Figure 2.6**Vehicle damage claims from 1994 to 2001**

Alcoa World Alumina Wagerup Refinery Vehicle Windscreen/Body damage claims		
YEAR	CLAIMS	INCIDENTS
1994	2	2
1995	16	7
1996	48	12
1997	49	30
1998	138	62
1999	82	23
2000	8	6
2001	5	3
	348	145

- 2.96 The Committee was advised that after the commissioning of the LBF, workers and local residents reported similar health symptoms.⁶⁶ A report commissioned in 2000 by Alcoa from Dr Bill Musk, Professor of Respiratory Medicine, Sir Charles Gairdner Hospital, stated that *“there was a strong perception among workers that the onset of LB [LBF] was associated with increases in a variety of symptoms, mostly non respiratory,...”*.⁶⁷
- 2.97 In response to a questionnaire survey undertaken in 1999 on behalf of Alcoa by Dr Musk, approximately half of Alcoa’s Wagerup workforce stated that they believed emissions, particularly from the LBF, had some effect on their health. However most workers stated that their symptoms had improved or gone completely once the LBF was closed down and fitted with emission control equipment.⁶⁸
- 2.98 The Committee notes that in addition to this evidence regarding impacts of the LBF, it also received evidence from some Alcoa employees who expressed their belief that the oxalate kiln emissions may have been affecting their health prior to the installation

⁶⁶ Mrs Cheryl Borserio, Chairperson of the Community Health Awareness Group, *Transcript of Evidence*, November 21 2001, p3.

⁶⁷ Submission No. 15 from Alcoa, February 18 2002, Appendix 13 - Professor A W Musk (Department of Respiratory Medicine, Sir Charles Gairdner Hospital) and N H de Klerk, Department of Public Health, University of Western Australia, 2000. *Health Effects from Liquor Burning Unit Emissions in an Alumina Refinery*, p7.

⁶⁸ Ibid, Table 4, p10.

of the LBF.⁶⁹ One resident living close to the refinery submitted that her symptoms, particularly skin rashes, occurred soon after the refinery was commissioned in 1984.⁷⁰

- 2.99 Some employees and local residents claim that they have continued to experience health problems in 2003/2004.⁷¹

CHRONOLOGY OF ALCOA'S EMISSIONS REDUCTION PROGRAM - MAJOR ITEMS

- 2.100 The Committee received evidence from Alcoa in a submission dated March 2003 that it had undertaken a number of emission reduction programs at its Wagerup refinery since 1996 at a cost of \$36.5 million.⁷²

- 2.101 The Committee has set out below a summary of the information provided by Alcoa regarding its emissions reduction programs:

- **1996/1997:** The LBF was built and commissioned in December 1996. An electrostatic precipitator (**ESP**) and scrubber were installed at that same time. The ESP is designed to remove particulates from the exhaust stream (greater than 99 percent), however it does not reduce VOCs.⁷³ Figure 2.7 shows the pollution control equipment installed on the LBF at the time it was commissioned in 1996.

⁶⁹ For example, Mr William van der Pal, Alcoa employee and safety representative, *Transcript of Evidence*, November 28 2001, p4.

⁷⁰ Mrs Cheryl Borserio, Chairperson of the Community Health Awareness Group, *Transcript of Evidence*, November 21 2001, p3.

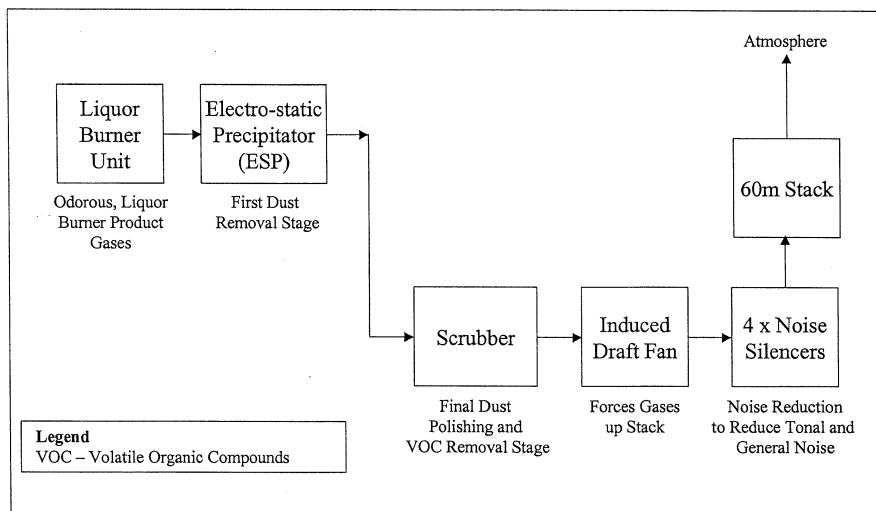
⁷¹ Letter from Mr David Puzey, Alcoa employee (until October 22 2003), October 24 2003; YDCRC, *Appeal to Alcoa Wagerup License 6217/7*, undated, tabled at a Committee meeting on October 27 2003, pp6 and 9; and Office of the Appeals Convenor website: www.wa.gov.au/appeals (accessed May 11 2004).

⁷² Submission No. 51 from Alcoa, March 4 2003.

⁷³ Letter from Mr Bill Knight, Wagerup Refinery Manager, October 28 2003.

Figure 2.7**Alcoa's Emissions from Wagerup's Liquor Burning Facility November 1997**

LBF flowsheet showing emission controls implemented until November 1997.

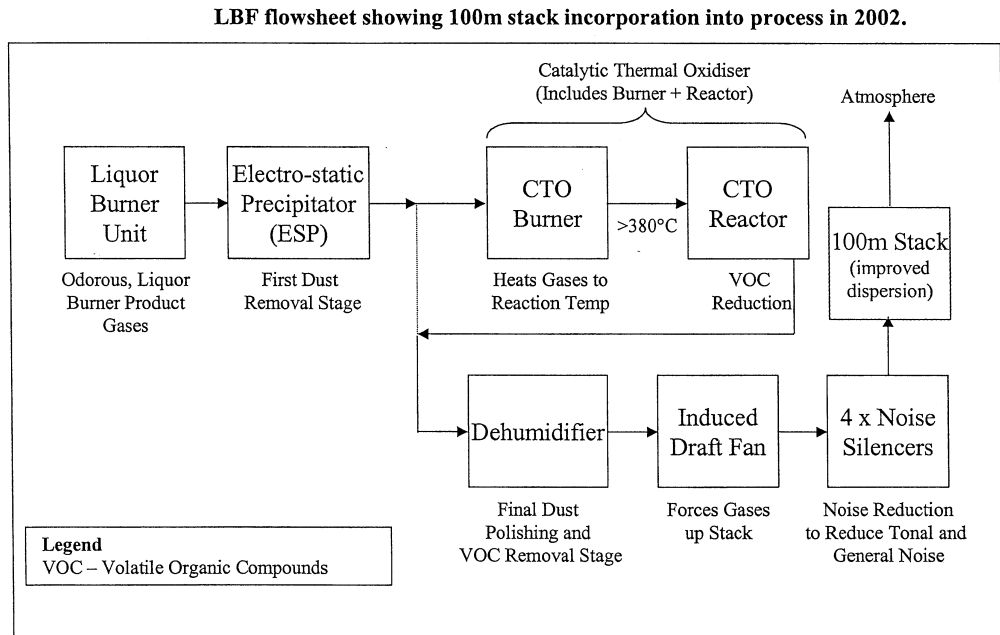


- **1998:** A CTO (burner and reactor) was installed on the LBF in 1998 to remove VOCs, in response to worker and community concerns regarding the possible link between reported health impacts and LBF emissions.⁷⁴ Alcoa estimated that VOCs were reduced by 90 percent compared to 1996 levels.⁷⁵
- **2000:** The oxalate kiln, which was known to be a source of VOCs, was closed down in 2000.
- **2001:** A dehumidifier was installed on the LBF in December 2001 to further reduce VOCs emissions.
- **2002:** The LBF stack was increased from 60 to 100 meters and the calciner stacks increased from 45 and 49 meters to 100 meters in mid 2002 to aid with emission dilution and dispersion from the calciners and the LBF. Digestion, evaporation, causticisation and clarification emissions were redirected to the powerhouse boilers for destruction.⁷⁶ Figure 2.8 shows all the emissions control equipment installed on the LBF since its commissioning.

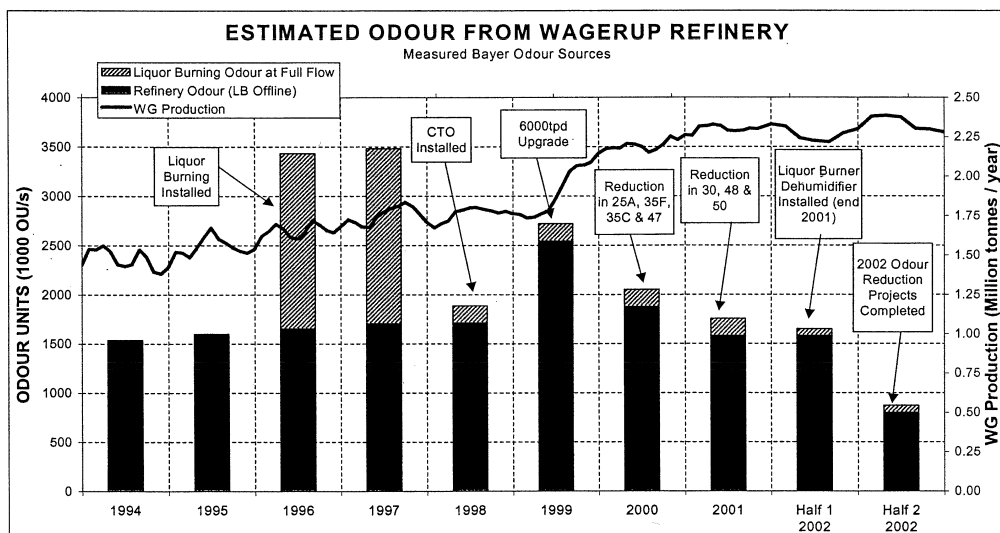
⁷⁴ Submission No. 51 from Alcoa, March 4 2003 - *Emissions reductions at Wagerup: Current state of play, 4 March 2003*, p1, and Mr Ron Stone, Environmental Health and Safety Manager, Alcoa World Alumina Australia, *Transcript of Evidence*, November 21 2001, p12.

⁷⁵ Submission No. 51 from Alcoa, March 4 2003.

⁷⁶ Alcoa Alumina Australia, *Wagerup Refinery Air Emissions Inventory - Final Report*, Alcoa World Alumina, September 25 2002, p1.

Figure 2.8**Alcoa's Emissions from Wagerup's Liquor Burning Facility 2002**

2.102 Figure 2.9 shows the total refinery odour output levels from 1994 to 2002.

Figure 2.9**Total refinery output levels from 1994 to 2002**

- 2.103 Odour is measured by dynamic olfactometry. Gas samples in a range of dilutions are presented to a trained test panel of four to six people. The odour threshold and actual concentration is determined from the response of the panellists to the various dilutions of the gas. The odour concentration of the sample is expressed in odour units per cubic metre, where the sample of gas is considered to be representative of the sampled emission-stream.⁷⁷

COMMITTEE FINDINGS

- 2.104 The Committee is concerned that the consistent use of the word 'odours' by Alcoa and regulatory authorities is inappropriate when applied generically to toxic emissions. The use of the word 'odours' trivialises the importance of controlling emissions and of taking appropriate steps to protect the health of workers and the community. The Committee notes that some toxic emissions are odourless while some may even have pleasant smells.
- 2.105 The Committee has preferred to use the term 'emissions' as a more generic description of the substantive issue under inquiry.
- 2.106 The Committee considers that the refinery processes produce a number of emissions that may cause the types of symptoms complained of by workers and the members of the local communities.
- 2.107 The Committee encourages Alcoa to determine a safe, environmentally acceptable long-term solution for the storage of oxalate produced from its Wagerup refinery.
- 2.108 The Committee notes that the October 2004 DoE Material includes conditions on the 2004/2005 licence that includes alternative management of sodium oxalate storage and disposal.⁷⁸

RECOMMENDATION

Recommendation 1: The Committee recommends that Government agencies and regulatory authorities should use the term 'emissions' rather than 'odours' to describe general emissions from the refining process.

⁷⁷ Submission No. 31 from Alcoa, June 13 2002, Appendix 2 - *Wagerup Refinery Odour Assessment*, Sinclair Merz Knight Pty Ltd, February 2002, p2; Submission No. 56 from Alcoa, Attachment - *Odour Survey - October 2000, Wagerup Refinery*, Final Report, The Odour Unit Pty Ltd, August 14 2001; and AWN, *Environmental Audit Alcoa World Alumina Australia Wagerup Refinery, April 2002 - May 2003*, AWN Pty Ltd, Ferntree Gully Victoria, May 19 2003. Report prepared for Department of Environmental Water and Catchment Protection (now DoE), Perth Western Australia, pp6.1-6.26.

⁷⁸ Submission from the DoE, pp19-20, attached to letter from the Minister for the Environment, October 5 2004.

CHAPTER 3

COMMUNITY COMPLAINTS

OVERVIEW OF CHAPTER

- 3.1 In this chapter the Committee deals with complaints from members of communities in the vicinity of Alcoa's Wagerup refinery. The Committee has summarised submissions received in relation to complaints including from members of those communities, Alcoa and the DEP (now DoE).
- 3.2 For information on complaints made by workers at Alcoa's Wagerup refinery refer to Chapter 4 (Public Health) and Chapter 5 (Occupational Health and Safety and Compensation and Rehabilitation).

BACKGROUND

Reasons for complaints

Adverse health effects

- 3.3 During its inquiry the Committee received many submissions regarding health complaints alleged to be caused by the emissions from the refinery. Examples of symptoms experienced included, among other things, multiple chemical sensitivity, continual fatigue and lethargy, short-term memory loss, mucous membrane disorders, skin and eye irritations, nose bleeds and chronic headaches. Refer to paragraph 4.107 and following of this report for a detailed discussion on the types of submissions in relation to health complaints received by the Committee during its inquiry.
- 3.4 At the Committee's hearing on November 21 2001 Mr Szkraba, submitted that "*The primary concern for WCHAG is the health and wellbeing of the community.*"⁷⁹ He submitted that, in 2001, many community members experienced health irritations and some experienced more serious symptoms including constant pain and lethargy.⁸⁰

Noise emissions

- 3.5 The Committee received evidence from a number of residents living in the vicinity of Alcoa's Wagerup refinery that in their opinion noise emissions from the refinery were

⁷⁹ Mr John Szkraba, Secretary, Wagerup Community Health Awareness Group, *Transcript of Evidence*, November 21 2001, p2.

⁸⁰ Ibid.

excessive.⁸¹ Evidence was received that this was particularly so at night.⁸² Refer to paragraph 8.73 and following of this report for a detailed discussion on noise emissions from Alcoa's Wagerup refinery.

Unpleasant odour

3.6 Members of communities adjacent to Alcoa's Wagerup refinery also provided evidence to the Committee that at times they experienced unpleasant odours from the refinery.⁸³ They expressed their view that the odours adversely affected their lifestyle.⁸⁴

Alcoa's Wagerup land management strategy

3.7 Alcoa's Wagerup land management strategy is discussed in paragraph 7.5 and following of this report. The Committee received a number of submissions from people who expressed their dissatisfaction with Alcoa's Wagerup land management strategy, including that:

- it does not fix the problem at its source;⁸⁵
- house and land properties will be de-valued;⁸⁶
- it will have a negative impact on the towns of Yarloop, Harvey and Waroona;⁸⁷ and
- the townships of Yarloop and Hamel are not wholly included in the area in which Alcoa has agreed to purchase people's properties for the life of the refinery, leading to anxiety in the local community.⁸⁸

WAGERUP COMMUNITY WORKING GROUP (FORMERLY WCHAG WORKING GROUP)

3.8 The WCHAG Working Group was established in late 1998 as a co-operative response between the community and Alcoa to investigate concerns raised by the community

⁸¹ For example, Mr Eric Walmsley, Alcoa employee and local resident, *Transcript of Evidence*, November 21 2001, p1.

⁸² Ibid.

⁸³ Ibid, p2.

⁸⁴ Ibid, pp2-3.

⁸⁵ Ibid, p3.

⁸⁶ Ibid.

⁸⁷ Letter from Mr John Bradshaw MLA, March 12 2002.

⁸⁸ Submission No. 44 from YDCRC, October 10 2002, p4.

with respect to emissions from the Alcoa refinery at Wagerup and odour and health issues especially in the area of northern Yarloop.⁸⁹

- 3.9 The WCHAG Working Group was originally comprised of two representatives from WCHAG, two from Alcoa and an independent facilitator.
- 3.10 An Advisory Group was established in May 1999 to provide independent technical advice to the WCHAG Working Group. This Advisory Group was comprised of representatives from the DEP, the DoH and Murdoch University. It was chaired by the same facilitator as the WCHAG Working Group.⁹⁰
- 3.11 An Interim Report was published by the WCHAG Working Group in August 2001 (**WCHAG Working Group Interim Report**).
- 3.12 In March 2002 the composition of the WCHAG Working Group changed to include two other community groups. It also changed its name to the Wagerup Community Working Group. Refer to paragraph 4.337 and following of this report for a more detailed discussion on the Wagerup Community Working Group.
- 3.13 The Committee was advised in July 2004 that at its last meeting the Wagerup Community Working Group resolved to dissolve the group. The Committee was also advised in July 2004 that a new group called Community Alliance for Positive Solutions had been formed.

Wagerup Community Health Awareness Group complaints sheets

- 3.14 The Committee received evidence on November 21 2001 from Mr Szkraba, Secretary, Wagerup Community Health Awareness Group, who expressed his concern with the manner in which the DEP handled community complaints. Mr Szkraba informed the Committee that members of the local community *“have trouble getting the DEP to recognise our complaints as complaints. It seems to only want to gather them as data - as information - and not register them as complaints against the industry.”*⁹¹
- 3.15 Mr Szkraba submitted that during the installation of the LBF and for the following 12 months *“Although many complaints were lodged with Alcoa and the Department of Environmental Protection the matter was not considered or investigated by either body until the community formed an incorporated group. In fact, initially neither*

⁸⁹ *Interim Report of the Alcoa-Wagerup Community Health Awareness Group Working Group*, August 2001, p4.

⁹⁰ Ibid.

⁹¹ Mr John Szkraba, Secretary, Wagerup Community Health Awareness Group, *Transcript of Evidence*, November 21 2001, p8.

*Alcoa nor the DEP wanted to accept the complaints submitted by the Wagerup community health awareness group as official complaints.*⁹²

- 3.16 In June 1999 the WCHAG therefore initiated a complaint recording system that comprised a form showing a week from Monday to Sunday. On experiencing adverse impacts from the Alcoa refinery at Wagerup, community members were requested to record their name and address, the date, time and weather conditions, whether the complaint was about noise, odour or dust, and any other relevant comments. The Committee was advised that copies of the WCHAG complaints sheets were sent to Alcoa, the DEP, Hon Jim Scott and Mr John Bradshaw MLA.⁹³
- 3.17 During its inquiry the Committee received WCHAG community complaint forms for the period June 1999 to November 2001.⁹⁴ In May 2004 the Committee requested an update of the total number of complaints recorded via the WCHAG community complaint forms. This was provided by the WCHAG and is current to May 13 2004.
- 3.18 In November 2001 Mrs Borserio, then Chairperson, WCHAG, submitted that WCHAG *“do not claim to know about all the people in the community who may or may not be having these problems. What we claim comes from the people who are making contact with us through our complaint form situation, and we have quite detailed records of their symptoms, when they happened, what the wind direction was, what the climatic situation was at the time, what their symptoms were and how they felt it affected them at the time.”*⁹⁵
- 3.19 The Committee also received a graph showing that:⁹⁶
- the total number of complaints recorded via WCHAG’s official complaint sheet for the period June 1999 to September 2001 inclusive was 1887;
 - complaints peaked during the winter months; and
 - the total number of complaints recorded each year increased between 1999 to 2001.

⁹² Ibid, p1. For the DEP’s response to this claim, refer to paragraph 9.72 and following and paragraph 9.95 and following of this report.

⁹³ Mr Giglio Martelli, Vice President, Wagerup Community Health Awareness Group, *Transcript of Evidence*, November 21 2001, p4.

⁹⁴ Forms tabled at the Committee’s hearing with Mr Martelli on November 21 2001; and Submission No. 5 from Mr Giglio Martelli, Vice President, Wagerup Community Health Awareness Group, November 21 2001.

⁹⁵ Mrs Cheryl Borserio, Chairperson, Wagerup Community Health Awareness Group, *Transcript of Evidence*, November 21 2001, p3.

⁹⁶ Graph tabled at the Committee’s hearing with Mr Martelli on November 21 2001; and Submission No. 5 from Mr Giglio Martelli, Vice President, Wagerup Community Health Awareness Group, November 21 2001.

- 3.20 The Committee notes that the figure of 1887 complaints was the total number of complaints recorded via the WCHAG complaints sheet for the period June 1999 to September 2001, and not the total number of complainants. Many complainants recorded more than one complaint during that period.
- 3.21 Mr Martelli advised the Committee that approximately 40 people recorded regular complaints via the WCHAG complaints sheet. He advised that the majority of the complaints did not come from the Yarloop townsite but from those people living within a three kilometre radius of Yarloop.⁹⁷
- 3.22 The update provided by the WCHAG in May 2004 showed that total complaints recorded via the WCHAG complaints sheet system peaked in 2001 with 1053 recorded complaints in that year. The following year complaints decreased by almost half to a total of 596 complaints and in 2003 the total number of complaints decreased to 319.⁹⁸

COMPLAINTS RECORDED BY ALCOA

- 3.23 Alcoa's *Wagerup Refinery and Bauxite Residue Operations Triennial Environmental Review 2000-2002* dated March 2003 (**Triennial Review**) provides a review of operations and relevant research at the Wagerup refinery, summarises performance for the 2002 calendar year and provides trend information where appropriate for the period 2000 to 2002.
- 3.24 The Triennial Review was provided to the Committee by the DoE, which received it from Alcoa as part of the reporting requirements under Alcoa's Wagerup Licence.
- 3.25 The following comments in relation to the Triennial Review relate only to complaints in relation to Alcoa's Wagerup refinery. The Triennial Review is discussed elsewhere in this report in relation to other specific issues arising from the Wagerup refinery.
- 3.26 In its Triennial Review Alcoa reported that it maintained its own community contact database to record complaints.⁹⁹ It noted that during 2002, the refinery received a total of 1590 complaints. 889 of those complaints were received directly by Alcoa from 101 neighbours. Of those:¹⁰⁰
- 512 related to odour;

⁹⁷ Mr Giglio Martelli, Vice President, Wagerup Community Health Awareness Group, *Transcript of Evidence*, November 21 2001, p5.

⁹⁸ Letter from WCHAG, undated but received May 21 2004.

⁹⁹ Alcoa's *Wagerup Refinery and Bauxite Residue Operations Triennial Environmental Review 2000-2002* dated March 2003, p74.

¹⁰⁰ Ibid.

- 310 related to noise;
 - 49 related to health issues; and
 - nine concerned dust control.
- 3.27 Alcoa noted that the number of direct complaints received increased from 500 in 2001 (from 84 neighbours).¹⁰¹
- 3.28 Alcoa's data for total complaints received during 2002 indicates that complaints increased during the winter period, that is, from approximately May to August. Further, more complaints were made direct to Alcoa than via the WCHAG complaints sheets.¹⁰²
- 3.29 Analysis of complaints by type from 2000 to 2002 showed that:¹⁰³
- odour complaints comprised the largest portion of complaints each year, with complaint numbers increasing less in 2002 than the previous year;
 - noise complaints significantly increased from 2000 to 2002 and as at March 2003 were the second most significant source of complaints; and
 - health complaints remained at similar levels in 2002 as in 2001.
- 3.30 Complaint data for 2001 showed that four residences (representing less than five percent of the total residences in Yarloop and Hamel) were responsible for 84 percent of all noise complaints.¹⁰⁴ Although this indicates that the most significant impact from noise was localised, the Committee notes Alcoa's statement that "*noise is recognised by Alcoa as a broad ranging issue for the community and is working to address this.*"¹⁰⁵
- 3.31 In its Triennial Review Alcoa stated that analysis had been carried out on complaints data for 2001 and 2002 in order to understand the potential effect of weather and the refinery process on odour complaints. The analysis determined that:¹⁰⁶
- the majority of complaints occurred from May to August in the peak months for winds from the north-west and north-east sector;

¹⁰¹ Ibid.

¹⁰² Ibid, p75.

¹⁰³ Ibid, p74.

¹⁰⁴ Ibid.

¹⁰⁵ Ibid.

¹⁰⁶ Ibid.

- the majority of complaints were received during normal waking hours, between the hours of 6am and 11pm;
- there were clear correlations between odour complaint times and wind directions and winter wind speeds; and
- no correlations were found between odour complaint times and any individual process variables studied, such as liquor burning operations, quality of calciner feed and calciner gas rates.

COMPLAINTS RECORDED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

3.32 For information on how the DEP responded to complaints made by workers at Alcoa's Wagerup refinery and members of the local communities, refer to paragraphs 9.72 and following and paragraph 9.95 and following of this report.

Data review for the period 1992 to September 2002

3.33 During its inquiry, the DEP provided the Committee with a number of data reviews on the WCHAG complaints sheets and other complaints it had received in relation to Alcoa's Wagerup refinery. These included:

- review for the period 1992/1993 to July 1996, which shows that the DEP received a total of two complaints for that period, being one complaint (in relation to noise) in 1994 and one complaint (in relation to water) in 1995/1996;¹⁰⁷
- review for the period July 1996 to February 2002 inclusive showing complaints made direct to the DEP and complaints recorded via the WCHAG sheets, attached as Appendix 5 to this report;¹⁰⁸ and
- review current to August 2002 showing complaints made direct to the DEP and complaints recorded via the WCHAG sheets, attached as Appendix 6 to this report.¹⁰⁹

3.34 The Committee draws readers' attention to the fact that the WCHAG complaints sheet system was not established until June 1999.

¹⁰⁷ Letter from the DEP, June 18 2002, p3.

¹⁰⁸ Appendix 17 of Submission No. 53 from the DEP, April 9 2002.

¹⁰⁹ Attachment 5 of Submission No. 52 from the DEP, January 24 2003.

Odour

- 3.35 The DEP's data reviews referred to above show that although complaints were being made direct to the DEP in relation to odour from August 1996 onwards, the total number of complaints was small. For the three-year period July 1996 to June 1999 the DEP's data reviews indicate that the DEP received only 11 complaints in relation to odour.
- 3.36 The Committee notes that when the WCHAG complaints sheet system was established in June 1999, odour was significantly the most common reason for complaint. During the first year the WCHAG complaints sheet system was implemented (July 1999 to June 2000), there were 384 complaints recorded in relation to odour. This was followed by:
- 819 complaints recorded from July 2000 to June 2001; and
 - 690 complaints from July 2001 to June 2002.
- 3.37 The Committee notes that during the same period the DEP did not receive a corresponding increase in the number of complaints made direct to it in relation to odour. During the same period from July 1999 to June 2002 when complaints in relation to odour recorded via the WCHAG complaints sheet system totalled 1893, the DEP recorded a total of 127 complaints in relation to odour. In the Committee's view this may be due to a preference in the local community to use the WCHAG complaints sheet system rather than reporting the complaint direct to the DEP. However the Committee also notes that the discrepancy may also indicate a breakdown in the recording mechanism for telephone complaints at the DEP. The Committee was unable to ascertain whether every complaint made to the DEP by a member of the community regarding issues at Alcoa's Wagerup refinery was recorded.

Noise

- 3.38 The DEP's data reviews referred to above show that from July 1996 to June 1999 only a small number of complaints (20) were made direct to the DEP in relation to noise.
- 3.39 With the establishment of the WCHAG complaints system in June 1999, however, there was a significant increase in the number of complaints recorded via that system in relation to noise. For the period July 1999 to June 2000 inclusive, 93 complaints relating to noise were recorded via the WCHAG sheets. This increased to:
- 131 complaints recorded for the period July 2000 to June 2001; and
 - 346 complaints for the period July 2001 to June 2002.

- 3.40 The Committee notes that during the same period the DEP did not receive a corresponding increase in the number of complaints made direct to it in relation to noise. During the same period from July 1999 to June 2002 when complaints in relation to noise recorded via the WCHAG complaints sheet system totalled 570, the DEP recorded a total of 39 complaints in relation to noise.
- 3.41 These figures show a significant and continuing increase in the number of complaints relating to noise from the Wagerup refinery and show that as at June 2002 such complaints were second only to complaints relating to odour.

Complainants

- 3.42 In its submission to the Committee dated January 24 2003 the DEP provided information which it submitted *“attempt to illustrate the change in the location of complainants against Alcoa regarding noise, odour or air quality...”*¹¹⁰
- 3.43 The information was for the financial years 1999/2000, 2000/2001 and 2001/2002. The DEP submitted that the information indicated that:¹¹¹
- *Complainants are concentrated in Yarloop township, with few occurring outside of this location.*
 - *Increases in the total number of complainants is based on an increase in the number of complainants within Yarloop township.*
 - *There has been a southerly shift in complainant location within the township of Yarloop, to around and south of Johnston Road, particularly evident in 2001/2002.*
 - *The total number of complainants in each year has increased, from 24 in 1999/2000 and up to 44 in 2001/2002.*
- 3.44 The DEP submitted that *“It is believed that comparison of the full 2002/2003 financial year with the earlier years may show a significant shift in complainant demographics as previously regular and “sensitised” complainants leave the area (under Alcoa’s buffer acquisition process) and the effects of the Tall Stacks project and Digestion odour destruction projects completed by 1 July 2002 take effect.”*¹¹²
- 3.45 The DEP also submitted that *“It is difficult to describe individual case histories, other than to note that typically the complainants that describe the greatest impacts or most*

¹¹⁰ Attachment 5 of Submission No. 52 from the DEP, January 24 2003.

¹¹¹ Ibid.

¹¹² Ibid.

severe symptoms are seeking to leave the district, dependent on successful negotiations with Alcoa for purchase of their properties."¹¹³

Data review for the period January 2001 to September 2003

3.46 In March 2004 the Committee received an updated complaints analysis report from the DEP (now DoE) for the period January 2001 to September 2003.

3.47 In its report the DoE expressed its awareness that there are many factors which may be influencing complaint numbers to varying degrees, including people leaving the area, complaint fatigue, social factors, major emission reduction works completed in June 2002 and different meteorological conditions in different years.¹¹⁴ The DoE noted that its report had analysed the data based on the numbers only, however it also noted that there were some trends which were quite significant.¹¹⁵ These are discussed below.

3.48 As was noted in the data reviews from the DoE referred to above, the vast majority of complaints registered from 2001 to 2003 were registered via the WCHAG complaints sheet system rather than direct to the DoE.¹¹⁶

3.49 The DoE noted that:¹¹⁷

- total complaints had reduced by 77 percent between 2001 to September 2003;
- the numbers of complaints had decreased by approximately 50 percent between subsequent years;
- there was an overall decrease in the number of new complainants from each previous year and for those complainants an overall reduction in the number of complaints registered. For example, 58 percent of the people who lodged a complaint in 2001 did not lodge a complaint in 2002 and 56 percent of the people who lodged a complaint in 2002 did not lodge a complaint to September 2003;
- the average number of total complaints per complainant declined significantly from 2001 to 2003; and
- the total number of complainants decreased in each year.

¹¹³ Ibid.

¹¹⁴ Letter from the DEP (now DoE), February 25 2004 attaching Complaints Analysis Report, p1.

¹¹⁵ Ibid.

¹¹⁶ Ibid, Attachment 1 of the letter.

¹¹⁷ Letter from the DEP (now DoE), February 25 2004 attaching Complaints Analysis Report, pp2-3.

- 3.50 The DoE also noted that its data suggested that in any year the majority of complaints were registered through a core group of complainants.¹¹⁸ For example, the DoE's data review shows that:¹¹⁹
- from July to December 2001 five complainants were responsible for 51 percent of the total complaints;
 - from July to December 2002 six complainants were responsible for 69 percent of the total complaints; and
 - from July to September 2003 four complainants were responsible for 86 percent of complaints.
- 3.51 In relation to the reasons for the complaints, the DoE's figures showed complaints about air quality and odour issues reduced over the period 2001 to 2003. Further, the average number of complaints per complainant in relation to air quality declined significantly between 2001 and 2002.¹²⁰
- 3.52 In relation to complaints about noise, the DoE noted that noise historically represents a significant complaint issue.¹²¹ Noise was the second most prominent reason for complaints in 2001 and 2002. It became the most complained about issue in 2003.¹²²
- 3.53 The DoE noted that the majority of complaints in relation to noise occurred within the boundary of Area A. Area A is discussed in paragraph 7.7 and following of this report.
- 3.54 The DoE also noted that although the number of complainants from July to December in each year decreased, the average number of complaints about noise per complainant rose from 2.6 complaints per complainant in 2002 to 9.2 complaints per complainant in 2003.
- 3.55 The DoE advised the Committee that it was not aware of any significant noise generating works occurring during this period and that no increase in throughput occurred during this period.¹²³ The DoE noted that complaints in relation to noise (like complaints in relation to odour) are primarily driven by certain meteorological

¹¹⁸ Ibid, p3.

¹¹⁹ Ibid.

¹²⁰ Ibid.

¹²¹ Ibid, p4.

¹²² Ibid.

¹²³ Ibid.

- conditions that may differ from year to year. The DoE submitted that this adds to the complexity of analysing the data.¹²⁴
- 3.56 The Committee is interested to note the DoE's advice that there was a 216 percent increase in the number of noise complaints received between 2002 and 2003.¹²⁵ The DoE noted that this could be because noise had *"become more topical rather than as an issue of increasing concern, and may be due in part to the lessened emphasis by the community on air quality issues."*¹²⁶
- 3.57 The DoE also submitted that *"Another reason for the increasing trend in noise complaints may be dissatisfaction with the current proposal and management strategy whereby Alcoa is currently seeking exemption under Regulation 17 of the Environmental Protection (Noise) Regulations 1992."*¹²⁷
- 3.58 The figures from the DoE show that April to September is the main complaint period in any year from 2001 to 2003. The peak complaint month in those years is consistently June.¹²⁸ The DoE submitted that this suggests that meteorological conditions over the winter period have a strong influence on complaint events both for noise and odour events.¹²⁹
- 3.59 In relation to the geographic location of where complainants recorded their complaints, the DoE submitted that all complaints received in 2003 (to September) were located south of Alcoa's Wagerup refinery. It submitted that this data was congruent with 2002 results.¹³⁰
- 3.60 The DoE noted that residents living in the Hamel area (north of the refinery) also experience events but had not complained to the DoE in 2003. The DoE advised that they had, however, complained to Alcoa. The DoE noted that the seasonality of events in the Hamel area was primarily in the summer period when prevailing wind patterns were different to those which influence the Yarloop area.¹³¹

¹²⁴ Ibid.

¹²⁵ Ibid, p5.

¹²⁶ Ibid.

¹²⁷ Ibid.

¹²⁸ Ibid.

¹²⁹ Ibid.

¹³⁰ Ibid. The DoE noted that geographic location was determined by the approximate location of complainants' residences. It advised that geographic locations of complainants may be incorrect if complainants were not at their home at the time they experienced the event.

¹³¹ Ibid.

COMMITTEE FINDINGS

- 3.61 On the basis of the data provided during the inquiry, the Committee notes the large number of complaints that were recorded following the installation of the LBF at Alcoa's Wagerup refinery.
- 3.62 The Committee notes that there were originally three different methods by which complaints in relation to Alcoa's Wagerup refinery were recorded, being by Alcoa, the WCHAG complaints sheets and the DEP. The Committee considers that this was partly due to the initial inadequacy of the DEP's complaint handling procedure. (Refer to paragraph 9.95 and following of this report for further information in relation to the DEP's complaint handling procedure).
- 3.63 The Committee notes evidence received in November 2001 that although people did lodge complaints with the DEP, those people felt that the DEP did not treat those approaches to their satisfaction. The Committee notes the DEP's advice, however, that prior to 1999 they did not receive many 'formal' complaints. These different positions indicate to the Committee that the DEP's complaints handling procedures were less than satisfactory.
- 3.64 The Committee notes that the DoE has now refined its internal protocols to aid in the early identification and resolution of emerging environmental issues including matters of community concern. The Committee considers that it is extremely important that the DoE makes its complaint handling and recording processes accessible to the community. The Committee notes, for example, that as at July 2004 there is no mechanism on the DoE website by which members of the community are informed as to how to lodge a complaint.
- 3.65 The Committee notes that:
- total complaints from the community decreased significantly between 2001 to 2003;
 - nevertheless many complaints continued to be lodged in 2003; for example, 319 complaints were lodged through the WCHAG complaints sheet system that year;
 - during 2003 noise overtook odour as the most common cause for community complaint;
 - the majority of complaints from the local community in relation to noise occurred within the boundary of Area A;
 - the majority of community complaints in relation to Alcoa's Wagerup refinery occur during the winter months, peaking in June; and

- the majority of community complaints come from a small number of complainants.
- 3.66 The Committee also notes that there was an overall decrease in the number of new complainants from each previous year and for those complainants an overall reduction in the number of complaints registered. The Committee considers that this correlation may be partly due to the extensive changes Alcoa made to its refining processes at Wagerup between 2001 and 2003. The Committee considers that the decrease in the number of complaints during this period could also be partly as a result of people who were affected by the refinery moving away from the area.
- 3.67 The Committee observes that the data provided indicates that in any year the majority of complaints were registered through a core group of complainants.

RECOMMENDATION

Recommendation 2: The Committee recommends that the Department of Environment establish a more readily accessible and transparent complaint handling system which includes formal acknowledgment when a complaint is registered.

CHAPTER 4

PUBLIC HEALTH

OVERVIEW OF CHAPTER

- 4.1 The Committee has summarised many of the submissions received in relation to public health issues to give the reader an understanding of the volume and complexity of submissions received and the range of issues that were brought to the Committee's attention during the course of its inquiry.
- 4.2 The Committee has also provided a summary of many of the reports, studies and projects undertaken in relation to public health concerns raised by Alcoa employees and people living in the local communities and the initiatives implemented by Alcoa and/or the State Government in response to those public health concerns. The Committee found no difference between the types of health complaints made by these two groups of people and has therefore made no distinction between them in its comments on public health issues.
- 4.3 In this chapter the Committee discusses:
- evidence from general practitioners;
 - evidence from Dr Mark Cullen, Professor of Medicine and Public Health at Yale University and joint Chief Medical Officer of Alcoa;
 - a submission to the National Centre for Classification in Health from Hon Alan Corbett MLC, Independent Member of the New South Wales Legislative Council;¹³²
 - examples of evidence received from individuals living and/or working in the vicinity of the Alcoa refinery at Wagerup in relation to health complaints;
 - evidence from the Department of Health (**DoH**);
 - various reports, studies, surveys and projects undertaken including the Healthwise Project and Wagerup Medical Practitioners' Forum;
 - the initiatives implemented by Alcoa and/or the State Government in response to those reports and studies;

¹³²

As of February 28 2003 Mr Corbett ceased to be a member of the NSW Parliament.

- evidence from Professor D’Arcy Holman, Chair in Public Health, School of Population Health, University of Western Australia; and
 - environmental and emission monitoring.
- 4.4 The final part of the chapter contains Committee findings, analysis and conclusions as well as recommendations.

EVIDENCE FROM GENERAL PRACTITIONERS

Dr M Somers

- 4.5 At the Committee’s hearing on April 10 2002 Dr Moira Somers appeared before the Committee and gave evidence in her capacity as a general practitioner who had seen several sick workers and residents from the Wagerup and Kwinana areas. Dr Somers advised the Committee that in 1987 and 1988 she became interested in the management of patients with chronic fatigue syndrome and, subsequently, patients who have had chemical injuries and multiple chemical sensitivities (MCS).¹³³
- 4.6 Dr Somers advised that the first worker from Alcoa presented to her in December 1997. At the hearing in April 2002, Dr Somers estimated that since December 1997 she had seen 19 workers (some of whom lived in close proximity to the refinery and who were affected by emissions at home and at work) and 16 to 18 residents of the local community. She had other patients on a waiting list. Of the 19 workers she had seen, Dr Somers advised that 17 were from Wagerup and two from Kwinana.¹³⁴
- 4.7 Dr Somers noted that:¹³⁵
- the patients who presented to her had remarkably similar histories and more often than not demonstrated “*a striking temporal relationship to exposures to refinery emissions, notably oxalate, caustic and liquor burning fumes.*”;
 - workers consistently reported becoming unwell with exposures to liquor burning fumes and that health impacts were not always related to odour; and
 - most of the workers presented with a multitude of symptoms, including lethargy, fatigue, headaches, epistaxis (bleeding from the nose), sore eyes, nose and throat, breathing difficulties, abdominal discomfort, urinary frequency, nocturia (getting up many times at night to go to the toilet),

¹³³ Dr Moira Somers, General Practitioner, *Transcript of Evidence*, April 10 2002, p1.

¹³⁴ Ibid, p2.

¹³⁵ Ibid.

myalgia and cognitive dysfunction (difficulty with mental function) and sensitivity to various chemicals.

- 4.8 The Committee was informed by Dr Somers that three of the 17 workers from the Wagerup refinery who had presented to her were contractors who had experienced significant exposure to refinery emissions.¹³⁶ Dr Somers advised that one of those contractors has Goodpasture's syndrome¹³⁷ and chemical sensitivities, another developed Wegener's Granulomatosis¹³⁸ shortly after he worked at the refinery and the third was still under investigation.
- 4.9 Dr Somers noted that Goodpasture's syndrome and Wegener's Granulomatosis have been documented in peer-reviewed literature to have some causal relationship to environmental factors. She noted that there is, medically, an overlap between the two conditions.¹³⁹
- 4.10 Dr Somers also informed the Committee that two patients have been diagnosed with reactive airways dysfunction syndrome, a variant of occupational asthma. Dr Somers submitted that both patients became unwell after exposure to VOCs. Another patient has occupational asthma, while another presented predominantly with skin complaints.¹⁴⁰
- 4.11 The Committee was advised by Dr Somers that some of the workers she had seen had developed depression secondary to their work-related injury. She advised that several workers had been assessed by psychiatrists on behalf of Alcoa and that depression had been excluded as having a causative role in the onset of their illness.¹⁴¹
- 4.12 Dr Somers gave evidence that another patient she had seen had been attending the Alcoa medical centre for approximately two years and that her understanding was that he had been told that his condition was psychosomatic.¹⁴² Dr Somers advised the Committee that when he presented to her, he had many complaints similar to other

¹³⁶ Ibid, pp2-3.

¹³⁷ A form of rapidly progressive glomerulonephritis (a form of kidney disease causing damage to the internal structures (particularly the glomeruli) and rapid loss of kidney function, with crescents ("new moon shaped" abnormalities) showing on a biopsy of the kidney) which involves a progressive decrease in the kidney's ability to function properly, accompanied by a cough with bloody sputum: <http://www.nlm.nih.gov/medlineplus/ency/article/000142.htm> (accessed August 26 2003).

¹³⁸ A rare disorder which causes inflammation of blood vessels (vasculitis) in the upper respiratory tract (nose, sinuses, ears), lungs, and kidneys. Many other areas of the body may also be affected, with arthritis (joint inflammation) occurring in almost half of all cases. The eyes and skin may also be affected: <http://www.nlm.nih.gov/medlineplus/ency/article/000135.htm> (accessed August 26 2003).

¹³⁹ Dr Moira Somers, General Practitioner, *Transcript of Evidence*, April 10 2002, p3.

¹⁴⁰ Ibid.

¹⁴¹ Ibid, pp3-4.

¹⁴² Ibid, p3.

workers, however his memory loss was more severe. She informed the Committee that further investigations revealed he had a cyst on the third ventricle of the brain and that he went on to have neurosurgery.¹⁴³

4.13 Dr Somers submitted that *“This is only one instance that highlights to me the need for independent assessment of workers to avoid industry bias.”*¹⁴⁴

4.14 Dr Somers expressed her belief that of the workers she had seen, ten met the diagnostic criteria for MCS as described by Dr Mark Cullen in the *Encyclopaedia of Occupational Health and Safety* (refer to paragraph 4.43 and following of this report) and in a consensus statement published in the May/June 1999 issue of *Archives of Environmental Health*, Vol. 54, No. 3, pp 147-149 (attached as Appendix 7 to this report). Dr Somers advised that these documents contain the guidelines she used to assess the patients. Nine of the patients were from Wagerup and one was from Kwinana.¹⁴⁵

4.15 Dr Somers expressed her concern that:¹⁴⁶

- the workers she had seen consistently reported to her that many other workers - at times up to 30 - had suffered ill effects such as nose, throat and eye irritations and chest problems;
- patients reported to her that the effects were short lived, and that often only one member of the crew would report the exposure on behalf of the whole crew; and
- this could lead to health impacts being underestimated.

4.16 The Committee was advised by Dr Somers that there had been a small increase in the number of people she had recently treated. Dr Somers expressed her opinion that this was because *“a lot of people have realised what they are suffering, they have a little more courage, and they have come out of the woodwork, so to speak.”*¹⁴⁷ However Dr Somers noted that she was not seeing new incidents of people becoming unwell but rather people who had been unwell for a long time. She noted that the dates these people reported becoming unwell *“pretty much dates back to about the same time that the others became unwell.”*¹⁴⁸

¹⁴³ Ibid, p3.

¹⁴⁴ Ibid.

¹⁴⁵ Ibid.

¹⁴⁶ Ibid.

¹⁴⁷ Ibid, p6.

¹⁴⁸ Ibid.

- 4.17 The Committee was informed by Dr Somers that of the residents of the local community she had seen, most reported irritant effects such as sore eyes, noses and throats, breathing difficulties, lethargy and headaches. She advised that two of the residents she had seen have MCS and two also suffer from significant skin rashes.¹⁴⁹

Multiple chemical sensitivities

- 4.18 Dr Somers discussed MCS and informed the Committee that *“A large number of people who work in that environment suffer irritant effects, but a significant small group of patients have become very unwell and have been diagnosed with multiple chemical sensitivities.”*¹⁵⁰

- 4.19 Dr Somers informed the Committee that it was not known what caused the illness or the exact physiology of MCS however she submitted that *“The onset of multiple chemical sensitivities often comes after exposure to toxic levels of chemicals, often in the work environment, and then leads to the development of a broadening sensitivity to a diverse range of chemicals at low dose.”*¹⁵¹ She submitted that *“Products that most of us would tolerate without any difficulty cause a person with MCS to become unwell with multiple symptoms, often similar to those experienced when they were first exposed to the high dose of chemicals in the workplace.”*¹⁵²

- 4.20 During the course of her evidence Dr Somers submitted that:

- patients with MCS give a history of some exposure, *“whether it is an individual exposure or several exposures over a period that seem to be rather large.”*¹⁵³
- symptoms experienced by people with MCS include headaches, tiredness, muscle aches and pains, abdominal discomfort, urinary tract problems, blunting of their mental functions and speech disturbances;¹⁵⁴
- people who present with MCS *“are tired, cannot recover, and cannot seem to ever get back to their former level of health.”*¹⁵⁵ and
- *“These people have long-term effects from this exposure.”*¹⁵⁶

¹⁴⁹ Ibid, p3.

¹⁵⁰ Ibid, p4.

¹⁵¹ Ibid, p4.

¹⁵² Ibid.

¹⁵³ Ibid, p16.

¹⁵⁴ Ibid.

¹⁵⁵ Ibid, p17.

4.21 The Committee was informed by Dr Somers that:¹⁵⁷

- she had seen patients who had said they had been exposed to a significant plume at the refinery, become unwell after exposure, recovered after several days off work, returned to work and were re-exposed to another plume and again become unwell;
- her patients indicated that this pattern occurred repeatedly and that they did not recover as well between each incident; and
- these people have gone on to develop generalised sensitivity.

4.22 Dr Somers advised the Committee that most of these patients had experienced several exposures, although she submitted that this did not mean it was not possible to develop sensitivity after one exposure.¹⁵⁸ She noted that all the workers she had seen with MCS had been remarkably consistent in their reporting of events in relation to both the exposures resulting in the onset of their illness and in the development of sensitivities to a diverse range of chemicals at low levels.¹⁵⁹

4.23 During the course of her evidence, Dr Somers submitted that over the years there had been considerable debate in the medical arena in relation to MCS. She expressed the view that the debate has a highly political component.¹⁶⁰

4.24 The Committee heard evidence from Dr Somers that according to peer-reviewed literature to 1998, out of 457 peer-reviewed scientific papers and reports, there was a two to one ratio in favour of a physical basis for MCS.¹⁶¹ Dr Somers submitted that at that time “*MCS had been further acknowledged by 25 United States federal authorities, 10 Canadian authorities, 23 US state authorities, myriad local authorities, eight US federal court decisions, 20 US state court decisions and countless independent and medical organisations.*”¹⁶² Dr Somers advised that MCS was listed as one of the top three environmental diagnoses by clinics such as Massachusetts General Hospital, John Hopkins University School of Medicine and Emory University.¹⁶³

¹⁵⁶ Ibid.

¹⁵⁷ Ibid, p6.

¹⁵⁸ Ibid.

¹⁵⁹ Ibid, p4.

¹⁶⁰ Ibid.

¹⁶¹ Ibid.

¹⁶² Ibid, pp4-5.

¹⁶³ Ibid, p5.

- 4.25 Dr Somers advised the Committee that MCS does not, as yet, have a designation as a disease entity, however she submitted that it is a well recognised illness and causes disability. She stated that:

*The fact that it does not have disease entity status does not deny the fact that individuals suffer from this illness and they deserve personal respect, professional objectivity and medical management to the best of our present knowledge. Medicine just does not understand the pathophysiology of this condition, and it may be a long time before we do.*¹⁶⁴

Rehabilitation

- 4.26 Dr Somers advised the Committee that there were varying degrees of illness and disability within the group of Alcoa workers she had seen.¹⁶⁵ In her view, “*Generally, most are severely disabled and will be unable to return to work in the refinery environment. Most will also find great difficulty establishing themselves in any form of sustainable employment outside of Alcoa.*”¹⁶⁶ Dr Somers also advised that in most cases, patients have been too unwell to attempt rehabilitation or they have failed rehabilitation attempts due to MCS.¹⁶⁷
- 4.27 During the course of her evidence Dr Somers advised that there are degrees of illness with MCS and that some of her patients who were mildly unwell with chemical sensitivities and who had removed themselves from exposure had managed to change direction in their lives and move on.¹⁶⁸ However Dr Somers submitted that none of her patients had ever become completely well after suffering from MCS.¹⁶⁹ She noted that people seem to develop the illness to a certain level and that level remains constant; that is, the condition is ongoing but not necessarily progressive. Dr Somers told the Committee that “*I do not have patients who have got rid of it.*”¹⁷⁰

Suggestions for the future

- 4.28 In response to a question from Hon Jim Scott about the possible need for a review and upgrade of training for those in the medical community in relation to clinical injury

¹⁶⁴ Ibid. “Pathophysiology” is defined as “*the physiology of abnormal states; specifically: the functional changes that accompany a particular syndrome or disease*”: <http://www2.merriam-webster.com/cgi-bin/mwmednlm?book=Medical&va=pathophysiology> (accessed August 26 2003).

¹⁶⁵ Dr Moira Somers, General Practitioner, *Transcript of Evidence*, April 10 2002, p5.

¹⁶⁶ Ibid.

¹⁶⁷ Ibid.

¹⁶⁸ Ibid, p8.

¹⁶⁹ Ibid.

¹⁷⁰ Ibid.

and in particular MCS, Dr Somers submitted that *“It would be absolutely wonderful if more doctors understood this condition. It would be just like a patient walking in with chest pain and being assessed objectively. That would be fantastic.”*¹⁷¹

Dr A Harper

- 4.29 At its hearing on February 18 2002 Dr Andrew Harper appeared before the Committee in his capacity as an occupational physician and private medical practitioner. He advised the Committee that he had seen a number of workers from Alcoa, but had not seen any residents from the local community. The workers he had seen were long-term Alcoa employees. Dr Harper told the Committee that he had been involved as a doctor both directly with Alcoa and with some of the workers since 1996.¹⁷²
- 4.30 Dr Harper expressed his view that the health concerns in relation to the Alcoa refinery at Wagerup are a public health problem, and as such *“the management of the affected workers requires a public health program that addresses both preventative and treatment components.”*¹⁷³ Dr Harper expressed his concern that *“there has not been a discrete, organised public health response to the situation that has occurred.”*¹⁷⁴
- 4.31 Dr Harper also submitted that medical treatment for affected workers should be independent of any vested interests.¹⁷⁵ He expressed concern that a medical program for affected workers provided by an employer could be subject to the economic interests of the employer and would have the potential to interfere with the quality of care and the access that people have to it.¹⁷⁶
- 4.32 Dr Harper noted that a number of people have been affected by the operations of the Alcoa refinery at Wagerup and have ongoing health problems. He expressed his opinion that *“It is appropriate, in terms of public health practice, that there be a health surveillance program.”*¹⁷⁷ Dr Harper submitted that this would constitute *“a register of people who have developed symptoms, a systematic and standardised assessment process and appropriate medical care and follow-up treatment.”*¹⁷⁸

¹⁷¹ Ibid, p16.

¹⁷² Dr Andrew Harper, Private Medical Practitioner, *Transcript of Evidence*, February 18 2002, pp 1 and 5.

¹⁷³ Ibid, p1.

¹⁷⁴ Ibid.

¹⁷⁵ Ibid.

¹⁷⁶ Ibid.

¹⁷⁷ Ibid.

¹⁷⁸ Ibid.

- 4.33 It was also Dr Harper's submission that industrial hygiene strategies are needed; specifically on-site strategies designed to minimise exposure.¹⁷⁹ Dr Harper submitted that these strategies vary between workplaces and according to the problems involved. He noted that one issue was the quality of air inhaled by the affected workers and submitted that *"It is appropriate that there be an industrial hygiene program specifically to focus on endeavouring to control the workplace air."*¹⁸⁰
- 4.34 Dr Harper submitted that such strategies could include modification of work patterns and practices (such as controlling the air inhaled by the workers), the location of workers relative to the emission plume and control of the workers' air space.¹⁸¹
- 4.35 In response to a question from the Chairman requesting examples of the kinds of symptoms people present with, Dr Harper advised that the symptoms are generally not specific to any particular disease. He advised that they include a variety of symptoms such as fatigue, upper respiratory irritation, general muscular discomfort, urinary frequency at night and mental symptoms; that is, some degree of difficulty concentrating.¹⁸²
- 4.36 In response to another question by the Chairman inquiring as to whether or not he accepted MCS as a distinct disease entity, Dr Harper submitted that he accepted that *"there are people today in very different workplaces who are experiencing recurrent symptoms, where the symptoms start with some exposure to a chemical and then may get worse in time."*¹⁸³
- 4.37 Dr Harper told the Committee that he sees this pattern a lot: in people who have worked in the aviation industry, farmers, mechanics and in the group of workers from Alcoa. Dr Harper noted that it has been called MCS and stated that he did not have any objection to that label. He expressed his belief that *"there is some form of chemical injury that is causing ongoing disability and ongoing sensitivity to exposure, quite often to a growing number of chemicals, such as fumes from wood-burning stoves, bush fires, cigarette smoke, diesel, perfume and a whole lot of things, which then incapacitates people in their everyday life;..."*¹⁸⁴
- 4.38 Dr Harper submitted that MCS is a controversial area in the field of medical science. He suggested that the controversy has probably arisen because toxicology in medicine has traditionally grown up around poisoning from heavy metals such as mercury and

¹⁷⁹ Ibid, p2.

¹⁸⁰ Ibid.

¹⁸¹ Ibid.

¹⁸² Ibid, p3.

¹⁸³ Ibid.

¹⁸⁴ Ibid.

lead which do not change in the body.¹⁸⁵ Dr Harper advised the Committee that if a person is sick from such heavy metals there are tests to determine that they have poisoning as a result of those heavy metals and when the compound is taken away there is a clear identifiable chemical cause.¹⁸⁶

EVIDENCE FROM DR M CULLEN

Background

- 4.39 At the Committee's hearing on February 18 2002 it heard evidence from Dr Mark Cullen. He advised that he attended medical school at Yale University in the 1970s, joined the full-time faculty of the university in 1980, and had been a full-time member of staff ever since. Dr Cullen advised that his position is Professor of Medicine and Public Health and in that capacity he directs the Occupational and Environmental Medicine Program at the Yale School of Medicine. He estimated that approximately half to two-thirds of his professional career had involved research. Dr Cullen advised that he has an interest in the issue of MCS and responses to low-level environmental chemical exposures.¹⁸⁷
- 4.40 Dr Cullen advised the Committee that in 1993 he developed a consulting relationship with Alcoa. That continued through 1996, at which time he and several other staff members at Yale University, pursuant to a contractual agreement between Alcoa and the university, collectively performed the duties of a medical director for Alcoa. Dr Cullen described this arrangement as a combined research and service activity that occupies 25 percent of his time. Five other individuals are actively involved in the contractual relationship. Under this contractual arrangement with Yale University, Dr Cullen serves as Chief Medical Officer of Alcoa.¹⁸⁸
- 4.41 Dr Cullen advised that he is not involved with the direct management of individual clinical cases. His responsibility is in the setting and development of policy and worldwide health protocols, and the supervision of the data sets in which the information is collected.
- 4.42 Dr Cullen advised the Committee that he had previously visited the Alcoa refinery at Wagerup in 1998. The major purpose of his visit to Western Australia in 2002 was to investigate the public health concerns at the Wagerup refinery.¹⁸⁹

¹⁸⁵ Ibid.

¹⁸⁶ Ibid.

¹⁸⁷ Dr Mark Cullen, Professor of Medicine, Yale University, *Transcript of Evidence*, February 18 2002, p1.

¹⁸⁸ Ibid, pp1-2.

¹⁸⁹ Ibid, p2.

Multiple Chemical Sensitivity

- 4.43 Dr Cullen advised the Committee that early in the 1980s as part of his practice at Yale University, he and his colleagues began observing a variety of clinical problems in individuals who reacted to levels of chemicals in situations that did not fit easily into the traditional occupational disease categories that were available.¹⁹⁰
- 4.44 As part of that study, Dr Cullen and his colleagues put together a monograph describing all the existing views in the mid-1980s of that condition. Among other things, the monograph introduced the label ‘MCS’ to describe a group of patients who had symptoms in response to multiple low-level environmental exposures. Dr Cullen informed the Committee that the monograph was published in 1987.¹⁹¹
- 4.45 The Committee also notes that an article written by Dr Cullen on MCS was published in the *Encyclopaedia of Occupational Health and Safety*.¹⁹² In that article Dr Cullen noted that “*Since the 1980s a new clinical syndrome has been described in occupational and environmental health practice characterized by the occurrence of diverse symptoms after exposure to low levels of artificial chemicals, although as yet it lacks a widely accepted definition.*”¹⁹³ Dr Cullen wrote that “*The disorder may develop in individuals who have experienced a single episode, or recurring episodes of a chemical injury such as solvent or pesticide poisoning. Subsequently, many types of environmental contaminant in air, food or water may elicit a wide range of symptoms at doses below those which produce toxic reactions in others.*”¹⁹⁴
- 4.46 Dr Cullen noted in his article that patients are presenting with MCS “*far more commonly than in the past*”¹⁹⁵ and that it is “*prevalent enough to have generated substantial public controversy as to who should treat patients suffering with the disorder and who should pay for the treatment, but research has yet to elucidate many scientific issues relevant to the problem, such as its cause, pathogenesis, treatment and prevention.*”¹⁹⁶ Dr Cullen wrote that “*Despite this, MCS clearly does occur and causes significant morbidity in the workforce and general population.*”¹⁹⁷

¹⁹⁰ Ibid, p3.

¹⁹¹ Dr Mark Cullen, *The Worker with Multiple Chemical Sensitivities: An Overview*, Occupational Medicine: State of the Art Reviews, Volume 2, No 4, October-December 1987, Hanley and Belfus (USA), pp655-62.

¹⁹² Dr Mark Cullen, *Multiple Chemical Sensitivities, Encyclopaedia of Occupational Health and Safety*, Fourth Edition, Vol 1, 1998, International Labour Office, Geneva, p13.6.

¹⁹³ Ibid.

¹⁹⁴ Ibid.

¹⁹⁵ Ibid.

¹⁹⁶ Ibid.

¹⁹⁷ Ibid.

4.47 Dr Cullen wrote that although there is no general consensus of a definition for MCS, certain features allow it to be differentiated from other well-characterized entities. These include the following:¹⁹⁸

- Symptoms typically occur after a definitely characterizable occupational or environmental incident, such as an inhalation of noxious gases or vapours or other toxic exposure. This ‘initiating’ event may be a single episode, such as an exposure to a pesticide spray, or a recurrent one, such as frequent solvent overexposure. Often the effects of the apparently precipitating event, or events, are mild and may merge without clear demarcation into the syndrome which follows.
- Acute symptoms similar to those of the preceding exposure begin to occur after re-exposure to lower levels of various materials, such as petroleum derivatives, perfumes and other common work and household products.
- Symptoms are referable to multiple organ systems. Central nervous system complaints such as fatigue, confusion and headache occur in almost every case. Upper and lower respiratory, cardiac, dermal, gastrointestinal and musculoskeletal symptoms are common.
- It is generally the case that very diverse agents may elicit the symptoms at levels of exposure orders of magnitude below accepted TLVs or guidelines.
- Complaints of chronic symptomatology such as fatigue, cognitive difficulties, gastrointestinal and musculoskeletal disturbances are common. Such persistent symptoms may predominate over reactions to chemicals in some cases.
- Objective impairment of the organs which would explain the pattern or intensity of complaints is typically absent. Patients examined during acute reactions may hyperventilate or demonstrate other manifestations of excess sympathetic nervous system activity.
- No better established diagnosis easily explains the range of responses or symptoms.

4.48 Dr Cullen’s article includes detailed discussion on diagnosis, pathogenesis,¹⁹⁹ epidemiology, natural history, clinical management and prevention and control of

¹⁹⁸ Ibid.

¹⁹⁹ Pathogenesis: the development of a particular disease, including the specific events involved, bodily tissues or systems affected, mechanisms of damage and timing of the course of disease: www.sfaf.org/treatment/beta/b32/b32glos.html (accessed May 11 2004).

- MCS. The Committee refers readers interested in this further information on MCS to Dr Cullen's article.
- 4.49 At its hearing on February 18 2002 Dr Cullen informed the Committee that MCS is yet to be understood well enough to classify as a distinct disease entity and has not yet been endowed with a diagnostic code in the international classification of diseases.²⁰⁰ He advised that in many countries, including the United States of America and in Europe, the label of 'MCS' was widely used in practice.²⁰¹
- 4.50 During the hearing on February 18 2002 Dr Cullen provided the Committee with an unpublished (as at February 18 2002) chapter he had written about MCS. Dr Cullen advised that the chapter would form part of the second edition of his textbook of occupational and environmental medicine.²⁰²
- 4.51 In the draft chapter provided to the Committee, Dr Cullen wrote that MCS is "*acquired, usually after the occurrence of a more clearly evident (although not necessarily serious) health event caused by environmental exposure, such as solvent intoxication, respiratory tract irritation, pesticide poisoning or NSBRI [Non-Specific Building Related Illness].*"²⁰³ He noted that the patient experiences multiple symptoms referable to several organ systems, almost always including the central nervous system.²⁰⁴
- 4.52 Dr Cullen noted that the agents that may precipitate the symptoms are multiple and chemically diverse and that "*The doses of these agents that precipitate symptoms are at least two orders of magnitude lower than the established thresholds for acute health effects.*"²⁰⁵
- 4.53 Dr Cullen noted that no test of physiologic function can explain the symptoms. He wrote that "*Although there may be clinical abnormalities, such as mild bronchospasm or neuropsychologic dysfunction, these are typically non-specific and insufficient to explain the full scope of the illness pattern.*"²⁰⁶

²⁰⁰ Dr Mark Cullen, Professor of Medicine, Yale University, *Transcript of Evidence*, February 18 2002, p3.

²⁰¹ Ibid.

²⁰² Dr Mark Cullen, Unpublished chapter headed "*Low-Level Environmental Exposures.*" The Committee understands from Dr Cullen that, as at November 25 2003, the second edition of his textbook is in press (Elsevier, London) and that the expected publication date is June 2004. The Committee understands that the chapter provided to the Committee will be published unchanged from the version provided to the Committee on February 18 2002.

²⁰³ Ibid, pp10-11.

²⁰⁴ Ibid, p11.

²⁰⁵ Ibid.

²⁰⁶ Ibid.

- 4.54 Dr Cullen noted that in people who have symptoms of MCS, no other organic disorder is present that can better explain the pattern of symptoms.²⁰⁷
- 4.55 The Committee notes with interest Dr Cullen's observation that *"Although no evidence has appeared to contradict the perception that clinically manifest MCS is uncommon, population surveys in North Carolina and California have demonstrated that as much as 6% of the population may have symptoms compatible with the diagnosis, sufficient to alter their lives in some ways to accommodate them."*²⁰⁸
- 4.56 The Committee notes Dr Cullen's observation that women are more frequently affected by MCS than men, by perhaps two to four fold.²⁰⁹ He noted that although middle age is the most commonly affected age group, cases have been described from school age through to retirement. Dr Cullen notes that risk for MCS appears relatively evenly distributed by social class and race.²¹⁰
- 4.57 Dr Cullen notes that two distinctive illness patterns are discernible among patients with MCS. Some have striking attacks after exposure, followed by recovery to normal or near normal. These people remain well as long as the offending agents are avoided. Others have persistent and often disabling symptoms, which are made worse by exposure but never entirely relieved.²¹¹
- 4.58 In the chapter provided to the Committee, Dr Cullen notes that *"Contrary to the perception of many patients that the illness runs an inexorable downhill course, current experience suggests that MCS tends to run a naturally cyclic pattern after initial onset."*²¹² He noted that *"the illness is punctuated by periods of greater and lesser discomfort associated with exposure to environmental agents and constitutional complaints."*²¹³
- 4.59 The Committee was interested to note Dr Cullen's comments that *"there is no convincing evidence that patients with MCS ever revert to their premorbid state. This is not to say that major functional and symptomatic improvements are not achievable but that the goal of cure, ie., to return to prior health, does not occur spontaneously and is not generally achievable with present therapeutic modalities."*²¹⁴

²⁰⁷ Ibid.

²⁰⁸ Ibid, p12.

²⁰⁹ Ibid.

²¹⁰ Ibid.

²¹¹ Ibid, p15.

²¹² Ibid.

²¹³ Ibid.

²¹⁴ Ibid, pp15-16.

4.60 The Committee also notes Dr Cullen's comments in relation to the treatment of patients with MCS. Dr Cullen writes that there are no established specific therapies.²¹⁵ Dr Cullen expresses his view that almost every patient needs the following things:²¹⁶

- *Education. A careful explanation of MCS, including what is and is not known about its cause and natural history, is required for the patient, their family, and often, the employer. It is crucial that the patient understand that the disorder is neither lethal nor curable.*
- *Support. This may include self-help groups, counsellors, social workers, or more formal clinical care to manage the inevitable psychologic and social issues that the patient with MCS will have to confront. The goal should be return to the highest level of social, personal and occupational function of which the patient is capable.*
- *Environmental modification. Although removing the patient from all contact with modern life is both highly counterproductive and unlikely to succeed, some changes are important, especially a removal or reduction in the heaviest exposures that are associated with the onset of illness. Often, this entails a work modification and changes in the home environment to make it comfortable and safe.*
- *Economic support. If MCS results in profound levels of disability or a marked reduction in income because of job modification, it is necessary to use available entitlement and benefit programs to guarantee that severe hardship does not undermine treatment and rehabilitation. Rehabilitation to promote new occupational possibilities within limitations is highly desirable.*

4.61 Dr Cullen notes that beyond these measures, little else has been helpful.²¹⁷ He notes that radical therapies, including isolation from all chemicals, megavitamins, antioxidants, desensitization regimes and fat purification are expensive and of unproved value.²¹⁸ Dr Cullen notes that behavioural therapy has been successful in a few widely reported cases but has not been studied in a larger population, so efficacy currently remains unproved.²¹⁹

²¹⁵ Ibid, p16.

²¹⁶ Ibid, pp16-17.

²¹⁷ Ibid, p17.

²¹⁸ Ibid.

²¹⁹ Ibid.

- 4.62 Dr Cullen makes the point that “*Similarly, although psychiatric treatment, including either pharmacologic and/or psychotherapeutic modalities, is always indicated to manage depressive features or troubling anxiety when present, current evidence does not suggest that such therapy is particularly successful for modifying the manifestations of MCS, nor is it clinically indicated for that purpose.*”²²⁰

Report by Dr Cullen

- 4.63 Following his visit to Western Australia, Dr Cullen prepared a report titled *Wagerup Alumina Refinery. Health Issues. Visit to Alcoa World Alumina Australia, West Australian Operations. February 2002.*
- 4.64 In his report, Dr Cullen explained that as Alcoa’s Chief Medical Officer he had been asked to evaluate the health issues associated with Alcoa’s Wagerup refinery and, where appropriate, make recommendations on any further action that might be required to resolve those issues.²²¹ His assessment was to focus on the diagnosis of MCS among the Wagerup workforce as well as broader health complaints among workers and members of the nearby community.²²²
- 4.65 Dr Cullen noted that these health concerns could be categorised as follows:²²³

Workplace:

- mucous membrane irritations (for example, nasal reactions, sore eyes, sore throat and cough); and
- 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;
- suspicion of health impacts, including MCS and heavy metal exposures; and
- fear of long term, serious health problems (for example, cancer, kidney and liver disease).

²²⁰ Ibid.

²²¹ Dr Mark Cullen, *Wagerup Alumina Refinery. Health Issues. Visit to Alcoa World Alumina Australia, West Australian Operations. February 2002.* p1.

²²² Ibid.

²²³ Ibid.

- 4.66 In his report Dr Cullen stated that *“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.”*²²⁴ He noted that Alcoa has *“by no means ignored the social dimension but appears to have placed greater emphasis on the latter.”*²²⁵
- 4.67 He noted that Alcoa therefore *“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.”*²²⁶
- 4.68 He wrote that *“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.”*²²⁷
- 4.69 In his comments regarding rehabilitation, Dr Cullen notes that:²²⁸
- 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;
 - *“any rehabilitation program would be rendered ineffective without an acknowledgment that the company [Alcoa] believes its employees are sincere about their disabilities.”*;
 - *“based on the known effects of plant emissions and existing data and patterns of existing data, the threat of serious illness from the refinery is negligible.”*; and
 - *“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.”*
- 4.70 In his report, Dr Cullen expresses his confidence that *“control of health and safety in the plant is at the highest level,…”*²²⁹

²²⁴ Ibid, p6.

²²⁵ Ibid.

²²⁶ Ibid.

²²⁷ Ibid.

²²⁸ Ibid.

²²⁹ Ibid.

- 4.71 In his comments regarding the community, Dr Cullen wrote that *“The anger of the community needs to be addressed through an acknowledgment that the plant has intruded on the community at a physical level, in terms of emissions exposures and other measurable annoyances such as noise.”*²³⁰
- 4.72 Dr Cullen expressed his belief that *“neighbours [of the refinery] have a reasonable expectation to live without intrusion by the plant into their daily lives.”*²³¹ He noted that *“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.”*²³²
- 4.73 He stated 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 [Alcoa] abates exposures, their health and safety is not at risk, nor their general amenity.”*²³³
- 4.74 In his recommendations, Dr Cullen stated that Alcoa should *“make clear, to its workforce, 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.”*²³⁴ Dr Cullen stated that to accomplish this, *“it is crucial that the company take all necessary steps to achieve an open relationship with the relevant parties based on bilateral trust and respect.”*²³⁵
- 4.75 Dr Cullen stated that it was essential from Alcoa’s perspective that *“all actions the company takes to solve the ongoing problem are done in a way that is completely transparent.”*²³⁶ As a preferred means to assure openness and transparency, Dr Cullen recommended that Alcoa support the proposed expansion of the Wagerup Medical Practitioners’ Forum (which is discussed in paragraph 4.240 and following of this report) into a broader based expert group to review all current and any new data and provide independent public commentary.²³⁷

²³⁰ Ibid, p7.

²³¹ Ibid.

²³² Ibid.

²³³ Ibid.

²³⁴ Ibid, p9.

²³⁵ Ibid.

²³⁶ Ibid, p9.

²³⁷ Ibid.

- 4.76 Dr Cullen recommended that *“The aggressive program for rehabilitation of previously affected workers needs to go forward with all deliberate speed.”*²³⁸ He expressed his opinion that *“Achievement of best results requires open and active cooperation with treating physicians chosen by affected individuals and their representatives.”*²³⁹
- 4.77 Dr Cullen also recommended that acknowledgment by Alcoa of its responsibilities for the best outcome, as well as expression of regret for perceived delays and diversions which may have occurred, was essential.²⁴⁰
- 4.78 The Committee notes that Dr Cullen also recommended that it is crucial that Alcoa effectively communicate to its workforce that the refinery at Wagerup *“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.”*²⁴¹
- 4.79 The Committee also notes with interest Dr Cullen’s statement that:
- 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 circumstance 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.*²⁴²
- 4.80 In relation to the local community, Dr Cullen recommended that Alcoa complete all emissions abatement measures currently planned as soon as possible, at which time a full environmental assessment must be undertaken.²⁴³ Dr Cullen also recommended that complete sharing of this data with the Wagerup Medical Practitioner’s Forum together with the timely provision of any additional data requested, is essential to assure independent confirmation of the success of the abatement.²⁴⁴
- 4.81 Dr Cullen also recommended that, as with the rehabilitation of affected workers, full acknowledgment of Alcoa’s role and responsibility for effective abatement was

²³⁸ Ibid.

²³⁹ Ibid.

²⁴⁰ Ibid.

²⁴¹ Ibid.

²⁴² Ibid, pp 9-10.

²⁴³ Ibid, p10.

²⁴⁴ Ibid.

essential.²⁴⁵ Dr Cullen further recommended that it was 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.”*²⁴⁶ Dr Cullen stated that *“This is based, in my opinion, on knowledge of the toxicity of all chemicals involved which have been carefully speciated, but also knowledge of the doses of these chemicals which fall far below those with toxic effects other than odour and irritation.”*²⁴⁷

Alcoa’s response to Dr Cullen’s report

- 4.82 The Committee received a letter from Mr Geoff Hayward, Executive Director, WA Operations, Alcoa World Alumina Australia, dated April 23 2002 containing a summary of actions taken by Alcoa in response to Dr Cullen’s report.
- 4.83 In response to Dr Cullen’s recommendation that Alcoa should accept full responsibility for complete and effective remediation of environmental problems at Wagerup, Mr Hayward advised that it had done so via press releases and other written and verbal communications. Mr Hayward advised that Alcoa will continue to emphasize this point in contacts with employees, communities, and government agencies and ministers.²⁴⁸
- 4.84 With respect to Dr Cullen’s recommendation regarding transparency and openness in Alcoa’s dealings with third parties, Mr Hayward advised that all data relating to the issues surrounding the ongoing issues with the refinery is being openly shared with all stakeholders. He advised that Alcoa has supported the continued involvement of the Wagerup Medical Practitioners’ Forum in assisting to resolve the issues.²⁴⁹
- 4.85 With respect to Dr Cullen’s recommendations referred to in paragraphs 4.78 and 4.79 of this report, Mr Hayward advised that these matters had been formally communicated to the Alcoa workforce, both at Wagerup and elsewhere. He submitted that reassurance regarding health impacts require total independence for full impact, and that Alcoa was requesting the continuing support of the Wagerup Medical Practitioners’ Forum in this respect.²⁵⁰ Mr Hayward advised the Committee that at Wagerup and Willowdale, informal discussions between management and small groups of employees will begin towards the end of April 2002. Mr Hayward

²⁴⁵ Ibid.

²⁴⁶ Ibid.

²⁴⁷ Ibid.

²⁴⁸ Letter from Mr Geoff Hayward, Executive Director, WA Operations, Alcoa World Alumina Australia, April 23 2002.

²⁴⁹ Ibid.

²⁵⁰ Ibid.

submitted that *“It is expected that these discussions will increase general understanding of the workforce.”*²⁵¹

4.86 Mr Hayward advised the Committee that with respect to Dr Cullen’s recommendations regarding emissions abatement measures, *“All currently known means of reducing emissions thought to be of concern have either been completed, or will have been completed by the middle of 2002.”*²⁵² Mr Hayward advised that Alcoa expects to continue to monitor and measure emissions and environmental impacts, in conjunction with the DEP, on an ongoing basis.

4.87 Mr Hayward also advised that Alcoa has provided what reassurance it could to the community regarding health effects. He advised that this had been done principally through communication of Dr Cullen’s report and reports of other experts. Mr Hayward submitted that the best means of doing this in a manner the community would trust would be via the Wagerup Medical Practitioners’ Forum. Mr Hayward advised the Committee that Professor Holman had agreed to assist by making further communications with the community as the available data was processed.²⁵³

4.88 Mr Osborn, Managing Director, Alcoa World Alumina Australia, provided comment on Dr Cullen’s visit to the Wagerup refinery in 2002 at the Committee’s hearing on September 8 2003. Mr Osborn stated that Dr Cullen’s visit in 2002 was *“helpful to me and the management group in addressing the issue and getting, from a layperson’s viewpoint, how best to go through it. I think it helped us provide a path through with our employees when prior rehabilitation processes were not being productive for us.”*²⁵⁴

4.89 Mr Osborn also told the Committee:

It was really a matter of the issue of the futility of looking for a cause that was only going to exacerbate the condition of individuals who not only felt ill but also felt that they were not believed in that process of investigation. The issues expressed by employees were accepted on face value and Alcoa tried to put in place as much as it could the proper clinical support and a rehabilitation process for individuals overall. It was a matter, I guess, of recognising that further investigation was not going to yield any more information. If it was

²⁵¹ Ibid.

²⁵² Ibid.

²⁵³ Ibid.

²⁵⁴ Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, *Transcript of Evidence*, September 8 2003, p8.

*to be beneficial we had to deal with the situation as it presented itself.*²⁵⁵

SUBMISSION FROM HON ALAN CORBETT MLC, INDEPENDENT MEMBER OF THE NEW SOUTH WALES LEGISLATIVE COUNCIL

- 4.90 During the course of its inquiry the Committee received a number of documents from Hon Alan Corbett MLC, Independent Member of the New South Wales Legislative Council.²⁵⁶ One of the documents provided to the Committee was a submission to the National Centre for Classification in Health (Sydney) prepared on behalf of Hon Alan Corbett by Dr Mark Donohoe, Fellow of the Australian College of Nutritional and Environmental Medicine and Ms Jo Immig, Legislative Advisor to Hon Alan Corbett (**Hon Alan Corbett's submission**).²⁵⁷
- 4.91 The National Centre for Classification in Health (Sydney) is situated at the University of Sydney and was formerly known as the National Coding Centre. The National Centre for Classification in Health was formed as a result of a joint venture agreement on January 1 1997 with the National Reference Centre for Classification in Health situated at Queensland University of Technology.²⁵⁸
- 4.92 A classification is a system of categories to which morbid entities are assigned according to established criteria. Health classifications consist of hierarchical systems of codes for diseases, injuries and interventions as documented in health care services.²⁵⁹
- 4.93 Coding is the translation of clinical data such as diseases, injuries and interventions from a patient record into an agreed coded format. Currently in Australia, diagnoses and procedures are assigned a series of numerical and/or alphanumerical codes using ICD-10-AM. This allows the comparison, analysis and interpretation of collected morbidity data.²⁶⁰
- 4.94 ICD-10-AM is the tenth revision of the International Statistical Classification of Diseases and Related Health Problems and is the latest in a series that was formalized in 1893 as the Bertillon Classification or International List of Causes of Death. While

²⁵⁵ Ibid, p14.

²⁵⁶ As of February 28 2003 Mr Corbett ceased to be a member of the NSW Parliament.

²⁵⁷ Dr Mark Donohoe, Fellow of the Australian College of Nutritional and Environmental Medicine and Ms Jo Immig, Legislative Advisor to Hon Alan Corbett MLC: *Request for Modification to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modifications (ICD-10-AM)*, undated but receipt of which was acknowledged by the National Centre for Classification in Health in a letter to Hon Alan Corbett MLC dated March 19 2002.

²⁵⁸ <http://www2.fhs.usyd.edu.au/ncch/sydney.html> (accessed September 17 2003).

²⁵⁹ Ibid.

²⁶⁰ Ibid.

- the title has been amended to make clearer the content and purpose and to reflect the progressive extension of the scope of the classification beyond diseases and injuries, the familiar abbreviation ‘ICD’ has been retained.²⁶¹
- 4.95 The basis of Hon Alan Corbett’s submission is for the ICD-10-AM to be modified to include a new code to index MCS.
- 4.96 Hon Alan Corbett’s submission states that he *“has actively taken up the cause of gaining better recognition for the condition known as Multiple Chemical Sensitivities (MCS), and is working to ensure that those who suffer from the illness have equitable access to appropriate medical care and community support services.”*²⁶²
- 4.97 Hon Alan Corbett’s submission acknowledges that the aetiology of MCS is *“at present uncertain and there are divergent views within medicine as to the proven mechanisms for MCS.”*²⁶³ It states that the dominant view, with the widest support, is that the illness or disease is an *“idiosyncratic adverse neurological response to exposure to either a single or repeated exposure to one or more chemicals.”*²⁶⁴
- 4.98 The Committee notes that Hon Alan Corbett’s submission puts forward the view that *“The widely agreed differences between multiple chemical sensitivities and allergy, on the one hand, and toxic injury on the other, is a strong argument for a separate and new classification category of a novel illness or disease. No current category allows for accurate classification, and this results in confusion and misclassification on the part of clinicians.”*²⁶⁵
- 4.99 Hon Alan Corbett’s submission states that the lack of an ICD category has hampered research into, and management of, MCS.²⁶⁶
- 4.100 Hon Alan Corbett’s submission notes that the incidence and prevalence of MCS appears to be increasing, and states the view that *“the establishment of an appropriate category in ICD-10-AM will allow for the epidemiology of the illness to be studied,*

²⁶¹ <http://www.who.int/whosis/icd10/descript.htm> (accessed September 17 2003.)

²⁶² Dr Mark Donohoe, Fellow of the Australian College of Nutritional and Environmental Medicine and Ms Jo Immig, Legislative Advisor to Hon Alan Corbett MLC: *Request for Modification to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modifications (ICD-10-AM)*, undated but receipt of which was acknowledged by the National Centre for Classification in Health in a letter to Hon Alan Corbett MLC dated March 19 2002, p2.

²⁶³ Ibid. “Aetiology” is defined as *“the cause or causes of a disease or abnormal condition; some types of cancer have a viral etiology; a multiple etiology in which biological, psychological, and sociocultural factors all play a role. A branch of medical science dealing with the causes and origin of diseases”*: <http://www2.merriam-webster.com/cgi-bin/mwmednlm?book=Medical&va=aetiology> (accessed August 26 2003).

²⁶⁴ Ibid.

²⁶⁵ Ibid.

²⁶⁶ Ibid.

and will result in improved health outcomes such as early identification, practical intervention and effective rehabilitation programs.”²⁶⁷

- 4.101 It states that “*There is an urgent need to code MCS in order that epidemiological data can be collected, to focus research and, [sic] to address inequities in the medical and social service sectors to secure better health outcomes for those who suffer from MCS.*”²⁶⁸
- 4.102 The Committee is interested to note that MCS was coded in the German November 2000 update (ICD-10-SGBV, version 3.1) as ‘Multiple-chemical-sensitivity-syndrome’, a listing in the main alphabetical index as well as under syndromes and under ‘Chemical-Sensitivity-Syndrome, Multiple’.²⁶⁹
- 4.103 Although Hon Alan Corbett’s submission commends the German designation of an ICD code for MCS, it also notes there is “*significant concern amongst environmental medicine specialists that its listing as an allergy (albeit in the section on poisonings) is misleading when it is [sic] has been clear from the medical literature for over a decade that MCS reactions are not IgE²⁷⁰ mediated and thus are distinct from ‘allergy’.*”²⁷¹
- 4.104 Hon Alan Corbett’s submission identifies and puts forward three coding options for MCS.
- 4.105 Following up on this matter, the Committee was advised by the National Centre for Classification in Health that, although it is acknowledged by a number of national and international clinical specialists and committees that the set of symptoms of MCS represents an important clinical problem, the proposal to assign a unique code in ICD-10-AM was rejected.²⁷²
- 4.106 The proposal was rejected because.²⁷³

²⁶⁷ Ibid.

²⁶⁸ Ibid, p3.

²⁶⁹ Ibid, pp4-5.

²⁷⁰ “IgE” is defined as “A class of immunoglobulins including antibodies that function especially in allergic reactions: an immunoglobulin of the class IgE”; <http://www2.merriam-webster.com/cgi-bin/mwmednlm?book=Medical&va=IgE> (accessed September 17 2003).

²⁷¹ Dr Mark Donohoe, Fellow of the Australian College of Nutritional and Environmental Medicine and Ms Jo Immig, Legislative Advisor to Hon Alan Corbett MLC: *Request for Modification to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modifications (ICD-10-AM)*, undated but receipt of which was acknowledged by the National Centre for Classification in Health in a letter to Hon Alan Corbett MLC dated March 19 2002, p5.

²⁷² Letter from the National Centre for Classification in Health, September 18 2003.

²⁷³ Ibid.

- *There is no clinical or laboratory evidence of an underlying pathological (disease) process in patients who have acquired this descriptive label, despite many attempts to identify one over the past 20 years.*
- *There is a wide spectrum of intolerance/irritation from smells and fumes in the general population, and it is not possible to draw any clear dividing line to delineate patients who might fall into the category of the proposed classification.*
- *There is no internationally accepted diagnostic criteria, nor validated diagnostic tests.*
- *There are a number of syndromes (ie symptom complexes) that appear to overlap with the clinical features proposed for the category of MCS, such as chronic fatigue syndrome and fibromyalgia. The relationship between these entities and MCS syndrome is unclear at present and this creates difficulty with diagnostic categorisation.*

EXAMPLES OF EVIDENCE RECEIVED FROM INDIVIDUALS LIVING AND/OR WORKING IN THE VICINITY OF THE ALCOA REFINERY AT WAGERUP IN RELATION TO HEALTH COMPLAINTS

4.107 The following summaries of submissions received from individuals living and/or working in the vicinity of the Alcoa refinery at Wagerup illustrate the types of submissions in relation to health complaints received by the Committee during the course of its inquiry.

Mr William van der Pal, Alcoa Employee and Safety Representative

4.108 At its hearing in Perth on November 28 2001 the Committee heard evidence from Mr William van der Pal, an Alcoa employee and safety representative from Alcoa's Wagerup refinery. Mr van der Pal advised the Committee that he was appointed to the position of full-time safety representative with Alcoa towards the end of 1997. He advised that he has worked in that position since his appointment.

4.109 Mr van der Pal also advised the Committee that in his view he had become ill "*from liquor burning emissions. It has had a huge impact on my life.*"²⁷⁴ He told the Committee he had had 18 months off work, but after that period of time had been able to return to work at the Alcoa minesite at Wagerup. He worked at the minesite without incident for 18 months, however had become ill again in July 2001 after being exposed to fumes from the liquor burner. Mr van der Pal advised that, at the time of providing evidence to the Committee in November 2001, he was still unwell.²⁷⁵

²⁷⁴ Mr William van der Pal, Alcoa Safety Representative, *Transcript of Evidence*, November 28 2001, p1.

²⁷⁵ Ibid, p11.

- 4.110 Mr van der Pal discussed the issue of odour in relation to the Alcoa refinery at Wagerup and submitted that *“All the workers who work there are subjected to horrendous fumes and odours day in and day out.”*²⁷⁶ He submitted that the fumes did not appear to have a lasting effect on the workers’ health, although he noted that the fumes would *“take one’s breath away and, on moving away to fresh air, they did not appear to have a lasting effect on health.”*²⁷⁷ Mr van der Pal also submitted that *“Only since the introduction of the liquor burner in 1996, when workers appeared to have lingering health impacts, were complaints made.”*²⁷⁸
- 4.111 The Committee notes Mr van der Pal’s comment that *“We do not accept the only thing making people ill is the odour.”*²⁷⁹ He submitted that workers had become ill during periods when odour was present and also when it was not. Mr van der Pal submitted that workers had also become ill from different forms of emissions such as dust, mist, water droplets, gas and emissions from the cooling tower.²⁸⁰ He also submitted that workers had become ill during periods when the refinery had been in different modes of operation including normal operation, start-up procedure, shutdown procedure, cleaning and during general maintenance.²⁸¹ He submitted that *“No location on the site has not had a report as a result of emissions from the liquor burner.”*²⁸²
- 4.112 The Committee was interested to note Mr van der Pal’s comments in relation to the oxalate kiln at the Alcoa refinery at Wagerup. Mr van der Pal advised the Committee that no other refinery in the world has a liquor burner and an oxalate kiln together.²⁸³ He submitted that *“Some people in the community believe that their health problems did not begin with the installation of the liquor burner. Another process - the oxalate kiln - produces similar emissions, and we believe that this could have been slowly contributing to people’s ill health over a long period.”*²⁸⁴

²⁷⁶ Ibid, p2.

²⁷⁷ Ibid.

²⁷⁸ Ibid.

²⁷⁹ Ibid.

²⁸⁰ Ibid.

²⁸¹ Ibid.

²⁸² Ibid.

²⁸³ Ibid, p4. The Committee sought clarification from Alcoa regarding Mr van der Pal’s comments in relation to the LBF and oxalate kiln. Alcoa advised by way of letter dated October 28 2003 that *“Kwinana refinery also operated an oxalate kiln and a liquor burning facility together. The oxalate kiln has since been decommissioned. The San Ciprian refinery in Spain also uses a similar technique for organic destruction.”* Alcoa also advised that it does not have plans to re-commission the oxalate kiln at the Wagerup Refinery.

²⁸⁴ Ibid.

Mr Darryl Puzey, Alcoa employee

- 4.113 The Committee received a submission from Mr Puzey dated November 29 2001 in which he advised the Committee that he had been employed at the Alcoa refinery at Wagerup since August 1989. He had been employed in a number of different maintenance positions including mechanical fitter, maintenance planner/scheduler, maintenance trade trainer and mechanical fitter.²⁸⁵
- 4.114 Mr Puzey advised that he first experienced difficulty in breathing and shortness of breath in 1993. Following the development of those symptoms, he moved to an office job at the refinery until July 2000, during which time he had no breathing difficulties.²⁸⁶
- 4.115 After July 2002, Mr Puzey returned to his role of mechanical fitter, working in the same area of the refinery as he had previously.²⁸⁷
- 4.116 Mr Puzey submitted that from July 2000 to April 20 2001, he started suffering from sleep disorders and looseness of the bowel. He submitted that on April 20 2001 he was exposed to a high dose of non-condensable gases and volatile organic compounds and subsequently experienced blurred vision, breathing difficulties, nasal and throat irritation, vertigo and raised pulse and blood pressure.²⁸⁸
- 4.117 Mr Puzey submitted that from April 20 2001 he would start to experience the symptoms referred to above when he went to work, and recover on his days off. He advised the Committee that this cycle continued until May 17 2001 when he experienced another high dose of non-condensable gases and volatile organic compounds. Mr Puzey submitted that as a result of this exposure his symptoms became constant, at home and at work, with no period of recovery.²⁸⁹
- 4.118 Mr Puzey informed the Committee that he had not worked at the Alcoa refinery at Wagerup since June 9 2001 due to the nature of his injuries. He submitted that he had recently been diagnosed with reactive airways dysfunction syndrome (a variant of occupational asthma).²⁹⁰

²⁸⁵ Letter from Mr Darryl Puzey, November 29 2001, p1.

²⁸⁶ Ibid.

²⁸⁷ Ibid.

²⁸⁸ Ibid.

²⁸⁹ Ibid.

²⁹⁰ Ibid, p2.

Mr Anthony Hall, Chairperson of the Yarloop and Districts Concerned Residents Committee (YDCRC)

- 4.119 At its hearing in Perth on February 18 2002 the Committee heard evidence from Mr Anthony Hall. Mr Hall advised that the YDCRC was elected at a meeting convened in August 2001 to discuss Alcoa's proposed buffer zone expansion. He advised the Committee that the districts represented by the YDCRC are Yarloop, Cookernup and Hamel.
- 4.120 Mr Hall commented on health issues in relation to the Alcoa refinery at Wagerup and submitted that *"Members of both the community and Alcoa's workforce have been diagnosed with various types of serious ailments, from chromosomal damage to multiple chemical sensitivity to organ failure."*²⁹¹
- 4.121 Mr Hall submitted that the increase in the number of health-related complaints coincided with the installation of the liquor burner at the Alcoa refinery at Wagerup in 1996. However he submitted that *"People may put all the blame onto the liquor burner, but we do not think the liquor burner is solely responsible. We think the combined aspects of the refinery are causing the problem."*²⁹²
- 4.122 Mr Hall advised the Committee that the impact of the emissions from the refinery were starting to be experienced by residents in Cookernup, which is approximately six to eight kilometres from the refinery. He informed the Committee that some residents in Cookernup were experiencing, among other things, blood noses and burning eyes.
- 4.123 In answer to a question from Hon Frank Hough MLC as to whether the adverse health impacts were experienced more noticeably by a particular group or groups of people such as the very young or the elderly, Mr Hall advised that people appear to be affected indiscriminately. Mr Hall submitted that *"Everyone seems to suffer in some form."*²⁹³ He advised the Committee that different people experience different symptoms, and that the symptoms might be more prominent in one person than another. He told the Committee that common symptoms include sore throats and burning sensations in the eyes and nose.

Other evidence

- 4.124 The Committee received numerous other written and oral submissions and evidence from current and former Alcoa employees and members of the local community regarding health complaints alleged to be caused by the emissions from the Alcoa refinery at Wagerup.

²⁹¹ Mr Anthony Hall, Chairperson, YDCRC, *Transcript of Evidence*, February 18 2002, p6.

²⁹² Ibid, p13.

²⁹³ Ibid, p14.

4.125 The Committee was advised that symptoms experienced included:

- painful, burning and inflamed joints;
- burning under the skin;
- hot flushes and inability to regulate body temperature;
- frequent urination and constant thirst;
- metallic taste after exposure to some chemicals;
- burning airways and upper respiratory complaints such as tightness and burning in the chest and breathing difficulties;
- continual fatigue and lethargy and poor sleep patterns;
- fluid retention;
- short-term memory loss and poor concentration;
- increased reaction time;
- itchy scalp and hair loss;
- depression;
- nausea and acid reflux;
- diarrhoea,
- mucous membrane, skin and eye irritations;
- nose bleeds;
- chronic headaches, chronic digestive upsets, chronic pain (particularly in the joints), burning in the stomach and throat, throat ulceration, and a general feeling of lethargy and being unwell;
- asthma;
- chromosome damage; and
- abnormal liver function.

4.126 The Committee received evidence that in addition to the general symptoms listed above, one contractor at Alcoa's Wagerup refinery had developed Goodpasture's

syndrome, one had Wegener's Granulomatosis and several other workers had reactive airways dysfunction syndrome. Refer to paragraph 4.8 of this report for information about these conditions.

EVIDENCE FROM THE DEPARTMENT OF HEALTH

4.127 The following representatives attended a hearing on July 8 2002 on behalf of the DoH:

- Dr Timothy Threlfall, Principal Medical Officer, WA Cancer Registry, Health Information Centre;
- Dr Merran Smith, General Manager, Health Information Centre;
- Mr Michael Jackson, Executive Director, Population Health; and
- Dr Peter Di Marco, Principal Toxicologist.

4.128 Mr Michael Phillips, Senior Lecturer, School of Public Health, Curtin University of Technology also attended and gave evidence at the hearing.

Cancer levels

4.129 In addition to discussing public health issues relating to the Alcoa refinery at Wagerup including the Wagerup Medical Practitioners' Forum and the Healthwise Project which are discussed in detail later in this chapter, the representatives from the DoH also commented on cancer rates and the incidence of cancer in the general community including the area in the vicinity of the refinery.

4.130 Dr Smith advised the Committee that the Health Information Centre within the DoH has responsibility for collecting population health data. One of those data collections is the Western Australian Cancer Registry. The Committee was advised that this register has been maintained for approximately 20 years. There is therefore detailed information on cancer in Western Australia.²⁹⁴

4.131 Dr Smith advised the Committee that cancer is a leading cause of death within Western Australia and nationally. In Western Australia over 3 000 cancer-related deaths are recorded each year and approximately 7 000 cases of cancer are identified each year.²⁹⁵

4.132 Dr Smith advised that many cancers in our society are preventable. She advised the Committee that the major factors in influencing cancer rates are lifestyle factors such

²⁹⁴ Dr Merran Smith, General Manager, Health Information Centre, DoH, *Transcript of Evidence*, July 8 2002, p5.

²⁹⁵ Ibid.

- as smoking and diet, which can be associated with differences in measures of socio-economic status.²⁹⁶
- 4.133 The Committee was advised that the Western Australian Cancer Registry records the type of cancer, as well as details such as age, sex and address to allow area-based analysis. Data is normally analysed on a regional basis (such as the Peel Health Service area or the South West Health Zone).
- 4.134 Dr Smith acknowledged, however, that *“because of the particular interest that some of you [Committee Members] would be aware of in Rockingham, Kwinana and also around Wagerup, we did a special study earlier this year looking at local government areas from Kwinana to Bunbury.”*²⁹⁷ The areas included in the review were the local government areas of Bunbury, Collie, Harvey, Kwinana, Mandurah, Murray, Rockingham and Waroona.
- 4.135 Dr Smith advised that the DoH found that *“generally the rates of cancer were similar to those for the whole of the population in Western Australia.”*²⁹⁸ The Committee was interested to note that in the shires of particular interest to its inquiry, that is, Harvey, Murray and Waroona, the cancer incident rates were no higher than the cancer rates for the State in total.²⁹⁹ Further, the types of cancers that occurred in these groups were common cancers that occurred throughout Western Australia.³⁰⁰
- 4.136 The Committee notes the DoH’s advice that in Collie and Waroona the hospitalisation rates and deaths for males due to cancer are slightly lower than State average rates.³⁰¹
- 4.137 The Committee also notes the DoH’s advice contained in the submission tabled at the hearing on July 8 2002 that in relation to the information from the Western Australian Cancer Registry, *“there is no cause for community alarm regarding this information”*.³⁰² It submitted that for the majority of areas and the vast majority of cancer types assessed, there is no significant indication of true differences in the risks

²⁹⁶ DoH submission tabled at the Committee’s hearing on July 8 2002, *Review of Cancer Data for Years 1996 - 2000*.

²⁹⁷ Dr Merran Smith, General Manager, Health Information Centre, DoH, *Transcript of Evidence*, July 8 2002, p6.

²⁹⁸ Ibid.

²⁹⁹ Dr Merran Smith advised that when it looks at cancer rates, the DoH looks at the number of new cases of cancer; that is, incidence is the indicator the DoH particularly considers: *Transcript of Evidence*, July 8 2002, p6.

³⁰⁰ Dr Merran Smith advised that the five most common cancers in Western Australia are prostate cancer (men), breast cancer (women) and for both men and women are lung cancer, colo-rectal cancer and melanoma: *Transcript of Evidence*, July 8 2002, p6.

³⁰¹ Ibid.

³⁰² Ibid.

of cancer.³⁰³ The cancers common in the areas concerned are, in general, the same ones that are common throughout Western Australia.³⁰⁴

4.138 The DoH submitted that taking into account the cancer types and known risk factors, the data from the Western Australian Cancer Registry contain no reliable indication that there are significant area-based cancer risk factors present.³⁰⁵

4.139 The Committee notes Dr Smith's advice that as at July 2002 *"a health surveillance program is just starting with this State that allows us to look at rates of smoking, diet, exercise and those sorts of things. At this stage we only have preliminary data for that."*³⁰⁶

Multiple Chemical Sensitivity

4.140 At the Committee's hearing on July 8 2002 the representatives from the DoH also commented on MCS.

4.141 Hon Louise Pratt MLC noted the reluctance by medical experts to use the term MCS. She queried how this affected people with symptoms of MCS in terms of how they are able to seek compensation, pursue superannuation claims or receive Centrelink benefits if they do not have access to terminology to enable them to prove their claim. Hon Louise Pratt queried whether it was possible to provide recognition of the symptoms experienced by people with MCS without actually naming the condition.

4.142 Mr Jackson, Executive Director, Population Health, acknowledged this issue and submitted that *"Multiple chemical sensitivity is not a recognised condition within listed diseases."*³⁰⁷ Dr Di Marco, Principal Toxicologist, commented that *"The model of multiple chemical sensitivity does not fit in any way the classical toxicological model of chemical action. Therefore, from a toxicological perspective, it is very difficult to prove one way or another what is or is not causing it."*³⁰⁸

4.143 Dr Di Marco expressed his opinion that this complicates the issue because a common trend in chemical or toxicological actions cannot be identified.³⁰⁹ However Dr Di Marco also expressed his view that *"There is no question that these people are being*

³⁰³ Ibid.

³⁰⁴ Ibid.

³⁰⁵ Ibid.

³⁰⁶ Ibid.

³⁰⁷ Mr Michael Jackson, Executive Director, Population Health, DoH, *Transcript of Evidence*, July 8 2002, p14.

³⁰⁸ Dr Peter Di Marco, Principal Toxicologist, DoH, *Transcript of Evidence*, July 8 2002, p7.

³⁰⁹ Ibid.

affected. Whether we call it multiple chemical sensitivity or give it another name, it does not really matter.”³¹⁰

4.144 Mr Phillips, Senior Lecturer, School of Public Health, Curtin University of Technology, submitted that the point raised by Hon Louise Pratt was a valid one but was *“something of a double-edged sword because as soon as you attach strict diagnostic criteria to a condition, you run the risk that many people suffering from the condition may not fit all the criteria.”*³¹¹

4.145 Mr Phillips submitted that *“One of the dangers in adopting a term that is not precisely defined and in adopting strict diagnostic criteria, especially when we are dealing with very cloudy cause and effect, is that problems can be caused for individuals who are ill. As soon as a person becomes involved in the medico-legal arena, strict definitions start to matter enormously.”*³¹²

4.146 Mr Phillips also noted that *“multiple chemical sensitivity is not, as far as I know, recognised by the Workers’ Compensation and Rehabilitation Commission in Western Australia as a compensable disease.”*³¹³ Mr Phillips submitted that *“Labelling it [MCS] in that manner does not help the workers and it would certainly not help the community because people are not eligible anyway.”*³¹⁴

4.147 Mr Jackson noted that *“In the medical practitioners’ forum it was stated that when medical practitioners assess people who walk into their rooms they seek to fit people into certain categories. It was described that these symptoms fit into the multiple chemical sensitivity “basket”. They referred to the symptoms of extreme lethargy and headaches that fit into the basket of the definition.”*³¹⁵

4.148 Mr Jackson also noted that *“The term is associated with a number of symptoms. However, that does not help the person who is seeking compensation. We have not addressed that. We have not ensured that people can obtain compensation or have it addressed through Medicare.”*³¹⁶

³¹⁰ Ibid.

³¹¹ Mr Phillips, Senior Lecturer, School of Public Health, Curtin University of Technology, *Transcript of Evidence*, July 8 2002, p14.

³¹² Ibid.

³¹³ Ibid, p14. Note that the Worker’s Compensation and Rehabilitation Commission, a statutory body, was established in May 1982 upon proclamation of the *Worker’s Compensation and Rehabilitation Act 1981*. Under an amendment to the *Worker’s Compensation and Rehabilitation Act 1981* which came into effect on December 24 1993, the department was authorised to use, and operate under, the name WorkCover Western Australia (WorkCover WA).

³¹⁴ Ibid.

³¹⁵ Mr Michael Jackson, Executive Director, Population Health, DoH, *Transcript of Evidence*, July 8 2002, p15.

³¹⁶ Ibid.

Suggestions for the future

- 4.149 Mr Jackson advised the Committee that the DoH was encouraging the development of health impact assessments when industry was planning to undertake particular work. He told the Committee that this applies in instances such as Bellevue, Brookdale and Cockburn Cement.³¹⁷ He submitted that *“Rather than just have an environmental impact assessment, there needs to be an impact on public health before adverse events occur. At the moment, we [the DoH] are trying to clean up after the event rather than anticipate and do our work beforehand.”*³¹⁸

DREW REPORT

- 4.150 In 1997 Alcoa commissioned Dr Roger Drew, Corporate Toxicologist, SHE Pacific Pty Ltd, Safety, Health and Environment Consultant and Adjunct Professor, Biochemical Toxicology, RMIT University (Royal Melbourne Institute of Technology) to:

- identify the emissions responsible for the unpleasant smell complained of by workers at the Alcoa refinery at Wagerup since the installation of the liquor burner in December 1996; and
- provide comment on the potential health effects of the emissions.

- 4.151 During the course of its inquiry Alcoa provided the Committee with a copy of Dr Drew’s draft report titled *“An Assessment of Liquor Burning Odour Emissions at Wagerup”*³¹⁹ (**Drew Report**).

- 4.152 In his report, Dr Drew identified two major types of emissions coming from the stack of the liquor burning plant; VOCs and very fine particulate matter.³²⁰ Dr Drew explained in his report that very fine particulate matter consists of sodium carbonate, sodium bicarbonate and complexes of sodium aluminate.³²¹ Dr Drew noted in his report that *“It is thought these particles originate as a mist from the water scrubbers in the stack. When the mist emerges into the air the water evaporates leaving small particles which are reasonably buoyant and can be breathed into the nose and mouth.”*³²²

³¹⁷ Ibid, p14.

³¹⁸ Ibid.

³¹⁹ The copy of the report provided to the Committee was marked “Confidential Draft”. The Committee understands from Dr Drew that a final copy of the report may not have been issued.

³²⁰ Dr Roger Drew, *An Assessment of Liquor Burning Odour Emissions at Wagerup*, p5.

³²¹ Ibid, p13.

³²² Ibid.

- 4.153 With respect to VOCs, Dr Drew noted that analytical analysis indicates that there are more than 300 different compounds present.³²³ He wrote that *“It is not possible to categorically identify the VOC components that are responsible for the smell. It is highly probable the smell is caused by several chemicals.”*³²⁴
- 4.154 Dr Drew noted that some of the compounds in the emissions have very low odour thresholds and are able to be smelt at the concentrations that could occur at ground level, especially when the wind is such that it pushes the stack emissions towards the ground.³²⁵
- 4.155 Dr Drew concluded that *“Under these conditions the levels of VOC’s at ground level, whilst being able to be smelt, are many times below the concentrations that could cause effects on the nose, eyes and throat. It is extremely unlikely that these very low concentrations will cause long term health effects.”*³²⁶
- 4.156 The Committee notes Dr Drew’s finding that *“Although the VOC’s are unlikely to be directly responsible for the health effects reported, they do cause the smell. It is well recognised unpleasant smells can make some people feel ill and also modify how someone might respond to other things that might cause mild symptoms.”*³²⁷
- 4.157 With respect to very fine particulates Dr Drew noted when they come in contact with moisture in the mucous of the eyes, nose and throat they become alkaline and have the potential to cause similar effects as caustic soda mist, although not as intense.³²⁸ Examples of these effects include sore eyes, itchy/burning sensation of the nose and back of the throat.³²⁹
- 4.158 With respect to odour, irritation and health effects, Dr Drew noted that stack emissions contain chemicals that have unpleasant odours and particulates which are potentially irritating to the upper respiratory tract.³³⁰ He noted that *“There are many scientific studies conducted on people which show the impact of odour on perceived sensory*

³²³ Ibid, p3.

³²⁴ Ibid.

³²⁵ Ibid.

³²⁶ Ibid.

³²⁷ Ibid.

³²⁸ Ibid, pp3-4.

³²⁹ Ibid, p4.

³³⁰ Ibid, p13.

*irritation can be profound.*³³¹ Dr Drew also noted that *“There is a strong correlation between mal-odour and the perception of the odour being a threat to health.”*³³²

- 4.159 Dr Drew noted in his report that odours serve as a sensory cue for the manifestation of stress related illness, or heightened awareness of underlying symptoms, or exacerbation of minor, or normally non-perceived irritants.³³³
- 4.160 The Committee notes Dr Drew’s findings that extreme examples of such symptom aetiology are MCS or anaphylaxis³³⁴ triggered by odour or perceived exposure.³³⁵
- 4.161 The Committee was also interested to note Dr Drew’s findings that factors which may markedly alter the perception of odour, sensory irritation and associated systemic discomfort are perception, expectation, information, previous experiences, odour intensity and unfamiliarity, bias to report irritation, concern regarding health effects and general stress and worry.³³⁶
- 4.162 Dr Drew concluded that it was possible that *“in the presence of unpleasant odour, irritation, perhaps not usually perceived or be only mild, may arise from exposure to alkaline particles carried over from the stack scrubber.”*³³⁷ Dr Drew further concluded *“Thus the symptoms of headache, eye and nose irritation, intestinal disturbances and fatigue amongst workers may have a high psychosomatic component associated with the odour, but not directly caused by it.”*³³⁸
- 4.163 The Committee notes that Dr Drew concluded that regardless of the cause (that is, a primary effect of an agent or secondary effect due to concern about the agent) the symptoms are nonetheless real.³³⁹ Dr Drew concluded that management of such symptoms is different from those of pure organic origin and may require more than the mere removal of the physical cause of the cognitive trigger.³⁴⁰

³³¹ Ibid.

³³² Ibid.

³³³ Ibid.

³³⁴ Anaphylaxis is a life-threatening type of allergic reaction: <http://www.nlm.nih.gov/medlineplus/ency/article/000844.htm> (accessed August 26 2003).

³³⁵ Dr Roger Drew, *An Assessment of Liquor Burning Odour Emissions at Wagerup*, draft dated November 25 1997, p13.

³³⁶ Ibid, p14.

³³⁷ Ibid.

³³⁸ Ibid.

³³⁹ Ibid.

³⁴⁰ Ibid.

- 4.164 With respect to possible long term health effects, Dr Drew found that *“there is very little likelihood of long term health effects from continuous exposure to VOC’s from the liquor burning process.”*³⁴¹
- 4.165 In his overall conclusions, Dr Drew found that *“Chemicals responsible for the odours, [associated with emissions from the liquor burning plant] because of the very low concentrations at ground level, are not responsible for the reported health effects, these are most likely the result of alkaline, fine particulates.”*³⁴²
- 4.166 Dr Drew also found that *“For some individuals the irritating effect of these is perceived to be worse in the presence of odour. Long term health effects are unlikely.”*³⁴³

MUSK AND DE KLERK REPORT

- 4.167 In January 1998 Professor Musk from the Department of Respiratory Medicine at Sir Charles Gardiner Hospital interviewed 22 employees at the Alcoa refinery at Wagerup who were working at the refinery’s liquor burning unit. These employees had reported respiratory symptoms, eye irritation and general malaise which they perceived to be associated with exposure to the odour of the emissions from the liquor burner.³⁴⁴
- 4.168 These interviews led to a study being conducted by Professor Musk in which all current [as at 1998] Alcoa employees and sub-contractors at the Wagerup refinery were invited to participate. There was an 88 percent response rate, including 15 of the 22 employees who were originally screened after initial complaints of symptoms.³⁴⁵ A total of 643 men in the then current Alcoa workforce participated in the study, 53 refused and 26 were missed due to holidays or sick days.³⁴⁶
- 4.169 The aim of the study were to search for measurable effects of the liquor burning emissions.³⁴⁷
- 4.170 The study resulted in a report by Professor Musk and NH de Klerk, Department of Public Health, University of Western Australia titled *“Health Effects from Liquor*

³⁴¹ Ibid, p16.

³⁴² Ibid.

³⁴³ Ibid.

³⁴⁴ AW Musk and NH de Klerk, *Health Effects from Liquor Burning Unit Emissions in an Alumina Refinery*, April 26 2000, p1.

³⁴⁵ Ibid, p4.

³⁴⁶ Ibid.

³⁴⁷ Ibid, p1.

Burning Unit Emissions in an Alumina Refinery”, April 26 2000 (**Musk and de Klerk Report**).

4.171 The study made use of data generated by the Healthwise Project as it provided data on the health status of employees prior to the commissioning of the liquor burning unit. The Healthwise Project commenced in 1994 and is discussed in paragraph 4.176 and following of this report.

4.172 The study aims were examined in the following ways:³⁴⁸

- the level of respiratory morbidity in the current workforce was compared to that of the workforce at the time of the Healthwise cross-sectional survey;
- the level of subjective symptoms, as recalled by the subjects, were compared for before, during and after liquor burning. The association of symptom changes with other respiratory morbidity was examined;
- changes in lung function and respiratory symptoms between the two surveys were compared with changes observed in the inception cohort from the two other Western Australian refineries;
- changes in bronchial reactivity in the inception cohort members were compared with changes observed in the inception cohort from the two other Western Australian refineries; and
- differences between changes in symptoms and lung function within the Wagerup workforce for, among other things, different process groups, smoking and age were also examined.

4.173 The Musk and de Klerk Report concluded that *“This study describes a group of people that has good respiratory function when compared with other populations.”*³⁴⁹

4.174 The report noted that lung function decline was higher than population averages but was comparable with the decline in lung function in the inception cohort from the other two refineries.³⁵⁰ The report also noted that respiratory symptoms using a standard validated questionnaire also indicated better respiratory health than would be expected.³⁵¹

³⁴⁸ Ibid, p3.

³⁴⁹ Ibid, p6.

³⁵⁰ Ibid.

³⁵¹ Ibid.

- 4.175 The Musk and de Klerk Report concluded that *“there was a strong perception among workers that the onset of LB [liquor burning] was associated with increases in a variety of symptoms, mostly non-respiratory, and also that greater increases in these symptoms were also significantly associated with changes in the standard, validated recording of respiratory symptoms.”*³⁵²

HEALTHWISE PROJECT

- 4.176 The Healthwise Project began in 1994 and is being conducted by medical researchers at Monash University in Melbourne and the University of Western Australia. It was commissioned by Alcoa. The Healthwise Project seeks to discover whether there are any significant differences in the health of people who have worked in the aluminium industry compared with people who have not.
- 4.177 The Committee notes that the Healthwise Project commenced prior to the installation of the liquor burner at Alcoa’s Wagerup refinery in 1996.
- 4.178 An advisory committee composed of independent scientific consultants, representatives of Alcoa, Monash University, the University of Western Australia and the Australian Council of Trade Unions oversees the Healthwise Project.
- 4.179 The Healthwise Project is comprised of three studies which have been or are being conducted to assess the health effects of work in the Alcoa of Australia workforce.³⁵³
- The first study was a Cross-Sectional Study conducted in 1995/1996 (now completed) which provided baseline data and a specific ‘snap-shot’ of the health of members of the Alcoa workforce employed at that time. The study focused on the respiratory health of workers with different types of exposures. 5095 employees took part in the study.
 - The New-Starter Study is an inception cohort study; that is, it is a continuing longitudinal study of the health effects of new members of the Alcoa workforce over time. This study measures the respiratory health of new employees and then conducts follow-up tests to determine if working in the aluminium industry causes any changes. The New-Starter Study has been recruiting participants and generating data from follow-up interviews since 1996. Approximately 1000 people across Australia are participating in this study.

³⁵² Ibid.

³⁵³ Monash University and the University of Western Australia: *Healthwise Cancer and Mortality Study, First Report, August 2002*, pp5-6.

- The third study is the Healthwise Cancer and Mortality Study. This draws subjects from the Cross-Sectional and New-Starter Studies as well as ex-employees of Alcoa (including retirees). The Healthwise Cancer and Mortality Study addresses the question of whether or not work in the aluminium industry is associated with increases in risk of death or risk of developing cancer. The Committee has provided information and comment about the Healthwise Cancer and Mortality Study in the following paragraphs.
- 4.180 The Committee was interested to know whether contractors were included in the Healthwise Project. In response to this query, Alcoa advised by way of letter dated October 6 2003 that contractors were not included. As part of its explanation, Alcoa submitted that *“Contractors are rarely included in epidemiological studies of cancer and mortality because of the substantial methodological problems involved.”*³⁵⁴
- 4.181 Alcoa advised that in response to concerns by some contractors, it asked the Healthwise researchers about the feasibility of including contractors in the study. Alcoa advised that the Healthwise Advisory Board has given preliminary advice that *“inclusion of contractors in the Healthwise cancer and mortality study would be difficult due to lack of identifiers for the group (employment records).”*³⁵⁵
- 4.182 The Committee notes that approximately 29 to 36 percent of Alcoa workers at Wagerup are contractors.³⁵⁶

Healthwise Cancer and Mortality Study, First Report, August 2002

- 4.183 Only Alcoa employees or former employees with at least 90 days’ service were included in the Healthwise Cancer and Mortality Study. This limitation was imposed in order to avoid unnecessary follow-up of transient workers with only a very small amount of relevant occupational exposure.³⁵⁷ Eligible worksites for the Healthwise Cancer and Mortality Study are Kwinana, Pinjarra, Wagerup, Jarrahdale, Huntly-Del Park, Willowdale and the Bunbury Shipping Terminal in Western Australia and Point Henry (including KAAL) and Portland in Victoria.
- 4.184 The First Report of the Healthwise Cancer and Mortality Study was published in August 2002 (**Healthwise Cancer and Mortality Report**). It found that there was a significantly lower overall risk of death in the Healthwise (Alcoa) cohort compared to the Victorian/Western Australian (general population) rate. Rates for all four major

³⁵⁴ Letter from Mr Bill Knight, Wagerup Refinery Manager, October 6 2003, p10.

³⁵⁵ Ibid, pp10-11.

³⁵⁶ Ibid, p11.

³⁵⁷ Monash University and the University of Western Australia: *Healthwise Cancer and Mortality Study, First Report, August 2002*, p6.

causes of death (circulatory disease, respiratory disease, cancer and injury) were also lower than the Victorian/Western Australian (general population) rates.³⁵⁸

- 4.185 The Healthwise Cancer and Mortality Report noted that these results are consistent with the finding of no elevated risk of death by cause in other aluminium industry cohort studies (Romundstad et al., 2000).³⁵⁹ It noted that the lower mortality results are consistent with findings in other industry cohort studies and “*are generally attributed to the “healthy worker effect”; that people employable in such industries are generally somewhat healthier than the population average.*”³⁶⁰
- 4.186 The Healthwise Cancer and Mortality Report also found that total cancer incidence in the Healthwise cohort was very similar to the population incidence. However, when incident cancer rates were examined by cancer site (primary site of the body), respiratory cancer and melanoma were found to be significantly higher in the Healthwise cohort than in the general population.³⁶¹
- 4.187 The Committee notes that the respiratory cancer incidences for Western Australia and Victoria were found to be similar, suggesting that the increased risk found for the whole cohort was spread fairly evenly between the different parts of the industry. The Healthwise Cancer and Mortality Report noted that as the spectrum of exposures is quite different for workers in the two states, this suggests that no one exposure is contributing to this increase in incident respiratory cancers in the whole cohort.³⁶²
- 4.188 The Committee notes the statement in the Healthwise Cancer and Mortality Report that “*The possible impact of asbestos exposure is worth some consideration in relation to the respiratory cancer findings.*”³⁶³ It stated that “*Asbestos exposure can be an explanation of excess respiratory cancer and mesothelioma cases.*”³⁶⁴

³⁵⁸ Ibid, p29.

³⁵⁹ Ibid, p26.

³⁶⁰ Ibid.

³⁶¹ Ibid, p29.

³⁶² Ibid, p28.

³⁶³ Ibid, p29.

³⁶⁴ Ibid.

4.189 Among other things, the Healthwise Cancer and Mortality Report found that:

- all pleural cancers³⁶⁵ occurred in the Western Australian part of the cohort, which suggests that asbestos exposure may be a greater risk factor in Western Australia than in Victoria;³⁶⁶
- incident bladder cancer was found to occur less commonly in the Healthwise cohort than in the general population;³⁶⁷ and
- when the Western Australian and Victorian parts of the cohort study were examined separately, there were no significant elevations in any cancer types in Victoria, however melanoma and pleural cancers were significantly elevated in the Western Australian subcohort. The number of pleural cancers was small.³⁶⁸

4.190 The Healthwise Cancer and Mortality Report discusses the finding of a raised incidence of melanoma and notes that:

- it was unexpected and may be a chance finding;
- the fact that the excess was confined to Western Australia may point towards climate-behaviour influences such as a greater proportion of outdoor work or other activity with poor sun protection compared with the rest of the Western Australia population; and
- the relationship between melanoma and outdoor activity warrants further exploration.³⁶⁹

4.191 The Committee notes that the Healthwise Cancer and Mortality Report found that smoking rates in the Healthwise cohort are similar to those in the general Australian population. Sub-analyses of incident respiratory cancers have found associations with increasing age and cigarette smoking, however no associations were found with broad categories of workgroups in the mines, refineries or smelters.³⁷⁰

³⁶⁵ Pleural cancer occurs in the lungs, as opposed to mesothelioma which is a malignant tumour in the lining of either the chest or the abdominal cavity: telephone conversation between Committee staff and the Cancer Council Western Australia, May 17 2004.

³⁶⁶ Monash University and the University of Western Australia: *Healthwise Cancer and Mortality Study, First Report, August 2002*, p29.

³⁶⁷ Ibid.

³⁶⁸ Ibid, pp29-30.

³⁶⁹ Ibid, pp27-28.

³⁷⁰ Ibid, p30.

- 4.192 Similarly, sub-analyses of incident melanoma cases found an association with increasing age. No associations were found with broad categories of work groups in the mines, refineries or smelters.³⁷¹
- 4.193 The Committee notes that the Healthwise Cancer and Mortality Study is to continue into the future. The Healthwise Cancer and Mortality Report states that *“Given the finding of higher than expected numbers of incident respiratory tract and pleural cancers, a review will be made of demographic, lifestyle and work characteristics in relation to these cases. The aim of this review will be to identify any common factors amongst this group.”*³⁷²
- 4.194 A specific issue noted for future development in the Healthwise Cancer and Mortality Report relates to the finding of an excess of pleural cancers in Western Australia. The Healthwise Cancer and Mortality Report indicates that an analysis based on asbestos exposure within Alcoa and prior to working with Alcoa would be useful. It also indicates that to further explore the excess melanoma finding, a further analysis based on an ‘outdoor activity’ metric would be worthwhile.³⁷³

Healthwise Review of Incident Respiratory and Pleural Cancer Cases, December 2002

- 4.195 This review (**Healthwise Respiratory and Pleural Cancer Cases Review**) is part of the ongoing Healthwise Cancer and Mortality Study and addresses the issues relating to respiratory and pleural cancer cases raised in the Healthwise Cancer and Mortality Report referred to above. It was published in December 2002.
- 4.196 The Healthwise Respiratory and Pleural Cancer Cases Review is a case review of 47 incident respiratory tract and six incident pleural cancers identified in the first series of matching the Healthwise cancer and mortality cohort against the National Cancer Statistics Clearinghouse database that was conducted in 1999. Of the 47 respiratory tract cancer cases reviewed, 23 were matched to subjects listed at Western Australian sites and 24 were matched to subjects at Victorian sites. All of the six pleural cancer cases were in Western Australian cohort members. The Committee has provided comment in this report in relation to the Western Australian cases only.
- 4.197 The Healthwise Respiratory and Pleural Cancer Cases Review aimed to provide a basic descriptive profile of the respiratory tract and pleural cancer cases identified in the Healthwise study so far. Specifically, it involved tabulating variables such as site,

³⁷¹ Ibid.

³⁷² Ibid.

³⁷³ Ibid, pp30-31.

- main job, year started working, smoking status and pre-Alcoa jobs in order to identify any commonalities among the cases, particularly in relation to Alcoa work.³⁷⁴
- 4.198 The six pleural cancer cases were also matched against the Western Australian Mesothelioma Registry in order to gain any known asbestos exposure data on those cases.
- 4.199 The Healthwise Respiratory and Pleural Cancer Cases Review emphasises that this type of case review is not usually able to draw any firm conclusions about the cause of the cancers in question. However it notes that it can be useful to indicate further areas of research in the main Healthwise Cancer and Mortality Cohort Study.³⁷⁵
- 4.200 It also notes that to properly evaluate risk factors for respiratory and pleural cancers, a control group is required to enable comparisons between the groups to be made in relation to these factors.³⁷⁶
- 4.201 The Healthwise Respiratory and Pleural Cancer Cases Review found that of the 23 respiratory tract cancers matched to subjects listed at Western Australian sites, all were male.³⁷⁷
- 4.202 Statistics published in the Healthwise Respiratory and Pleural Cancer Cases Review in relation to respiratory tract cancers show that the average age at diagnosis matched to Western Australian subjects was 57 years of age. The average year of commencement of Alcoa service was 1974 and the average length of service with Alcoa was 15.8 years. Data on smoking was available for 15 subjects (65 percent) and of these 13 were listed as current or former smokers.³⁷⁸
- 4.203 Fourteen of the 23 respiratory tract cancer cases were matched to Kwinana subjects (61 percent), eight cases were matched to Pinjarra subjects (35 percent) and one case was matched to a mines site.³⁷⁹ The Healthwise Respiratory and Pleural Cancer Cases Review noted that the greater number of cases matched to Kwinana is consistent with it being the longest operating of the refinery sites. It stated that the number of cases matched to subjects at each site is likely to be influenced by differences in the lengths of time the sites have been operating resulting in different cumulative workforce sizes

³⁷⁴ Monash University and the University of Western Australia, prepared by Malcolm Sim, Geza Benke, Lin Fritschi and Ewan MacFarlane: *Healthwise Review of Incident Respiratory and Pleural Cancer Cases*, December 2002, p2.

³⁷⁵ Ibid.

³⁷⁶ Ibid.

³⁷⁷ Ibid, p9.

³⁷⁸ Ibid, p10.

³⁷⁹ Ibid.

- and different workforce age structures. These matters were not taken into account in this case review.³⁸⁰
- 4.204 The Healthwise Respiratory and Pleural Cancer Cases Review found that of the Western Australian respiratory tract cancer cases, five cases (22 percent) had worked primarily in refinery administration, 11 (48 percent) had worked primarily in refinery production and six (26 percent) had worked primarily in refinery maintenance work groups. One Western Australian respiratory tract cancer case worked primarily in mine administration.³⁸¹
- 4.205 To access possible carcinogenic exposures from pre-Alcoa employment the Healthwise Respiratory and Pleural Cancer Cases Review used a Finnish Job Exposure Matrix, known as FINJEM. This was used because no Australian job exposure matrix exists. By using FINJEM, past occupational exposures can be assigned retrospectively to job histories. In this review, the researchers ran each pre-Alcoa job recorded against FINJEM for eight known respiratory tract carcinogens, namely asbestos, arsenic, chromium, nickel, silica, benzo(a)pyrenes, diesel exhaust and polycyclic aromatic hydrocarbons.³⁸²
- 4.206 In the Western Australian respiratory tract cancer cases, FINJEM showed likely exposure in recorded pre-Alcoa jobs to at least one of the eight respiratory carcinogens in 11 cases and no likely exposure in pre-Alcoa jobs in 11 cases. One case had no pre-Alcoa jobs recorded.³⁸³
- 4.207 The Healthwise Respiratory and Pleural Cancer Cases Review found that of the six cases of pleural cancer, five cases were male and one was female.³⁸⁴
- 4.208 Statistics published in the Healthwise Respiratory and Pleural Cancer Cases Review in relation to pleural cancers show that the average age at diagnosis matched to Healthwise cohort members was 52 years of age. The average year of commencement of Alcoa service was 1977 and the average length of service with Alcoa was 11.7 years. Data on smoking was available for five of the six subjects and of these two were listed as current or former smokers and the remaining three were recorded as non-smokers.³⁸⁵

³⁸⁰ Ibid.

³⁸¹ Ibid.

³⁸² Ibid, pp4-5.

³⁸³ Ibid, p10.

³⁸⁴ Ibid, p11.

³⁸⁵ Ibid, p12.

- 4.209 Three of the pleural cancer cases were from Kwinana, one was from Wagerup and one from Pinjarra. One case worked primarily at mine sites.³⁸⁶
- 4.210 The Healthwise Respiratory and Pleural Cancer Cases Review found that of the pleural cancer cases, two cases had worked primarily in refinery maintenance, two cases had worked primarily in refinery administration and one had worked primarily in refinery production. One pleural cancer case worked primarily in mine production.³⁸⁷
- 4.211 As with the respiratory tract cancer cases, FINJEM was used to establish likely previous exposures to asbestos. The Healthwise Respiratory and Pleural Cancer Cases Review notes that asbestos was the only substance tested as this is the only known occupational cause of mesothelioma.³⁸⁸ FINJEM showed likely occupational exposure to asbestos in three of the five cases for whom previous jobs were recorded. One case had no prior jobs listed.³⁸⁹
- 4.212 The Healthwise Respiratory and Pleural Cancer Cases Review notes that according to case-specific information obtained from the Western Australian Mesothelioma Registry, environmental exposure was very likely in two of the cases (associated with residence in Wittenoom). Non-Alcoa occupational exposure was likely in three cases. In one case, significant asbestos exposure was unlikely.³⁹⁰
- 4.213 The Committee notes the comment in the Healthwise Respiratory and Pleural Cancer Cases Review that from the data currently available *“it appears that there are no major groupings or clusterings of the respiratory tract cancers in Alcoa work-groups.”*³⁹¹ However the researchers note that they were not able to look at particular exposures within the production work-groups and, without being able to compare those percentages with those of a control group or compare age structures and smoking rates, their ability to interpret the figures is limited. They also note that the small numbers of cases represented by the percentages also limits their ability to draw any firm conclusions about commonalities of cases in particular work-groups.³⁹²
- 4.214 The Healthwise Respiratory and Pleural Cancer Cases Review notes that in relation to the pleural cancer cases, the additional information provided by the Western Australian Mesothelioma Registry confirms likely occupational or environmental

³⁸⁶ Ibid.

³⁸⁷ Ibid.

³⁸⁸ Ibid.

³⁸⁹ Ibid.

³⁹⁰ Ibid.

³⁹¹ Ibid.

³⁹² Ibid.

exposure to asbestos prior to or otherwise outside Alcoa employment in five of the six cases.³⁹³ Pre-Alcoa asbestos exposures appear to be a factor in the development of mesothelioma in these cases.

- 4.215 The Committee notes that the Healthwise Respiratory and Pleural Cancer Cases Review states that another factor which suggests that Alcoa employment is less important than other asbestos exposure for these cases is the relatively short latency; that is, the period between starting work with Alcoa and diagnosis of cancer. It notes that there is usually a long latent period for mesothelioma: it is almost unknown before ten years and rare before 20 years (Seidman and Selikoff, 1990).³⁹⁴
- 4.216 The Healthwise Respiratory and Pleural Cancer Cases Review concludes its discussion on pleural cancer cases by noting that the additional data from the Western Australian Mesothelioma Registry are “*strongly suggestive of non-Alcoa asbestos exposure being an important risk factor.*”³⁹⁵
- 4.217 In relation to respiratory tract cancer cases, the Healthwise Respiratory and Pleural Cancer Cases Review concludes by noting that as the review is primarily descriptive, it is difficult to make firm conclusions about the significance or otherwise of the findings in relation to risk factors for the development of respiratory tract cancer.³⁹⁶ It suggests that this could be done by undertaking a more formalised comparison with the overall Healthwise cohort in relation to these factors or by undertaking a case-control study.³⁹⁷

Evidence from Alcoa in relation to the Healthwise Project

- 4.218 At the Committee’s hearing in Waroona on November 21 2001 Mr Barry Chesson, Manager Occupational Hygiene, Alcoa, discussed the Healthwise Project and submitted that the research shows that Alcoa has an essentially healthy workforce.³⁹⁸ He submitted that workers employed by Alcoa are healthier than other populations in the general community. Mr Chesson submitted “*That is not unexpected because most epidemiologists are aware of the so-called healthy-worker effect. A working environment tends to have fitter, healthier individuals.*”³⁹⁹

³⁹³ Ibid, p13.

³⁹⁴ Ibid.

³⁹⁵ Ibid.

³⁹⁶ Ibid.

³⁹⁷ Ibid.

³⁹⁸ Mr Barry Chesson, Manager Occupational Hygiene (WA Operations), Alcoa World Alumina Australia, *Transcript of Evidence*, November 21 2001, p7.

³⁹⁹ Ibid.

- 4.219 Mr Chesson told the Committee that the Healthwise Project gives Alcoa *“a lot of confidence for the long-term health of our employees. We believe we have basically a healthy workforce.”*⁴⁰⁰
- 4.220 The Healthwise Project was also referred to in Alcoa’s written submission tabled at the hearing on November 21 2001. Alcoa submitted that the Healthwise Project is *“one of the largest and most comprehensive medical studies ever carried out in Australia.”*⁴⁰¹
- 4.221 At the Committee’s hearing on February 18 2002 Hon Kate Doust MLC queried what percentage of new employees at Alcoa (that is, those people employed since the catalytic thermal oxidiser was installed in 1998) were showing adverse health effects such as blood noses, nausea and headaches.⁴⁰²
- 4.222 Alcoa included the data requested in a submission dated June 13 2002. Alcoa advised that since 1999 there have been 183 incidents relating to exposure to emissions by 116 individuals. Of these, twelve were raised by eight employees who commenced employment with Alcoa since 1999. Alcoa advised that this number (eight) represents less than five percent of the number of new employees in that period.⁴⁰³

Evidence from the Department of Health in relation to the Healthwise Project

- 4.223 At the Committee’s hearing on July 8 2002 representatives from the DoH discussed the Healthwise Project. Mr Michael Jackson, Executive Director, Population Health, told the Committee that the DoH considered it to be *“a good initiative by Alcoa, and it is a very robust study.”*⁴⁰⁴
- 4.224 Dr Merran Smith, General Manager, Health, Information Centre, DoH noted that the researchers have foreshadowed additional work, and she submitted that the DoH endorsed that *“particularly in the case of people with mesothelioma to understand what sort of exposure they had, where they had worked over the years and where they were working within Alcoa.”*⁴⁰⁵
- 4.225 The Committee notes that since this evidence was taken in July 2002 the Healthwise Respiratory and Pleural Cancer Cases Review has been published. The Committee

⁴⁰⁰ Ibid.

⁴⁰¹ Submission No. 2 from Alcoa, November 21 2001, p10.

⁴⁰² Hon Kate Doust MLC, *Transcript of Evidence*, February 18 2002, p15.

⁴⁰³ Submission No. 31 from Alcoa, June 13 2002, p1.

⁴⁰⁴ Mr Michael Jackson, Executive Director, Population Health, DoH, *Transcript of Evidence*, July 8 2002, p11.

⁴⁰⁵ Dr Merran Smith, General Manager, Health, Information Centre, DoH, *Transcript of Evidence*, July 8 2003, p10.

refers readers to paragraph 4.195 and following of this report for a discussion on the Healthwise Respiratory and Pleural Cancer Cases Review.

REPORT ON WAGERUP HEALTH SURVEY

- 4.226 In August 1999 the Environmental Health Service of the DoH contracted the Survey Research Centre from the Department of Public Health at the University of Western Australia to conduct a survey to investigate claims of health effects experienced by residents of the Yarloop area living in close proximity to the Alcoa refinery.
- 4.227 The original aim of the survey was to investigate symptoms, possible diagnoses and trends in these claims of health effects by a survey of medical records.⁴⁰⁶ It was decided in addition to survey a group of residents about their personal symptoms, the conditions under which the symptoms occur, the effect of the symptoms on their lifestyle and basic information about their residence.⁴⁰⁷
- 4.228 The survey was overseen by the Alcoa Wagerup Community Health Awareness Group Working Group and Advisory Group which are discussed in paragraph 4.337 and following of this report. Questionnaires were sent to a targeted sample of residents of Yarloop who had been identified as possible respondents to the survey; that is, those families had made themselves known to the Wagerup Community Health Awareness Group in the context of having concerns about emissions from the Alcoa refinery at Wagerup. Members of fifteen families agreed to participate in the survey.⁴⁰⁸
- 4.229 Eighteen people gave permission for their doctor(s) to be contacted. Nine doctors were nominated by the residents, and all were contacted to solicit their participation. Of the 24 questionnaires sent, ten completed responses were received.⁴⁰⁹
- 4.230 In April 2001 a report was published titled *Report on Wagerup Health Survey (Wagerup Health Survey)*. A copy of the Wagerup Health Survey was tabled by representatives of the DoH at the Committee's hearing on July 8 2002.
- 4.231 The Wagerup Health Survey found that "*It is reasonable to conclude that there is a commonality between the symptoms experienced by the respondents to the questionnaire.*"⁴¹⁰ It noted that a mucous membrane irritant appears to be present in the atmosphere and was affecting the group of people who live on the northern border of Yarloop. This irritation occurred most frequently in damp, overcast weather with

⁴⁰⁶ The Survey Research Centre, Department of Public Health, University of Western Australia, *Report on Wagerup Health Survey*, April 2001, p1.

⁴⁰⁷ Ibid.

⁴⁰⁸ Ibid, p2.

⁴⁰⁹ Ibid.

⁴¹⁰ Ibid, p18.

- winds from the north/north east. Winter was found to be the time of the greatest irritation, followed by autumn.⁴¹¹
- 4.232 The Wagerup Health Survey also concluded that the mucous membrane irritation was often accompanied by an odour, however the nature of the chemical(s) involved had not been established.⁴¹²
- 4.233 The Wagerup Health Survey also noted that the symptoms were self-reported and that there was no objective measure available on the severity of the symptoms experienced by the respondents, or verifiable objective evidence of the possible causes.⁴¹³
- 4.234 The first recommendation of the Wagerup Health Survey was that the presence of ‘caustic mist’ or ‘caustic dust’ on the refinery site and surrounding areas should be investigated.⁴¹⁴ It noted that *“It has been suggested that this substance is blown off-site under certain climatic conditions. It is proposed that any link to caustic be investigated.”*⁴¹⁵
- 4.235 Secondly, the Wagerup Health Survey recommended that the proposed temporal relationship between the onset of symptoms and exposure to chemicals/liquor burning be investigated.⁴¹⁶
- 4.236 The third and final recommendation made by the Wagerup Health Survey was that a case-crossover study be carried out as specified by Professor D’Arcy Holman, Director, Centre for Health Services Research, Professor of Public Health, Department of Public Health, The University of Western Australia in a letter to Dr Annette Mercer, Health Survey Research Centre, dated March 24 2000.⁴¹⁷
- 4.237 At its hearing on July 8 2002 the Committee was advised by Mr Michael Jackson, Executive Director, Population Health, DoH, that as a result of the third recommendation by the Wagerup Health Survey, representatives from the DoH approached Professor Holman in order to seek clarification and advice about a possible case-crossover study.
- 4.238 Mr Jackson advised the Committee that Professor Holman’s advice at that time was that such a study could *“take us on a tangent that might take some time and would not*

⁴¹¹ Ibid, p16.

⁴¹² Ibid, p18.

⁴¹³ Ibid.

⁴¹⁴ Ibid.

⁴¹⁵ Ibid.

⁴¹⁶ Ibid.

⁴¹⁷ Ibid. Professor Holman’s letter to Dr Mercer is attached as Appendix D to the Wagerup Health Survey.

*be productive... ”.*⁴¹⁸ As a result the case-crossover study was not carried out and Mr Jackson told the Committee that the DoH had no intention at that time [July 2002] of carrying out that study.⁴¹⁹

- 4.239 However the Committee notes that the Wagerup Health Survey led to the formation of the Wagerup Medical Practitioners’ Forum which is discussed below.

WAGERUP MEDICAL PRACTITIONERS’ FORUM

- 4.240 As noted above the DoH approached Professor Holman in order to seek clarification and advice about a possible case-crossover study. As noted, such a study was not carried out. However a medical practitioners’ forum (**Wagerup Medical Practitioners’ Forum**) was conducted to discuss and investigate the health problems surrounding the issue.
- 4.241 The Wagerup Medical Practitioners’ Forum, chaired by Professor D’Arcy Holman, convened key medical experts, local practitioners, practitioners and specialists from Perth, epidemiologists and industry representatives together with officers from the DoH, DEP and DMPR. The Wagerup Medical Practitioners’ Forum was convened on September 19 2001 in Perth and on October 23 2001 in Mandurah.
- 4.242 The recommendations of the Wagerup Medical Practitioners’ Forum were formulated towards the end of 2001 and were developed into a document for public presentation to the Waroona Shire Council and to a public meeting in Waroona on February 6 2002. The recommendations of the Wagerup Medical Practitioners’ Forum are set out in paragraph 4.247 below.
- 4.243 The Wagerup Medical Practitioners’ Forum concluded that there was a sense of concern within the forum, expressed its belief that lives were affected and stated that it was taking the concerns of the community and the workers at Alcoa seriously.⁴²⁰
- 4.244 The Wagerup Medical Practitioners’ Forum noted that there is a considerable weight of medical opinion that there is a medical problem, however the forum also noted that did not have a specific chemical as a causal target for which a solution could be developed or regulated.⁴²¹
- 4.245 The Wagerup Medical Practitioners’ Forum concluded that there appears to be an association between health problems and Alcoa’s refinery at Wagerup, and that there

⁴¹⁸ Mr Michael Jackson, Executive Director, Population Health, DoH, *Transcript of Evidence*, July 8 2002, p5.

⁴¹⁹ Ibid.

⁴²⁰ *The Wagerup Medical Practitioners’ Forum Conclusions and Recommendations*, Conclusions 1, 2 and 3.

⁴²¹ Ibid, Conclusion 3.

are meteorological and temporal conditions that could connect the refinery with health problems.⁴²²

4.246 The Wagerup Medical Practitioners' Forum acknowledged that the community is also concerned about a variety of social issues and that "*industry is doing its utmost to resolve this problem, as well as government.*"⁴²³

4.247 The recommendations of the Wagerup Medical Practitioners' Forum are as follows:

- i) *That a delegation of this group, headed by the Chair (Prof. Holman), meet with the community and workers as well as briefing the Ministers for the Environment, Health and Minerals and Petroleum Resources.*
- ii) *Further research into identifying causality is unlikely to be rewarding and hence should not be a major priority. However, an open dialogue should be maintained on this issue and it is recommended that a workshop on Multiple Chemical Sensitivity be convened by the Department of Health.*
- iii) *There needs to be improved focus on the clinical management of affected people. There needs to be a focus on getting affected people out of the exposure situation.*
- iv) *The Forum supported exposure reduction via a planned buffer zone.*
- v) *The Forum supported exposure reduction via reduction of emissions.*
- vi) *There be an ongoing commitment to surveillance and monitoring and review process involving this Medical Forum.*
- vii) *That further opportunities be explored that will reduce exposure at the individual worker level.*

4.248 In its submission to the Committee dated April 9 2002, the DEP stated that it supported all of the recommendations made by the Wagerup Medical Practitioners' Forum and will continue its strategy of reducing emissions wherever opportunities exist, consistent with the recommendations.⁴²⁴ It advised the Committee that its ongoing strategy incorporated, where appropriate, the recommendations of the Wagerup Medical Practitioners' Forum.⁴²⁵

⁴²² Ibid, Conclusion 4.

⁴²³ Ibid, Conclusions 5 and 6.

⁴²⁴ Submission No. 53 from the DEP, April 9 2002, p21.

⁴²⁵ Ibid.

- 4.249 The Committee notes that the recommendations from the Wagerup Medical Practitioners' Forum led to the formation of a Ministerial Council on Environment, Health and Industry Sustainability and Coordinating Task Force which are discussed below.
- 4.250 The Committee commends the work done by the Wagerup Medical Practitioners' Forum. In particular the Committee notes that when the Wagerup Medical Practitioners' Forum published its recommendations in February 2002, it was the first time an expert group in Western Australia had acknowledged that a health problem did exist in relation to the Alcoa refinery at Wagerup.

MINISTERIAL COUNCIL ON ENVIRONMENT, HEALTH AND INDUSTRY SUSTAINABILITY

- 4.251 The Committee notes that a Ministerial Council on Environment, Health and Industry Sustainability (**Ministerial Council**) was established in February 2002 to formally respond to the recommendations of the Wagerup Medical Practitioners' Forum. The Ministerial Council is comprised of the Minister for the Environment as Chair and the Ministers for Health, State Development, Consumer and Employment Protection, Planning and Infrastructure and Tourism, Small Business, Peel and the South West.
- 4.252 The Minister for the Environment advised the Committee in a letter dated April 9 2002 that the Ministerial Council would initially focus on coordinating all Government activities towards addressing the issues concerning the Alcoa refinery at Wagerup. The Minister also advised that it would develop a long-term Government strategy to address the wider issue of community concerns currently being expressed regarding possible health and environmental consequences of matters such as hazardous waste treatment, contaminated sites and some existing and proposed industries.

COORDINATING TASK FORCE

- 4.253 The Committee notes that the Ministerial Council will be assisted by a Coordinating Task Force comprised of relevant government agencies which will both advise the Ministerial Council and ensure that the relevant Government departments implement the decisions of the Ministerial Council in a timely manner.

GOVERNMENT RESPONSE TO THE RECOMMENDATIONS OF THE WAGERUP MEDICAL PRACTITIONERS' FORUM

- 4.254 The Ministerial Council prepared a formal response to recommendations made by the Wagerup Medical Practitioners' Forum. This response was released in September 2002.
- 4.255 The Ministerial Council supported all of the recommendations made by the Wagerup Medical Practitioners' Forum which are set out in paragraph 4.247 of this report.

Wagerup Medical Practitioners' Forum Recommendation 1

4.256 The Ministerial Council noted that Recommendation 1 of the Wagerup Medical Practitioners' Forum had been completed.⁴²⁶ It noted that:

- a delegation from the Wagerup Medical Practitioners' Forum, headed by Professor Holman, had met with the Minister for the Environment and the Minister for Health;
- a public information evening was arranged by the DoH to present and discuss the findings of the Wagerup Medical Practitioners' Forum with the local community and workers at the Alcoa refinery at Wagerup;⁴²⁷ and
- a delegation from the Wagerup Medical Practitioners' Forum and the DoH had met with representatives from the Waroona Shire and local Members of Parliament to discuss the recommendations of the Wagerup Medical Practitioners' Forum.

Wagerup Medical Practitioners' Forum Recommendation 2

4.257 The Ministerial Council expressed its support for open dialogue and stated that it believed early detection of health impacts and ongoing clinical management was paramount.⁴²⁸ The Ministerial Council stated its belief that "*concerned members of the community should have easy, local access to professional health advice that complements the expertise provided by local medical practitioners.*"⁴²⁹

4.258 With regard to the exchange of information on MCS referred to in Recommendation 2 of the Wagerup Medical Practitioners' Forum, the Ministerial Council noted the visit by Dr Cullen to Perth in February 2002. It noted that Dr Cullen had provided a report on his investigations into the issues relating to the Alcoa refinery at Wagerup and expressed its understanding that Alcoa was progressing the implementation of his recommendations.⁴³⁰

4.259 In addition to responding to Recommendation 2 of the Wagerup Medical Practitioners' Forum, the Ministerial Council also made its own recommendations. It recommended that the DoH establish a 'clinic' to enable persons to seek preliminary assessment and referral for medical management and supervision. It recommended

⁴²⁶ Government Response to the Recommendations of the Wagerup Medical Practitioners' Forum, p1.

⁴²⁷ Ibid, pp1-2.

⁴²⁸ Ibid, p2.

⁴²⁹ Ibid.

⁴³⁰ Ibid.

that a process be put in place for Wagerup that allows the local community to receive ongoing health information support.⁴³¹

- 4.260 In its response the Ministerial Council noted that the DoH has proposed that a specialist nurse, who would have training in the health issues associated with the Alcoa refinery at Wagerup, be based in the Yarloop Hospital. This nurse would screen and counsel members of the community and provide a report to the treating general practitioner. The nurse would have access to a specialist for further advice together with professional support from the DoH.⁴³²
- 4.261 The Ministerial Council suggested that this system should also be available to workers from the refinery should they choose to use this facility rather than the facilities provided by Alcoa.⁴³³
- 4.262 The Committee notes that at its hearing on July 8 2002 Mr Michael Jackson, Executive Director, Population Health, DoH, submitted that having a specially trained community health nurse attached to the Yarloop Hospital with an understanding of the issues being dealt with would “*provide better epidemiological screening of what is happening in the community and further provide some appropriate clinical management of those people.*”⁴³⁴
- 4.263 The Committee notes that the Yarloop Community Clinic (YCC) was established in October 2002. This is discussed in paragraph 4.277 and following of this report.
- 4.264 The Committee notes that the Ministerial Council agreed with Recommendation 2 of the Wagerup Medical Practitioners’ Forum in that it noted that further research into causality may be difficult and is unlikely to lead to rapid resolution of the issue.⁴³⁵ However the Ministerial Council recognised that the community wants some effort to continue in this area, and stated that while this will not be the most critical priority, it did support some continued investigation into causality.⁴³⁶
- 4.265 The Ministerial Council also recommended that the Wagerup Medical Practitioners’ Forum continue to review the progress made in understanding the issue of MCS and,

⁴³¹ Ibid.

⁴³² Ibid, p3.

⁴³³ Ibid.

⁴³⁴ Mr Michael Jackson, Executive Director, Population Health, DoH, *Transcript of Evidence*, July 8 2002, p4.

⁴³⁵ Government Response to the Recommendations of the Wagerup Medical Practitioners’ Forum, p3.

⁴³⁶ Ibid.

if necessary, make further recommendations to foster better management of the issue.⁴³⁷

Wagerup Medical Practitioners' Forum Recommendation 3

4.266 The Ministerial Council:

- supported this recommendation with respect to both community and employee exposure, however it interpreted the recommendation as referring primarily (but not exclusively) to the issue of workers at the Alcoa refinery at Wagerup;⁴³⁸
- accepted and recognised that workers and people in the area had legitimate medical concerns and that clinical management should focus on earliest possible exposure removal, followed by appropriate ongoing clinical management, where required;⁴³⁹ and
- recommended that *“Alcoa continues to implement workplace practices that facilitate the early identification of exposures resulting in health impacts. Furthermore, that Alcoa continues, where possible, to remove workers with confirmed health impacts from the relevant problematic exposure and provide them with alternative employment.”*⁴⁴⁰

Wagerup Medical Practitioners' Forum Recommendation 4

4.267 The Ministerial Council supported Alcoa's buffer expansion concept. For further comment on the Ministerial Council's response to the buffer expansion concept refer to paragraph 7.190 and following of this report.

Wagerup Medical Practitioners' Forum Recommendation 5

4.268 The Ministerial Council noted that:

- the DEP and the Minister for the Environment have required Alcoa to implement a number of initiatives designed to reduce emissions from the Wagerup refinery and noted that *“Alcoa has cooperated fully with the government agencies in carrying out these initiatives.”*⁴⁴¹;

⁴³⁷ Ibid, p4.

⁴³⁸ Ibid.

⁴³⁹ Ibid.

⁴⁴⁰ Ibid.

⁴⁴¹ Ibid, p5.

- significant reductions in emissions from the refinery have been achieved⁴⁴² and that further improvements scheduled for completion by mid 2002 were in progress;⁴⁴³
- as a result of the emissions reduction works, it is estimated that odour emissions will be about 20 percent lower than they were prior to the installation of the liquor burner facility in 1996.⁴⁴⁴ The Ministerial Council noted that “*Some community members have stated that emissions at that time were generally at acceptable levels.*”⁴⁴⁵; and
- the emissions reductions already achieved and in progress have addressed the known major emission sources and any further reductions projects may only achieve relatively minor reductions.⁴⁴⁶ It also noted that “*government will require Alcoa to pursue further emissions reduction works until all reasonable and practicable measures have been exhausted.*”⁴⁴⁷

4.269 The Ministerial Council noted that concentrations of compounds from the Alcoa refinery at Wagerup in the ambient air in the locality of Yarloop are already low. It expressed its belief that “*Considering the significant emission reductions already achieved or scheduled, any further emissions reductions are unlikely to resolve this issue. Other programs such as worker and community support and the buffer strategy must be developed and continued.*”⁴⁴⁸

4.270 The Ministerial Council also expressed its opinion that “*In view of the fact that there is no simple solution to this issue, and that an engineering solution is unlikely to completely resolve community concerns, a continuing program of community consultation and education will be necessary.*”⁴⁴⁹

Wagerup Medical Practitioners’ Forum Recommendation 6

4.271 The Ministerial Council expressed its support for an ongoing role for the Wagerup Medical Practitioners’ Forum in assisting the community, Alcoa and government’s efforts to address the health impacts reported by members of the local community and

⁴⁴² Ibid.

⁴⁴³ Ibid, p6.

⁴⁴⁴ Ibid.

⁴⁴⁵ Ibid.

⁴⁴⁶ Ibid, p7.

⁴⁴⁷ Ibid.

⁴⁴⁸ Ibid.

⁴⁴⁹ Ibid.

the refinery workforce.⁴⁵⁰ It stated that *“To this end, the relevant government agencies should continue to work with the MFP [Wagerup Medical Practitioners’ Forum] in developing further government led initiatives”*.⁴⁵¹

4.272 However the Ministerial Council:

- expressed its belief that there is a need for a broader, State-wide initiative investigating the issue of sustainable industry and environmental health.⁴⁵² It stated that *“This initiative should harness the expertise of independent health experts and provide a conduit for community input and government investigation into possible impacts of industrial emissions on environmental health.”*⁴⁵³;
- formalised its position by recommending that *“Government, in partnership with academic institutions, intends to establish an Environmental Health Foundation with a mandate to assist government, the community and industry in their investigations into the potential impact of industrial emissions on environmental health.”*⁴⁵⁴; and
- recommended that this concept be further developed by the relevant government agencies in partnership with academic institutions such as the School of Public Health at the University of Western Australia, School of Health at Curtin University, School of Environmental Science at Murdoch University and School of Nursing and Public Health at Edith Cowan University.⁴⁵⁵

4.273 The Ministerial Council stated that the draft terms of reference and institutional arrangements for the Environmental Health Foundation will be consulted between the relevant academic institutions, the Wagerup Medical Practitioners’ Forum, industry representatives, the voluntary conservation movement and relevant government agencies.⁴⁵⁶

4.274 For further comment on the Environmental Health Foundation refer to paragraph 4.287 and following of this report.

⁴⁵⁰ Ibid.

⁴⁵¹ Ibid.

⁴⁵² Ibid.

⁴⁵³ Ibid.

⁴⁵⁴ Ibid, p8.

⁴⁵⁵ Ibid.

⁴⁵⁶ Ibid.

Wagerup Medical Practitioners' Forum Recommendation 7

- 4.275 The Ministerial Council noted that actions in Recommendation 5 of the Wagerup Medical Practitioners' Forum relate to this matter. These are discussed in paragraph 4.268 and following of this report.
- 4.276 The Ministerial Council also expressed its support for initiatives taken by the Wagerup Medical Practitioners' Forum which include reviewing results of ongoing workplace and point source atmospheric monitoring surveys, further sampling where required, undertaking management review of engineering and process systems and conducting further site inspections.⁴⁵⁷

YARLOOP COMMUNITY CLINIC

- 4.277 As noted above, as a result of the Wagerup Medical Practitioner's Forum recommendations and the Ministerial Council's response to those recommendations, the YCC was established in October 2002 following the receipt of funding confirmation from the DoH. The YCC was a free confidential service, available to all current and past residents and workers in Yarloop. The major aim of the YCC was to *"acknowledge and address emerging health issues at Yarloop."*⁴⁵⁸
- 4.278 The YCC was initially established for six months, however the contract was extended until the end of the 2003 calendar year.⁴⁵⁹ It was located in the old administration office of the Yarloop Hospital.
- 4.279 The appointment of the community nurse was to a full time position (76 hours per fortnight). When the YCC opened in October 2002, clinic open hours were Monday and Wednesday 10am-2pm and Tuesday 1pm-7pm. Appointments could also be made for times outside those hours. From May 1 2003 the winter opening hours were Monday, Tuesday, Thursday and Friday 9am-4pm.⁴⁶⁰
- 4.280 The role of the community nurse was to *"acknowledge and report on the health concerns of the residents of Yarloop and it's [sic] immediate surrounds and development of a healthy community approach, in accordance with local health services priorities."*⁴⁶¹

⁴⁵⁷ Ibid.

⁴⁵⁸ Ms Margot Cook, Community Nurse, South West Population Health Unit, *Six Month Report of Yarloop Community Health Clinic: Yarloop Community Clinic, Feb 03 - April 03*, August 5 2003, p2.

⁴⁵⁹ Ibid.

⁴⁶⁰ Ibid, p3.

⁴⁶¹ Ms Margot Cook, Circular, Population Health Unit, South West Area Health Service, September 10 2003.

- 4.281 Among other things, the community nurse was required to provide first point of contact in the local community, record health effects from specific events, case manage community members who feel they may have existing health problems and contact general practitioners and specialists regarding individuals. The community nurse was also required to provide a comprehensive and accessible information service for the community and other agencies and conduct regular community health programs to address issues of concern.⁴⁶²
- 4.282 The community nurse also met regularly with the Chairman of the YDCRC to “*identify the community expectations of the clinic and provide and [sic] avenue for community issues to be presented and strategies developed.*”⁴⁶³ The community nurse attended the Wagerup Community Group meetings.
- 4.283 For the period October 2002 to the end of April 2003 a total of 48 clients had presented to the YCC with health concerns. Eighty nine percent of the clients were residents of Yarloop with the average age being 48 years for women and 52 years for men.⁴⁶⁴ Common symptoms included headache, fatigue, sleep disturbances, lack of motivation, worry, muscle cramps, dry itchy eyes and sneezing and coughing.⁴⁶⁵
- 4.284 The community nurse noted that “*On many times there has been no identified odour with the onset of symptoms. In some instances the residents are unable to detect any odour, and it is from being with others they are told of the odour. Other occasions, residents who usually detect the odour, have reported symptoms not linked to an “odour event”.*”⁴⁶⁶
- 4.285 The community nurse identified ten ongoing issues that were published in the *Six Monthly Report of Yarloop Community Health Clinic, Yarloop Community Clinic, Feb 03- April 03* dated August 5 2003. These included the community’s perception of Alcoa’s land management strategy, community concerns about the reduction of population in Yarloop and the flow on effect upon infrastructure in the town, a possible changing social demographic in Yarloop, concerns about damage to flora and fauna in the local area, accessing medical services, the role of government, the community’s perception of government agencies and departments and suggested procedures for the implementation of programs and strategies. For more detail please refer to the *Six Monthly Report of Yarloop Community Health Clinic, Yarloop Community Clinic, Feb 03- April 03* dated August 5 2003.

⁴⁶² Ibid.

⁴⁶³ Ms Margot Cook, Community Nurse, South West Population Health Unit, *Six Month Report of Yarloop Community Health Clinic: Yarloop Community Clinic, Feb 03 - April 03*, August 5 2003, p9.

⁴⁶⁴ Ibid, p3.

⁴⁶⁵ Ibid, p4.

⁴⁶⁶ Ibid, p5.

4.286 The Committee was advised that the Yarloop Community Clinic ceased operating at the end of 2003.⁴⁶⁷ The Committee notes that the October 2004 DoE Material included a copy of the final report of the YCC.⁴⁶⁸

ENVIRONMENTAL HEALTH FOUNDATION

4.287 The Committee notes that in response to Recommendation 6 of the Wagerup Medical Practitioners' Forum the Ministerial Council is seeking to establish an Environmental Health Foundation. In a letter to the Committee dated October 2 2002 the Minister for the Environment advised that the Environmental Health Foundation will "*investigate, where necessary, and provide advice to the [Ministerial] Council on the human health effects of exposure to hazardous, or potentially hazardous industrial emissions.*"⁴⁶⁹

4.288 A concept paper on the Environmental Health Foundation was agreed to by the Ministerial Council on June 24 2002.

4.289 The concept paper states that the Environmental Health Foundation will "*conduct its business at the request of the Ministerial Council and provide advice and make recommendations to the Ministerial Council for subsequent implementation by relevant State government agencies in a coordinated manner.*"⁴⁷⁰ As part of this process it may consult with industry, the voluntary conservation movement and with communities and local health care providers.

4.290 The goal of the Environmental Health Foundation, as stated in the concept paper, is to "*assist and advise government in preventing or reducing harmful human health effects from exposure to hazardous substances.*"⁴⁷¹

4.291 The Environmental Health Foundation will carry out its responsibilities by providing advice in the following areas:⁴⁷²

- conduct of public health risk assessments;
- consultations;
- health studies;

⁴⁶⁷ Telephone conversation between Mr Michael Jackson, DoH and Committee staff, March 23 2004.

⁴⁶⁸ Submission from the DoE, p13 and Appendix L - attached to letter from the Minister for the Environment, October 5 2004.

⁴⁶⁹ Letter from the Minister for Environment, October 2 2002.

⁴⁷⁰ Concept Paper - *Establishment of an Environmental Health Foundation.*

⁴⁷¹ Ibid.

⁴⁷² Ibid.

- toxicological profiles on sites; and
- exposure assessments.

4.292 Where directed, the Environmental Health Foundation may also conduct investigations in these areas.

4.293 The terms of reference of the Environmental Health Foundation are to:⁴⁷³

- *Advise and make recommendations to the Ministerial Council on the impact, or potential impact, of point source emissions and chemicals on the health of the community, including workers.*
- *Assess, report and provide independent expert advice to assist in the regulatory and consultative functions of government agencies, including the following:*
 - *provide independent, expert advice to government on new facilities or proposals, where the potential to adversely impact on the health of the community has been established and make recommendations to address these impacts.*
 - *evaluate existing hazardous facilities where emissions have the potential to cause undesirable health impacts, and makes recommendations to government agencies.*
 - *review levels of contamination of existing sites, identified as having the potential to cause health impacts.*
 - *review technical and related information for government agencies as a result of direct referrals; for example risk assessments.*

4.294 The Committee notes that the concept paper states that “*It is not intended that the [Environmental Health] Foundation will either duplicate or conflict with the authority of existing government agencies. Its findings and recommendations will be made public and will assist government and its agencies in their decision-making processes.*”

⁴⁷³

Ibid.

*However the [Environmental Health] Foundation will have no independent statutory authority.*⁴⁷⁴

- 4.295 The concept paper states that membership of the Environmental Health Foundation should include learning institutions including the University of Western Australia, Curtin University and Murdoch University, members of the medical fraternity and representatives from the DoH and DEP. It also notes that temporary secondments onto the Environmental Health Foundation might be necessary.
- 4.296 The concept paper sets out the role the Ministerial Council is expected to perform. This role is to appoint members of the Environmental Health Foundation, direct the Environmental Health Foundation to investigate issues and undertake research and prepare government responses to findings and recommendations of the Environmental Health Foundation.
- 4.297 The Committee was advised that as of October 2 2002 members of the Environmental Health Foundation had not been appointed, however the DEP was assisting the Ministerial Council by approaching potential members of the Environmental Health Foundation to ascertain their willingness to become members.
- 4.298 Following up on the progress, if any, made in establishing an Environmental Health Foundation, the Committee was advised in August 2003 that carriage of the Environmental Health Foundation was proposed to be with an academic institution.⁴⁷⁵ The Committee was advised that, as at August 2003, the DoH was preparing tender specifications for carriage of the Environmental Health Foundation.⁴⁷⁶
- 4.299 In response to its queries regarding the Ministerial Council's intentions for funding for the Environmental Health Foundation, the Committee was advised in a letter from the Minister for the Environment, as Chair of the Ministerial Council, that funding of \$125 000 has already been allocated for the Environmental Health Foundation.⁴⁷⁷ The Committee was also advised that the DoH is currently in the process of drafting tender documents for its establishment.⁴⁷⁸ The Minister's letter advised that it is envisaged that it could be operating by the end of 2003.
- 4.300 The Committee notes the Minister's belief that *"the Foundation [Environmental Health Foundation] will be of considerable assistance to Government in providing independent, expert health advice on matters relating [sic] health implications of*

⁴⁷⁴ Ibid.

⁴⁷⁵ Telephone conversation between Committee staff and Mr Lindsay Gillam, DoH, August 12 2003.

⁴⁷⁶ Ibid.

⁴⁷⁷ Letter from the Minister, September 17 2003.

⁴⁷⁸ Ibid.

industrial activities and chemicals generally. Such advice will be critical in resolving a range of matters of community concern, including the Wagerup issue."⁴⁷⁹

UPDATE ON MINISTERIAL COUNCIL

4.301 In response to its request, the Ministerial Council provided the Committee with an update on its achievements and strategy for future action. A copy of the Ministerial Council's letter, dated December 18 2003, is attached as Appendix 8 to this report.

4.302 In summary, the Ministerial Council advised the Committee that:⁴⁸⁰

- it endorsed the concept of setting up the Wagerup Medical Practitioners' Forum, accepted all the recommendations made by it, and responded with a whole of government strategy;
- through the DoE, the Minister for the Environment required significant emissions reductions from the refinery which had been achieved through the expenditure by Alcoa of approximately \$36 million;
- it supported the appointment of the Yarloop Community Clinic;
- it approved the creation of an Environmental Health Foundation;
- it held public meetings in the Wagerup area to receive community input and provide information to the public;
- it formulated an overall Wagerup and Districts Sustainability Program to address emerging social issues that had arisen with respect to Wagerup; and
- it supported the tripartite consultation process being developed by the DEP as a means of engaging in discussions on ongoing licensing issues and the development of an emissions based licence.

4.303 The Ministerial Council advised the Committee that its strategy for resolving the Wagerup issue was consistent with the recommendations of the Wagerup Medical Practitioners' Forum. The key elements of the strategy are to:⁴⁸¹

- continue to require Alcoa to reduce emissions from the refinery wherever it is reasonable and practicable to do so;

⁴⁷⁹ Ibid.

⁴⁸⁰ Letter from the Minister for the Environment as Chair of the Ministerial Council on Health, Environment and Industry Sustainability, December 18 2003.

⁴⁸¹ Ibid.

- encourage Alcoa to assist those members of the community who wish to leave the area to do so;
 - ensure that all relevant health and environmental guidelines are achieved and preferably bettered;
 - monitor emissions, the ambient environment, community health (and complaints) to ensure actual improvements are achieved and maintained;
 - address collateral social issues and concerns where these can be alleviated by government agencies;
 - improve regulatory controls over the refinery operations and ensure compliance;
 - identify and as appropriate coordinate programs which will facilitate the establishment of sustainable communities in the region from Pinjarra to Brunswick;
 - engage the community and facilitate its meaningful input into the resolution of the issue and in guiding the future development of the area; and
 - regularly reviewing progress and success of the strategy and modify it as required.
- 4.304 The Ministerial Council advised that a schedule of meetings for 2004 had been determined with monthly meetings of both the Ministerial Council and Coordinating Taskforce.
- 4.305 Following up with the Ministerial Council on the details of the Yarloop Sustainability Project, the Committee was provided with background information about the project dated June 2003.
- 4.306 The information from the Ministerial Council stated that:⁴⁸²
- the State Government was planning a community development program in the Yarloop and Hamel areas to address some of the impacts of alumina refining in the region;
 - the Yarloop Sustainability Project was based on a Government commitment to the future of the town and its community;

⁴⁸² Information provided by the Ministerial Council on Health, Environment and Industry Sustainability: *Yarloop Sustainability Project, Background Information - June 2003*, p1.

- the project would include an extensive consultation program to give local residents the central role in planning a successful future for the communities; and
 - the key issues identified by residents included the viability of Yarloop and Hamel, the future of the region's communities, community health, land purchase scheme impacts and community engagement.
- 4.307 The implementation of the Yarloop Sustainability Project began with an information day and workshop on June 19 2003. Members of the local communities attended an information afternoon and evening community workshop together with representatives from the DoH, DoE (also representing the Department of Conservation and Land Management), DMPR, South West Development Commission, Peel Development Commission, Department of Agriculture, Keystart Home Loans and Department for Community Development.
- 4.308 The purpose of the workshop was to obtain community input on how the whole of government initiatives should be developed and implemented.⁴⁸³
- 4.309 The Ministerial Council provided the Committee with a copy of a report (**Outcomes Report**) from that workshop.
- 4.310 The Outcomes Report sets out the outcomes of the workshop as follows:⁴⁸⁴
- input on community health concerns;
 - scoping for the planning studies;
 - comments on land purchase scheme impacts;
 - suggestions on community viability; and
 - agreements on the next steps for community engagement.
- 4.311 For further details on each of these outcomes, please refer to the Outcomes Report.

PROFESSOR D'ARCY HOLMAN

- 4.312 As part of its inquiry, the Committee heard evidence from Professor D'Arcy Holman, Chair in Public Health, School of Population Health, University of Western Australia. As noted previously, Professor Holman is Chair of the Wagerup Medical

⁴⁸³ *Yarloop Sustainability Project: Outcomes Report from a Community Workshop held on Thursday, 19 June 2003*, p1.

⁴⁸⁴ *Ibid*, p2.

Practitioners' Forum which is discussed at paragraph 4.240 and following of this report. Professor Holman appeared before the Committee on August 18 2003.

View of government response

- 4.313 The Committee was particularly interested to obtain Professor Holman's opinion as to what extent the Government had satisfactorily delivered on the recommendations made by the Wagerup Medical Practitioners' Forum.
- 4.314 Professor Holman expressed his belief that *"the way the Government has reacted to the recommendations of the Wagerup Medical Practitioners' Forum indicates to me that the Government regards the issue with the highest priority."*⁴⁸⁵ Professor Holman told the Committee that he has been *"very satisfied with the timeliness and the degree of the response that the recommendations have produced from the Government, Alcoa and the relevant government agencies."*⁴⁸⁶
- 4.315 Professor Holman also told the Committee that although the recommendations were an integrated package, *"there was never any doubt in my mind that we were always dealing with two related problems: the health of the workers at the refinery and also the health concerns of the people living in the surrounding area."*⁴⁸⁷ Professor Holman noted that the two groups overlap to a degree.
- 4.316 Professor Holman noted that *"Some of the recommendations were particularly targeting better management of the workers' health problems."*⁴⁸⁸ He expressed his belief that *"Alcoa is to be commended for having made significant progress in this area."*⁴⁸⁹
- 4.317 Professor Holman submitted that *"In particular, one of the recommendations is designed to emphasise the importance of the early identification of workers who appear to be starting to suffer some of the symptoms that have been seen, which progress to the point whereby some people would call it multiple chemical sensitivity syndrome."*⁴⁹⁰
- 4.318 Professor Holman noted that *"when those symptoms begin to appear, Alcoa now takes a much more proactive response. It aims to find an alternative place for the affected*

⁴⁸⁵ Professor D'Arcy Holman, Chair in Public Health, School of Population Health, University of Western Australia, *Transcript of Evidence*, August 18 2003, p1.

⁴⁸⁶ Ibid, p1.

⁴⁸⁷ Ibid, pp1-2.

⁴⁸⁸ Ibid, p2.

⁴⁸⁹ Ibid.

⁴⁹⁰ Ibid.

worker to continue to be employed by Alcoa if possible. If necessary, Alcoa tries to assist the worker to find alternative employment elsewhere.”⁴⁹¹

4.319 Professor Holman submitted that *“The early intervention of identifying people who show the early signs of sensitivity and then removing them from the exposed environment is one of the most important recommendations for the workers. I am very happy with the way Alcoa has responded to that recommendation.*”⁴⁹²

4.320 Professor Holman also noted Dr Cullen’s visit to Perth, which is discussed in paragraph 4.39 and following of this report, and expressed his belief that Professor Cullen’s visit had produced some very positive benefits. Professor Holman told the Committee that he was *“very pleased with the way in which he [Dr Cullen] advised the company that he worked for [Alcoa] [to] change its attitude and become much less defensive and more proactive when dealing with workers’ problems.*”⁴⁹³

4.321 In relation to the recommendations of the Wagerup Medical Practitioners’ Forum that focused on the health concerns of the people living in the local communities surrounding the refinery, Professor Holman expressed his belief that *“Overall, I have been very pleased with the way those recommendations have been received and acted on.*”⁴⁹⁴ Professor Holman noted that Alcoa has *“put a very considerable sum of money - many millions of dollars - into improved control measures to further reduce emissions. Our report provided some of the impetus for that.*”⁴⁹⁵

View of multiple chemical sensitivity

4.322 The Committee was interested to obtain Professor Holman’s opinions regarding MCS. In answer to a question from the Chair requesting his view of whether MCS is now more widely recognised amongst health professionals than it was ten years ago, Professor Holman replied *“The answer is yes; there is wider acceptance of the syndrome, but it is still controversial.*”⁴⁹⁶

4.323 Professor Holman submitted that health professionals do not yet understand the aetiology⁴⁹⁷ of MCS and that at the current time there are only theories to attempt to

⁴⁹¹ Ibid.

⁴⁹² Ibid.

⁴⁹³ Ibid.

⁴⁹⁴ Ibid.

⁴⁹⁵ Ibid.

⁴⁹⁶ Ibid, p6.

⁴⁹⁷ “Aetiology” is defined as *“the cause or causes of a disease or abnormal condition; some types of cancer have a viral etiology; a multiple etiology in which biological, psychological, and sociocultural factors all play a role. A branch of medical science dealing with the causes and origin of diseases”*: <http://www2.merriam-webster.com/cgi-bin/mwmednlm?book=Medical&va=aetiology> (accessed August 26 2003).

explain it. Professor Holman submitted that *“One of the very interesting theories that has started to appear in the literature is that it is mediated through an olfactory mechanism; that is, it is mediated through one’s sense of smell and the effect that smelling certain chemicals has on various parts of the brain.”*⁴⁹⁸ However Professor Holman stressed that this was simply a theory at this stage.

- 4.324 In relation to the classification of diseases, Professor Holman advised that *“Officially, something becomes a disease from a purely definitional perspective when it is classified by the World Health Organisation in the international classification of diseases.”*⁴⁹⁹ He informed the Committee that at the current time MCS is not in the World Health Organisation (WHO) classification and internationally it is not considered to be a disease.

Proposals for the future

- 4.325 Looking to the future, and in response to a question from Hon Jim Scott regarding a possible need for greater scrutiny, at the governmental level, regarding the location and planning of new industries, Professor Holman expressed his view that *“There is no doubt in my mind at all that this is a lesson to be learnt, not just from the difficulties that we have seen with the Wagerup refinery, but indeed a number of the other environmental controversies that have occurred in the metropolitan area.”*⁵⁰⁰ Professor Holman submitted that *“Time and time again we do see evidence that perhaps better placement should have been considered in the first place.”*⁵⁰¹
- 4.326 In response to the following proposition put to him by the Chair: *“Taking up your earlier point on better planning, could one therefore surmise that you would be in favour of the Government taking the lead on the issue of land-use policy buffers and so on rather than it being driven by the company?”*,⁵⁰² Professor Holman submitted *“Very much so. You have to be aware of the false economy of taking the least cost option when it actually involves siting things close to populated areas.”*⁵⁰³
- 4.327 Professor Holman also expressed his view that *“we need a full health impact assessment of all major, new industrial developments.”*⁵⁰⁴ He noted that currently an environmental impact assessment is required to be carried out however he submitted

⁴⁹⁸ Professor D’Arcy Holman, Chair in Public Health, School of Population Health, University of Western Australia, *Transcript of Evidence*, August 18 2003, p7.

⁴⁹⁹ Ibid.

⁵⁰⁰ Ibid, p3.

⁵⁰¹ Ibid.

⁵⁰² Ibid, p5.

⁵⁰³ Ibid.

⁵⁰⁴ Ibid, p15.

that it would be “*very positive to have a process that produces both an environmental and health impact assessment right at the beginning of these proposals and that would help make sure that the Department of Health was involved.*”⁵⁰⁵

- 4.328 Professor Holman submitted that for this to be achieved there should be a well-defined process, a “*fully integrated, major interdepartmental government process, and it needs to occur at that stage and not be left until problems develop and then we start working together to solve the problems.*”⁵⁰⁶

Community health audit

- 4.329 In the context of possible future practices and procedures that could be established to assist with solving the problems associated with the Alcoa refinery at Wagerup, the Committee was particularly interested to note Professor Holman’s comments regarding conducting a once-off health audit of the entire community of Yarloop.

- 4.330 Professor Holman submitted “*Once we provide a baseline of the full extent of the symptomatology and apparent health effects in the town from everyone who is resident there, we will not be coloured by the reports about the people who come forward with a complaint.*”⁵⁰⁷

- 4.331 Professor Holman told the Committee that “*I would like to know how many people living in Yarloop are completely symptom-free and do not experience any health problems whatsoever.*”⁵⁰⁸

- 4.332 Another advantage of conducting such a survey, according to Professor Holman, was that it could “*also be used to get a baseline on people’s perceptions of the social situation, how they feel about their sense of community and if they believe the town is viable.*”⁵⁰⁹

- 4.333 The Committee notes with interest Professor Holman’s suggestion that such a baseline survey would not be particularly expensive and could be repeated in five years in order to ascertain whether any overall progress has been made.⁵¹⁰

⁵⁰⁵ Ibid, p16.

⁵⁰⁶ Ibid.

⁵⁰⁷ Ibid, p9.

⁵⁰⁸ Ibid.

⁵⁰⁹ Ibid.

⁵¹⁰ Ibid.

Toxicology and environmental health

4.334 The Committee also notes Professor Holman's comments that "*the general concept of promoting further development of the academic sector in this area of environmental health is warranted. In particular, Western Australia is weak in the area of environmental toxicology. It is very hard to find fully qualified, experienced and independent toxicologists. Some toxicologists provide consulting services to industry.*"⁵¹¹

4.335 Professor Holman also told the Committee:

*I would prefer senior academic toxicologists to be advising the Government from a more independent position on some of these areas. A modest amount of additional funding support for the academic sector, particularly to promote environmental toxicology in a multidisciplinary framework, would probably put us in a stronger position in the future. I do not think it will help Wagerup that much. The whole scenario at Wagerup has moved well beyond the science of the situation. We are dealing with a combination of scientific and medical issues and significant social problems.*⁵¹²

4.336 The Committee notes with interest Professor Holman's opinion regarding the unlikelihood of being able to determine a possible connection between exposures and health problems. Professor Holman stated his belief that "*I doubt whether any research will clearly identify exactly which chemical or combination of chemicals from the Wagerup refinery is responsible for certain problems.*"⁵¹³

WAGERUP COMMUNITY WORKING GROUP

4.337 The Alcoa-Wagerup Community Health Awareness Group (**WCHAG**) Working Group (**WCHAG Working Group**) was established in late 1998 as a co-operative response between the community and Alcoa to investigate concerns raised by the community with respect to emissions from the Alcoa refinery at Wagerup and odour and health issues especially in the area of northern Yarloop.⁵¹⁴

4.338 The WCHAG Working Group was originally comprised of two representatives from WCHAG, two from Alcoa and an independent facilitator.

⁵¹¹ Ibid, p6.

⁵¹² Ibid.

⁵¹³ Ibid, p12.

⁵¹⁴ *Interim Report of the Alcoa-Wagerup Community Health Awareness Group Working Group*, August 2001, p4.

- 4.339 An Advisory Group was established in May 1999 to provide independent technical advice to the WCHAG Working Group. This Advisory Group was comprised of representatives from the DEP, the DoH and Murdoch University. It was chaired by the same facilitator as the WCHAG Working Group.⁵¹⁵
- 4.340 The Advisory Group initially met separately to the WCHAG Working Group, however the two groups resolved to meet together as one working unit in order to improve efficiency and effectiveness.⁵¹⁶
- 4.341 The terms of reference for the WCHAG Working Group were to:⁵¹⁷
- i) identify and understand the community's issue in regard to health;
 - ii) explore any linkage between health effects and Alcoa's Wagerup operations; and
 - iii) identify and implement solutions for the community.
- 4.342 These terms of reference also applied to the Advisory Group.
- 4.343 An Interim Report was published by the WCHAG Working Group in August 2001 (**WCHAG Working Group Interim Report**).
- 4.344 The WCHAG Working Group Interim Report noted that, whilst the terms of reference were quite specific, the WCHAG Working Group had also been a forum for:⁵¹⁸
- *Improving communications, understanding and interaction between all the stakeholders;*
 - *Receiving and discussing regular updates on Alcoa's Action Plan which has targeted reductions in both noise and odour emissions from the refinery;*
 - *Discussing, reviewing and approving environmental emission and ambient sampling programs;*
 - *Sponsoring and approving an independent health survey of residents in the Yarloop area;*⁵¹⁹

⁵¹⁵ Ibid.

⁵¹⁶ Ibid.

⁵¹⁷ Ibid.

⁵¹⁸ Ibid.

⁵¹⁹ *Report on Wagerup Health Survey*, April 2001, discussed in paragraphs 4.226 to 4.239 of this report.

- *Receiving and discussing environmental monitoring results and providing suggestions and input to additional studies;*
- *Receiving and discussing research and works being undertaken by Alcoa into odour emissions and control; and*
- *Receiving direct input and requests from WCHAG on specific areas of concern or proposed study.*

4.345 The WCHAG Working Group Interim Report stated that five streams of activities were undertaken simultaneously. These were:

- Wagerup Health Survey;
- Department of Environmental Protection's Regulator Role;
- Environmental and Emission Monitoring;
- Analysis of Community Complaints; and
- Alcoa's Noise and Air Emissions Reduction Plan.

4.346 Findings, conclusions and recommendations published in the WCHAG Working Group Interim Report relating to matters other than public health are discussed in relevant chapters throughout this report. The following comments in this chapter regarding WCHAG Working Group findings, conclusions and recommendations relate only to public health matters.

4.347 The WCHAG Working Group concluded that "*Under specific meteorological conditions, emissions from the Wagerup refinery are impacting on some residents in close proximity to the refinery at levels considered unacceptable by those residents.*"⁵²⁰ It noted that the majority of complaints identified as being typical of the Wagerup refinery odours are from the community immediately south of the refinery boundary.⁵²¹ Refer to paragraph 6.206 and following for a discussion on the meteorological conditions at Wagerup.

4.348 The WCHAG Working Group found that an analysis of complaints data indicated that there was no single source or process event in the refinery responsible for particular odour impacts as reported by the community.⁵²² It also found that all odourous

⁵²⁰ *Interim Report of the Alcoa-Wagerup Community Health Awareness Group Working Group*, August 2001, p15.

⁵²¹ Ibid.

⁵²² Ibid.

substances tested for in the refinery stack emission sampling were found to be below relevant ambient health levels.⁵²³

4.349 The WCHAG Working Group found that *“The levels of chemicals measured in the ambient environment at residences south of the refinery during times when the wind was from that direction, were very low and significantly lower than appropriate health guidelines. It was considered that these levels do not explain the health symptoms reported by the community in that area.”*⁵²⁴

4.350 The Committee is interested to note that the WCHAG Working Group concluded that *“The group has established that emissions from the refinery are responsible for odour impacts in the community. The group has not found chemicals or particles at levels, which would explain the reported health symptoms.”*⁵²⁵

4.351 The Committee notes the WCHAG Working Group’s final recommendation that a final report on the activities, findings and recommendations of the WCHAG Working Group should be published. As at the date of tabling this report, a final report has not been published.

4.352 In March 2002 the composition of the WCHAG Working Group changed to include two other community groups, the Yarloop and Districts Concerned Residents Committee (discussed in paragraph 4.119 and following of this report) and the Buffer Response Coordinating Committee representing the Hamel community (discussed in paragraph 7.32 and following of this report). It also changed its name to the Wagerup Community Working Group.

4.353 In March 2002 the Wagerup Community Working Group also amended its terms of reference as follows; to:

- develop a process for industry, government, and community consultation and communication to be effective;
- provide a forum to receive, discuss and address environmental and health concerns regarding environmental and health issues in the Wagerup area;
- disseminate information for distribution to the general public; and
- enhance community involvement and understanding of environmental monitoring.

⁵²³ Ibid.

⁵²⁴ Ibid.

⁵²⁵ Ibid.

4.354 The Committee was advised that at its meeting on August 14 2003 the Wagerup Community Working Group again amended its terms of reference as follows:

- to provide a forum for industry, government and community to receive, discuss and identify ways to address environmental and health issues in the Wagerup area, and to disseminate information and findings to the general community and all stakeholders.

4.355 The Wagerup Community Working Group continues to meet on a regular basis.

4.356 The Committee notes that in its submission dated April 9 2002 the DEP stated that *“The Wagerup Working Group has been very successful in providing a vehicle for improved and regular communication between Alcoa, the community, DEP and DOH”*.⁵²⁶ It noted that *“The activities of the group have also enabled the various members to obtain an understanding of all the relevant factors involved with this matter in an open and transparent manner.”*⁵²⁷

4.357 The DEP also submitted that *“The Wagerup Working Group importantly provides a direct opportunity for the community representatives to transfer information to their community groups and for questions or issues to be transmitted to the Wagerup Working Group to be addressed.”*⁵²⁸

4.358 The Committee notes the DEP’s submission that *“The DEP believes the success of the Wagerup Working Group is such that it should be viewed as a model for similar issues as a means of engaging the community in the process of investigating and resolving the issue in question.”*⁵²⁹

ENVIRONMENTAL AND EMISSION MONITORING

WCHAG Working Group Interim Report

4.359 As noted above, one stream of activity reported in the WCHAG Working Group Interim Report was environmental and emission monitoring. Findings were published in relation to environmental sampling as at August 2001.

4.360 Two reports referred to in the WCHAG Working Group Interim Report were produced by the Chemistry Centre (WA) and were based on data gathered by the Chemistry Centre (WA) during the winters of 1999, 2000 and 2001. Those reports

⁵²⁶ Submission No. 53 from the DEP, April 9 2002, p15.

⁵²⁷ Ibid.

⁵²⁸ Ibid, p16.

⁵²⁹ Ibid.

contained, among other things, sampling data and analysis and interpretation of that data.

- 4.361 The WCHAG Working Group Interim Report stated that the sampling program undertaken during July and August 1999 focused on the north Yarloop area where the majority of complaints originated. A broad based sampling program was undertaken which included rainwater, creek water, town scheme water (local catchment area), gutter sludges, hair, nail and urine samples, air borne particulates and VOCs.⁵³⁰ Control samples were also taken.
- 4.362 Findings published in the WCHAG Working Group Interim Report for the sampling period July to August 1999 stated that “*Results of body residue sampling did not indicate recent exposure to the compounds tested.*”⁵³¹
- 4.363 Findings for the sampling period July to August 1999 were also published in relation to water, air and gutter sludge samples.
- 4.364 The overall conclusions of the WCHAG Working Group for the sampling period July to August 1999 were that the sampling “*has not revealed any potential causes of the reported health problems being experienced by the community.*”⁵³²
- 4.365 It concluded that further water, body residue and gutter sludge testing was not necessary, however noted that particulate sampling of emissions and further sampling at sites close to the Wagerup refinery would be undertaken.⁵³³
- 4.366 Another sampling period occurred during July to October 2000 and focused on the winter ‘event’ season. Sampling was undertaken for dust, acid gases, alkaline mists, oxalates, aldehydes and organics. Oxides of nitrogen and sulphur were sampled using continuous monitors.⁵³⁴
- 4.367 All sampling and analysis was undertaken by the Chemistry Centre (WA) with the exception of monitoring equipment for oxides of nitrogen and sulphur, which were set up by staff of the DEP.⁵³⁵ Sampling during the July to October 2000 period took place in three stages at different locations, including two properties on Kaus and Boundary Roads.

⁵³⁰ *Interim Report of the Alcoa-Wagerup Community Health Awareness Group Working Group*, August 2001, p6.

⁵³¹ Ibid.

⁵³² Ibid, p8.

⁵³³ Ibid.

⁵³⁴ Ibid.

⁵³⁵ Ibid.

- 4.368 In relation to this sampling period, the WCHAG Working Group recommended that further monitoring be undertaken at the Boundary Road site during the next 'event' season and that the monitoring should concentrate on only sampling 'events'.⁵³⁶ The WCHAG Working Group recommended that continuous monitors should also be deployed for comparison purposes.⁵³⁷
- 4.369 The WCHAG Working Group also recommended that further monitoring for arsenic and fluoride should be undertaken in response to community concerns about these chemicals.⁵³⁸ It also recommended that further consideration be given to sampling calciner dust emissions.⁵³⁹
- 4.370 The final sampling period reported in the WCHAG Working Group Interim Report commenced in June 2001 however was not completed prior to publication of the Interim Report. Results from this period are to be published in the WCHAG Working Group's final report.⁵⁴⁰

Submission from Dr Les Little

- 4.371 During its inquiry the Committee received a submission from Dr Les Little, a retired Reader in Chemistry from the University of Western Australia. Dr Little's submission was dated June 24 2002 and discussed, among other things, discrepancies he claimed existed between analytical results from the Chemistry Centre (WA) and analytical data published in the WCHAG Working Group Interim Report.⁵⁴¹
- 4.372 In particular, Dr Little expressed concern in relation to the analysis of arsenic. He noted that the arsenic analyses were carried out by the Chemistry Centre (WA) and that the materials analysed were urine samples and hair and nail clippings from certain inhabitants in the vicinity of Alcoa's Wagerup refinery. In addition, samples were taken from houses in the affected area such as scrapings from gutters.⁵⁴²
- 4.373 Dr Little stated in his letter to the Committee that there were three important factors with regard to arsenic measurements taken by the Chemistry Centre (WA) in relation to samples taken from people in the vicinity of Alcoa's Wagerup refinery.
- 4.374 The first factor claimed by Dr Little was that:

⁵³⁶ Ibid, pp10-11.

⁵³⁷ Ibid, p11.

⁵³⁸ Ibid.

⁵³⁹ Ibid.

⁵⁴⁰ Ibid.

⁵⁴¹ Letter from Dr Les Little, June 24 2002, p1.

⁵⁴² Ibid, p8.

- the analysis regime of the Chemistry Centre (WA) was “*defective in that it cannot distinguish between organic arsenic (from sea food), which is regarded as harmless or benign and inorganic arsenic which is dangerous and poses severe health risks leading to cancer and death.*”;⁵⁴³
- this was because some of the harmful inorganic arsenic is metabolised in the body and converted to two forms of organic arsenic compounds, separate from the safe organic arsenic of seafood origin. Dr Little claimed that in the Chemistry Centre technique, “*all organic forms are lumped together and treated as safe organic arsenic of marine origin.*”⁵⁴⁴; and
- the Chemistry Centre (WA) should instead use a technique that measured the metabolised organic arsenic forms separately and then combine them with the residual inorganic arsenic to give a total inorganic value. He submitted that the results from the Chemistry Centre (WA) are “*in error as they stand.*”⁵⁴⁵

4.375 The second factor claimed by Dr Little was that “*The analyses of urine, fingernail and hair apply to different periods in the past as regards times of ingestion of arsenic into the body.*”⁵⁴⁶ He submitted that the different time periods for measuring arsenic in different parts of the body correspond to different events of exposure to the arsenic.

4.376 The third factor claimed by Dr Little was that:

- the analyses by the Chemistry Centre (WA) were given as parts per million by weight (milligrams arsenic per kilogram hair or nail) or in the case of urine, milligram arsenic per litre of urine;⁵⁴⁷ and
- “*In the analyses of arsenic in hair or nail these analytical figures are meaningless because the emission of arsenic from the factory chimneystack is episodal - not continuous.*”⁵⁴⁸

4.377 As part of his submission Dr Little outlined some chemical aspects of arsenic:⁵⁴⁹

- a) *from industrial sources where ore or earth containing arsenic is heated to high temperatures, arsenious oxide is volatilized*

⁵⁴³ Ibid, p10.

⁵⁴⁴ Ibid.

⁵⁴⁵ Ibid.

⁵⁴⁶ Ibid, p11.

⁵⁴⁷ Ibid.

⁵⁴⁸ Ibid.

⁵⁴⁹ Ibid, pp12-13.

from the samples and exists as small particles via the airflow through the system;

- b) arsenious oxide (arsenic III) is much more toxic than its oxidized form arsenate;*
- c) when ingested into the human body in sub-lethal doses as arsenious oxide or sodium arsenite (both inorganic arsenic III) the arsenic is partly eliminated via urine as **inorganic arsenic III**;*
- d) ... the inorganic arsenic III is partly metabolized in the defence mechanism of the body to produce monomethyl arsonic acid (MMA) and dimethyl arsinic acid (DMA), both of which are eliminated in the urine;*
- e) some inorganic arsenic III is retained in the body and appears in the hair and nails; and*
- f) there is an additional form of **organic arsenic compound** occurring in relatively high concentrations in bottom dwelling seafood. The overwhelming abundant form of **organic arsenic** in fish and crustaceans is a compound called **arseno betaine**.*

4.378 As part of his submission Dr Little provided the Committee with copies of two documents he advised were obtained on February 22 2000 from the Chemistry Centre (WA) by Mrs Borserio, at his request, to detail the technique used by the Chemistry Centre (WA) to analyse arsenic in urine. Dr Little submitted that the Chemistry Centre (WA) analysis gave only two pieces of information, namely:

- the amount of inorganic arsenic III in the urine which is the remaining amount of this type after the ingestion of the initial inorganic arsenic III; and
- the total arsenic in the urine at the time of sampling.

4.379 Dr Little submitted that the Chemistry Centre (WA) analysis did not separately measure:

- MMA metabolised from inorganic arsenic III;
- DMA metabolised from inorganic arsenic III; or
- safe organic arsenic of marine seafood origin.

- 4.380 Dr Little submitted to the Committee that in its analysis the Chemistry Centre (WA) assumed that the difference between the two readings that it did take (that is, the total arsenic in the urine at the time of sampling less the amount of inorganic arsenic III in the urine which is the remaining amount of this type after the ingestion of the initial inorganic arsenic III) was the amount of harmless organic arsenic of marine food origin.
- 4.381 Dr Little submitted that *“This is wrong. This has ignored two other types of organic arsenic. There is no way that the Chemistry Centre technique can identify separately and measure the two forms of organic arsenic MMA and DMA which are formed by the metabolism in the human body of the original, inorganic arsenic III which was ingested.”*⁵⁵⁰ Dr Little claimed that *“There is no way the Chemistry Centre technique can identify and analyse independently the harmless organic arsenic of marine food origin.”*⁵⁵¹
- 4.382 In his submission Dr Little discussed a urine sample taken from a resident living in the vicinity of Alcoa’s Wagerup refinery that was reported in the WCHAG Working Group Interim Report.⁵⁵² The sample showed that the total arsenic was 40 micrograms per litre of urine. He submitted that since the creatinine in the sample was 0.8 grams per litre, for one gram of creatinine the arsenic value would be 50 micrograms of arsenic per gram of creatinine.⁵⁵³ The Committee notes that this is at the upper limit for workplace exposure.
- 4.383 He claimed that *“The Chemistry Centre did not identify in their analysis whether major components of the arsenic in the urine sample were MMA and DMA or was safe arseno betaine from a fish meal. They should have done this.”*⁵⁵⁴ Dr Little submitted that if the subject of the study had not had a fish meal during the previous week before the sample of urine was taken, then the total of the 50 micrograms of arsenic per gram of creatinine would have arisen from inorganic arsenic III ingested in one ‘event’ from the refinery effluent emission.⁵⁵⁵
- 4.384 Dr Little submitted that the Chemistry Centre (WA) ascribed the major part of the 50 micrograms creatinine in the urine sample to *“the ingestion of safe organic arsenic of marine food source without having analysed to prove this.”*⁵⁵⁶ He submitted that *“There is urgent need to have these arsenic analyses repeated many times on*

⁵⁵⁰ Ibid, p14.

⁵⁵¹ Ibid.

⁵⁵² Ibid, p16.

⁵⁵³ Ibid.

⁵⁵⁴ Ibid.

⁵⁵⁵ Ibid, p17.

⁵⁵⁶ Ibid.

inhabitants of Wagerup taken only during ‘events’ and extended over a 5-day period.”⁵⁵⁷

- 4.385 Further, Dr Little submitted that the tests should be made with an appropriate technique that distinguishes inorganic arsenic III and metabolised organic arsenic from safe organic arsenic of seafood origin.⁵⁵⁸ He submitted that the analysis should be made by an independent analyst.⁵⁵⁹
- 4.386 In relation to the Chemistry Centre (WA) generally, Dr Little claimed that whenever it found a high analysis figure for some chemical substance, its reports “*went into denial mode and blamed the local inhabitants. It was due to something they ate.*”⁵⁶⁰
- 4.387 Dr Little claimed that the Chemistry Centre (WA) trivialised high analysis figures by suggesting a food source, such as rhubarb in the case of high oxalate samples and fish in the case of high arsenic samples.⁵⁶¹
- 4.388 Dr Little claimed in his submission that “*It seems that the Chemistry Centre is determined not to find anything. There is no self-doubt ... The Chemistry Centre should show due concern and quadruple their efforts to get to the bottom of this pollution problem.*”⁵⁶²
- 4.389 The Committee drew the matters raised by Dr Little to the attention of the Chemistry Centre (WA) and the DEP by providing them with a copy of Dr Little’s letter and requesting their response.
- 4.390 In its response the Chemistry Centre (WA) expressed its belief that Dr Little’s submission “*includes many misleading statements*”⁵⁶³ and has been presented in a way “*that could be misleading to people without a scientific background and incorrect allegations/interpretations have been made.*”⁵⁶⁴
- 4.391 In response to Dr Little’s claim set out at paragraph 4.380 above, the Chemistry Centre (WA) submitted that “*No such statement was made nor was the term ‘harmless’ ever used in this context in Chemistry Centre reports.*”⁵⁶⁵

⁵⁵⁷ Ibid.

⁵⁵⁸ Ibid.

⁵⁵⁹ Ibid.

⁵⁶⁰ Ibid.

⁵⁶¹ Ibid, p18.

⁵⁶² Ibid, p20.

⁵⁶³ Letter from JW Hosking, Director, CCWA, August 6 2002, p2.

⁵⁶⁴ Ibid.

⁵⁶⁵ Ibid.

- 4.392 In its submission the Chemistry Centre (WA) referred to the urine sample taken from a resident living in the vicinity of Alcoa's Wagerup refinery and referred to in paragraph 4.382 above.
- 4.393 The Chemistry Centre (WA) advised the Committee that a publication titled *Biological Monitoring Guideline*, Department of Minerals and Energy Western Australia, November 1997 was helpful in the interpretation of urinary arsenic results.⁵⁶⁶ The *Biological Monitoring Guideline* discusses Biological Exposure Indices (**BEIs**) and explains that they are reference values intended as guidelines for the evaluation of potential health hazards.⁵⁶⁷ It states that BEIs do not indicate a sharp distinction between hazardous and non-hazardous exposures and are primarily an index of exposure. They are not an indicator of health effects that may have been produced from exposure to a workplace chemical.⁵⁶⁸ BEIs generally represent biological levels of workplace substances which are most likely to be found in the blood or urine of employees who have been exposed, through breathing, at the level of the occupational exposure standard.⁵⁶⁹
- 4.394 The *Biological Monitoring Guideline* provides that the BEI for arsenic is 220 micrograms arsenic per gram creatinine (total arsenic) and 50 micrograms arsenic per gram creatinine (inorganic arsenic).⁵⁷⁰ These levels are for occupationally exposed workers.
- 4.395 The Chemistry Centre (WA) submitted that its conclusion that the urine sample taken from the resident living in the vicinity of the Wagerup refinery did not represent evidence of significant recent exposure to inorganic arsenic was because the total arsenic figure was at the BEI for inorganic arsenic. It submitted that even if all arsenic in the sample was present as the most harmful form (inorganic arsenic) the BEI would not have been exceeded.⁵⁷¹
- 4.396 The Chemistry Centre (WA) submitted to the Committee that "*It is not correct to say that Chemistry Centre technique for arsenic determination was wrong because the arsenic was not speciated into its various forms. A screening test was applied to provide information. This is normal practice.*"⁵⁷²

⁵⁶⁶ Ibid, p3.

⁵⁶⁷ *Biological Monitoring, Guideline*, DoIR, December 1997, Document No: ZMR7741Y, p11.

⁵⁶⁸ Ibid.

⁵⁶⁹ Ibid, p12.

⁵⁷⁰ Ibid, p9.

⁵⁷¹ Letter from JW Hosking, Director, CCWA, August 6 2002, p3.

⁵⁷² Ibid.

- 4.397 In relation to testing nails for arsenic, the Chemistry Centre (WA) submitted that this was undertaken opportunistically as it may have turned up an anomaly. The Chemistry Centre (WA) noted that it did not.⁵⁷³
- 4.398 It also noted that sampling human finger nails and toe nails is invasive and that no further nail testing had been requested by WCHAG nor done by the Chemistry Centre (WA) in relation to the Wagerup issue.⁵⁷⁴
- 4.399 In relation to the detection of arsenic in the Wagerup area generally, the Chemistry Centre (WA) submitted that *“Air-borne particulates sampled at various locations around Yarloop have been analysed for the past three winters but arsenic has not been detected in any of these samples.”*⁵⁷⁵
- 4.400 In relation to the allegation made by Dr Little set out in paragraph 4.386 above, the Chemistry Centre (WA) submitted that *“We find this quite a preposterous accusation. It is standard Chemistry Centre practice to interpret the results of test data and to attempt to place the results into context. Most informed clients required this and WCHAG certainly did.”*⁵⁷⁶ It submitted that *“For an investigation such as the Wagerup environmental study, a lot of time and discussion between staff of the Chemistry Centre, Department of Environment Protection, Department of Health, Alcoa and community members went into this aspect of the results.”*⁵⁷⁷
- 4.401 In its response to Dr Little’s criticisms, the DEP advised the Committee that in addition to the advice of its own staff it had also obtained advice from the Chemistry Centre (WA) and the DoH. The DEP noted that the Chemistry Centre (WA) had responded to the Committee direct.
- 4.402 The DEP submitted that the initiation of urine, hair and nail analysis in 1999 was one put forward by community members; it was not suggested by either the DoH or the DEP representatives. Caution was expressed at the time by the DoH representatives both with respect to the testing and value of the results. Testing was done essentially to accommodate community concerns.⁵⁷⁸
- 4.403 The DEP also submitted that testing by the Chemistry Centre (WA):⁵⁷⁹

⁵⁷³ Ibid.

⁵⁷⁴ Ibid.

⁵⁷⁵ Ibid, p4.

⁵⁷⁶ Ibid.

⁵⁷⁷ Ibid.

⁵⁷⁸ Letter from Mr Tim McAuliffe, Director, Environmental Regulation Division, DEP, January 24 2003, p19.

⁵⁷⁹ Ibid, pp19-20.

- in 1999 for arsenic in rainwater tanks showed it was at or below the limit of detection and below the drinking water guidelines. Testing by the Chemistry Centre (WA) at the same time for arsenic in roof gutter sludges showed levels at houses close to the refinery were similar but lower than at a control house several kilometres to the south further away from the refinery;
- in 2000 for dust from the calciners at the refinery showed very low levels of arsenic in leachate from the dust samples;
- in 2001 for arsenic in ambient air samples at a house in Yarloop consistently showed arsenic was below the limit of detection. Testing by Alcoa of ambient air at the same house in 2002 showed arsenic levels were below the detection limit; and
- in 2002 for arsenic in ambient air at two houses selected by the community in Yarloop showed levels were below the limit of detection. Following this and earlier results the Chemistry Centre (WA) has recommended that no further testing of any metals in particulates be carried out due to the consistently low levels found.

4.404 The DEP submitted that *“The key issue with this whole matter is that the inorganic arsenic level was low and therefore, further speciation is not necessary.”*⁵⁸⁰ It submitted that, based on expert advice, *“the DEP believes that the very low arsenic levels in ambient air adjacent to the refinery are not likely to be a cause of the reported health impacts and that further investigation in this regard is not warranted.”*⁵⁸¹

4.405 The Committee received a further submission from Dr Little in which he responded to the submission from the Chemistry Centre (WA).⁵⁸²

4.406 Among other things, Dr Little submitted that the BEI for arsenic for occupationally exposed workers (220 micrograms arsenic per gram creatinine and 50 micrograms arsenic per gram creatinine as inorganic arsenic) should be lowered.⁵⁸³ Dr Little submitted that the value of BEI 50 micrograms arsenic per gram creatinine should be reduced to 30 micrograms arsenic per gram creatinine.⁵⁸⁴

⁵⁸⁰ Ibid, p20.

⁵⁸¹ Ibid.

⁵⁸² Submission No. 42 from Dr Little, September 11 2002.

⁵⁸³ Ibid, p6.

⁵⁸⁴ Ibid, p9.

4.407 Dr Little submitted that *“It is a disgrace that Australia should have a time weighted average for arsenic of 50 [micrograms arsenic per m³] where the USA has a value of 10 [micrograms arsenic per m³]. It is also a disgrace that Australia has BEI for arsenic of 220 [micrograms arsenic per gram creatinine] and also a value of 50 [micrograms arsenic per gram creatinine]. The USA has BEI for arsenic of 35 [micrograms arsenic per gram creatinine].”*⁵⁸⁵

4.408 The Committee sought advice from the Chemistry Centre (WA) seeking further information about their current procedures for testing arsenic levels. In response to the Committee’s request, the Chemistry Centre (WA) advised that:⁵⁸⁶

- for the period up until July 2000 all analyses for arsenic on biological samples (urine and bloods) were for total arsenic;
- after this date, the distinction between inorganic and total arsenic was made for urine samples only;
- total arsenic is the only form reported in blood; and
- to assist with the interpretation of the analyses in urine the results are also published as creatinine corrected, which permits the effects of dilution or concentration as a result of varying fluid consumption to be made.

4.409 The Committee has not addressed the merits of the conflicting scientific views expressed in these submissions.

COMMITTEE FINDINGS

4.410 The Committee has found that some Alcoa employees at the Wagerup refinery and some members and former members of the local communities of Yarloop, Hamel and Cookernup have experienced a wide range of adverse health effects that are associated with emissions from the refinery.

4.411 The Committee is concerned to note that of the two people tested, the arsenic levels found in one urine sample were at the upper level accepted for workplace exposure rather than residential exposure. The Committee is further concerned that, although analytical practice was changed by the Chemistry Centre (WA) in July 2000, the Chemistry Centre (WA) failed to determine whether this sample was of organic or inorganic origin.

⁵⁸⁵ Ibid, p10.

⁵⁸⁶ Letter from Mr Peter McCafferty on behalf of Mr Neil Campbell, Acting Managing Director, CCWA, May 18 2004, p1.

- 4.412 The Committee notes that when the Wagerup Medical Practitioners' Forum published its recommendations in February 2002, it was the first time an expert group in Western Australia had acknowledged that a health problem did exist in relation to the Alcoa refinery at Wagerup. The Committee commends the work done by the Wagerup Medical Practitioners' Forum.
- 4.413 The Committee is of the view that some people are more susceptible to experiencing adverse health effects from emission events than others. Some of these people have experienced severe symptoms known as multiple chemical sensitivity
- 4.414 The Committee notes that the onset of multiple chemical sensitivity may be triggered by a single, significant initiating event, such as inhalation of noxious gases or other toxic exposure. This may lead to the development of a broadening sensitivity to a diverse range of chemicals at very low doses. This hypersensitivity impacts on the ability of the sufferer to both work and socialise normally.
- 4.415 The Committee believes that the emissions from Alcoa's Wagerup refinery are likely to have been trigger events which have caused some people to suffer from multiple chemical sensitivity. Many of these people continue to experience ill-health.
- 4.416 The Committee finds that the operations of the liquor burner facility during 1996 to 1999 could have been responsible for such trigger events.
- 4.417 The Committee notes that multiple chemical sensitivity is not currently classified as a specific disease entity due to the fact that the pathogenesis⁵⁸⁷ is not understood and has not been identified. A person with symptoms associated with multiple chemical sensitivity would not be able to claim compensation for the condition as a distinct disease entity under the *Workers Compensation and Rehabilitation Act 1981*. However the Committee notes that they may be able to claim compensation under that Act if their symptoms come within the list of specified industrial diseases set out in column 1 of Schedule 3 of the *Workers Compensation and Rehabilitation Act 1981*. The Committee considers that people with multiple chemical sensitivity are disadvantaged in their claim for compensation by the lack of formal recognition of multiple chemical sensitivity as a distinct disease entity.
- 4.418 The Committee notes that at least nine workers at Alcoa's Wagerup refinery have been diagnosed with multiple chemical sensitivity.
- 4.419 The Committee endorses Dr Harper's opinion that there should be a discrete, organised public health response to the situation at Wagerup and his suggestion that a health surveillance program be initiated. The Committee is of the view that such a

⁵⁸⁷ Pathogenesis: the development of a particular disease, including the specific events involved, bodily tissues or systems affected, mechanisms of damage and timing of the course of disease: www.sfaf.org/treatment/beta/b32/b32glos.html (accessed May 11 2004).

- program should be backdated to 1996 and should include current and former employees at the Alcoa refinery at Wagerup and current and former members of the local community.
- 4.420 The Committee believes it is important that a standard, systematic process be established for assessing people who have developed adverse health symptoms.
- 4.421 The Committee is of the view that this process should be limited in its geographic scope to the adjacent communities, because surveys of larger areas are unlikely to disclose statistically significant findings.
- 4.422 The Committee considers that the health surveillance program should include a health audit of the entire Yarloop community, as suggested by Professor Holman in his evidence to the Committee. The Committee is of the view that such an audit would demonstrate the extent of health problems currently experienced in the local community and could be used as a baseline to assess the incidence of new reports of adverse health effects in the future.
- 4.423 The Committee notes that some people who have had their health impacted upon have moved away from the area. Those people should be afforded the opportunity to be included in the health audit. The Committee suggests that a useful starting point for the health audit is 1996 when the LBF was commissioned.
- 4.424 The Committee notes that contractors (comprising approximately forty percent of the workforce at Wagerup) have not been included in many of the health surveys that have been undertaken to date and is of the view that contractors should be included in future health surveys.
- 4.425 The Committee believes that the Department of Health should have the principal responsibility for the carriage of the health surveillance program.
- 4.426 The Committee is of the view that public pressure from the Yarloop community encouraged Alcoa to bring Dr Cullen back to Western Australia in 2002. The Committee considers that Dr Cullen's visit was very beneficial as it was the catalyst for Alcoa's acknowledgment to the local community that the refinery at Wagerup had intruded on their daily lives. The Committee also notes that Dr Cullen's visit to Western Australia in 2002 led to Alcoa changing its internal processes, some of which had contributed to the breakdown in communication between Alcoa and the local community.
- 4.427 However the Committee is of the view that it would have been more beneficial had the significance and importance of these issues been raised with Dr Cullen during his first visit to Western Australia in 1998. Acknowledging the benefit of hindsight, the Committee believes that had these issues been dealt with at the time of Dr Cullen's

first visit to Western Australia, some of the problems that were experienced may not have occurred.

- 4.428 The Committee acknowledges the work of the Yarloop and Districts Concerned Residents Committee in bringing the public health issues to the attention of the Western Australian Parliament, the public and Alcoa and the responsible manner in which the Yarloop and Districts Concerned Residents Committee has dealt with these issues.
- 4.429 In relation to the Healthwise Project, the Committee is of the opinion that it is a significant and worthwhile study initiated by Alcoa that should continue into the future. Given that the Healthwise Project commenced prior to the installation of the LBF at Wagerup, the Committee believes that the information gathered in relation to the Alcoa employees and contractors at the Wagerup refinery is valuable in comparing the number and type of adverse health effects experienced by Alcoa employees before and after the installation.
- 4.430 The Committee believes that the YCC provided a valuable service for the people of Yarloop and surrounding areas and that it encouraged people to seek professional medical assistance in the event that they had a health complaint. The YCC also provided a valuable stress counselling service.
- 4.431 The Committee notes that for the period October 2002 to the end of April 2003 a total of 48 clients presented to the YCC with health concerns.
- 4.432 The Committee supports the Government's proposal to establish an Environmental Health Foundation.
- 4.433 The Committee notes that although the idea for an Environmental Health Foundation was mooted in September 2002 it has not, as at the date of this report, been established.
- 4.434 The Committee believes that prior to the commencement of major new industrial developments in Western Australia, or the expansion of existing industrial facilities, where the potential to impact on the health of the community has been identified, a well-defined, fully integrated, interdepartmental Government assessment should be conducted. The Committee believes that this should include an environmental health impact assessment that would ensure the involvement of the DoH. The Committee believes that such a requirement may result in the future prevention of similar public health problems that have been identified during the course of this inquiry.
- 4.435 The Committee notes the work carried out by the Wagerup Community Working Group (formally WCHAG) and believes that it was an important and effective way for the community to be involved in the issues raised by the Alcoa refinery at Wagerup. The Committee is of the view that the Wagerup Community Working Group provided

an effective forum for communication, interaction and the dissemination of information between the community, Alcoa, and the Government.

- 4.436 The Committee recognises Alcoa's efforts to support the communities surrounding the Alcoa Refinery at Wagerup (refer to paragraph 8.51 and following of this report). The Committee also recognises that although Alcoa has not accepted liability under the workers compensation regulatory regime for claims made by its employees, it continues to pay the employees' pre-absence wages on a without prejudice basis (refer to paragraph 5.75 of this report) and it has assisted its employees by focusing on finding an individualised rehabilitation for affected workers (refer to paragraph 5.79 of this report). The Committee also notes that ex-gratia payments have been made to employees (refer to paragraph 5.91 of this report).
- 4.437 The Committee is concerned about the need for equity in assistance between employees and residents who have suffered long term health effects linked to the refinery emissions. The Committee notes that although the health problems are shared, affected residents who have experienced significant impacts do not have access to the same avenues for redress and support as employees.
- 4.438 The Committee received private evidence that at least one former local resident has suffered long term impairment due to MCS.
- 4.439 The Committee considers that Alcoa, in the spirit of continued community support, seriously consider extending the expression of good will and support shown to employees who have suffered serious health problems to those members and former members of the local communities who have and continue to experience adverse health effects.

Recommendations

Recommendation 3: The Committee recommends that the Department of Health, as a matter of priority, establish a discrete, organised public health response to the situation at Wagerup. This should comprise, in part:

- a long-term health surveillance program, backdated to 1996, and include current and former employees at the Alcoa refinery at Wagerup, current and former contractors at the Alcoa refinery at Wagerup and current and former members of the local communities of Yarloop, Hamel and Cookernup;
- a health audit of the total population of Yarloop. This health audit should be repeated in five years time; and
- counselling and referral to appropriate health services being made available.

Recommendation 4: The Committee recommends that the Government review its decision to close the Yarloop Community Clinic.

Recommendation 5: The Committee recommends that the Government give immediate priority to the establishment and long-term funding of an Environmental Health Foundation, to be independent from Government but required to report to the Minister for the Environment and the Minister for Health.

Recommendation 6: The Committee recommends that the Government should cause all reports received from the Environmental Health Foundation to be tabled before each House of Parliament.

Recommendation 7: The Committee recommends that the membership of the Environmental Health Foundation include community representation.

Recommendation 8: The Committee recommends that that the Environmental Health Foundation report to Government on, among other things:

- diagnostic tools available for cases of multiple chemical sensitivities; for example, the use of chromosome testing;
- treatment options for managing the condition of people who have multiple chemical sensitivities;
- methodologies for the carriage of health surveillance programs;
- methodologies for the carriage of health impact assessments; and
- reviewing the current exposure standards for arsenic and bringing them in line with international standards.

Recommendation 9: The Committee recommends that the Government facilitate the development of the study of environmental health in Western Australia, particularly in the area of environmental toxicology to ensure the availability of fully qualified, experienced and independent toxicologists.

Recommendation 10: The Committee recommends that the Department of Health should ensure access to appropriate medical expertise and diagnostic health and support services for people with multiple chemical sensitivities and other chemical injuries.

CHAPTER 5

OCCUPATIONAL HEALTH AND SAFETY; AND COMPENSATION AND REHABILITATION

OVERVIEW OF CHAPTER

- 5.1 This chapter covers issues regarding occupational health and safety at the Alcoa refinery at Wagerup. It includes:
- a summary of the regulatory regimes used to deal with occupational health and safety at the refinery;
 - occupational health and safety issues associated with the refinery;
 - discussion of rehabilitation and compensation issues at Alcoa's refinery at Wagerup; and
 - Committee findings and recommendations.

REGULATION OF OCCUPATIONAL HEALTH AND SAFETY AT ALCOA'S WAGERUP REFINERY

- 5.2 In Western Australia two main Acts cover occupational health and safety; the *Mines Safety and Inspection Act 1994 (MSI Act)* and the *Occupational Safety and Health Act 1984 (OSH Act)*. The regulatory regime for occupational health and safety in Western Australia is administered by two separate Government departments:
- The DMPR (now DoIR) has jurisdiction over mine sites and is responsible for the administration of the MSI Act and *Mines Safety and Inspection Regulations 1995 (MSI Regulations)*. In this respect a mine refers to both a mine site and mining operations associated with it, such as processing plants and refineries.
 - All other workplaces in Western Australia come under the Department of Consumer and Employment Protection (WorkSafe Division). The Department is responsible for the administration of the OSH Act and the *Occupational Safety and Health Regulations 1996*.
- 5.3 The Department of Environmental Protection (**DEP**) is responsible for setting refinery emission levels by way of conditions on the operating licence (refer to paragraphs 6.5 to 6.8 of this report).

Jurisdiction of the Department of Minerals and Petroleum Resources

- 5.4 The Committee notes that the DMPR has recently been merged with the industry and trade functions of the Department of Industry and Technology to form the Department of Industry and Resources (**DoIR**). Except where otherwise noted the Committee has referred to the department as the DMPR throughout this report.
- 5.5 The DMPR is required to ensure that Alcoa's Wagerup refinery complies with the legislative regime dealing with occupational health and safety, which includes compliance with the national and international occupational atmospheric contaminant exposure and health standards, which the legislation invokes.⁵⁸⁸
- 5.6 The regulatory regime relies predominantly on industry self-regulation by taking a 'duty of care' approach, which makes it the employer's responsibility to maintain the work environment to a standard required under the occupational health and safety regulatory regime.⁵⁸⁹ The MSI Act and MSI Regulations set out the objectives, define standards of occupational health and safety and contain some prescriptive elements.⁵⁹⁰
- 5.7 WorkSafe Australia has published a list of contamination standards that apply across Australia. The appropriate exposure standards are set out in Part 9.11 of the MSI Regulations.
- 5.8 For further details of the DMPR's jurisdiction regarding occupational health and safety and the adequacy of the regulatory regime covering occupational health and safety at Alcoa's Wagerup refinery refer to Chapter 9 of this report.

Background to the self-regulation of occupational health and safety and 'duty of care'

- 5.9 Occupational health and safety regulation in Australia (and Western Australia) has followed the recommendation of the Robens Report on *Safety and Health at Work* (1972), for the need for a more effective self-regulating system. In summary the Robens self-regulatory system and the Western Australian regulatory regime establish:⁵⁹¹

- the general duties on employers, workers and suppliers of materials;

⁵⁸⁸ Letter from Mr LC Randford, Director General, Department of Minerals and Energy, to Hon Kim Chance MLC, Chairman, Standing Committee on Public Administration, December 11 1998 (contained in Report No. 12 of the former Standing Committee on Public Administration).

⁵⁸⁹ For further information on self-regulation and duty of care refer to paragraphs 5.9 to 5.12 of this report.

⁵⁹⁰ For further details refer to the DoIR's website: <http://www.mpr.wa.gov.au/safety/index.html> (accessed September 11 2003) and the *Mines Safety and Inspection Act 1994*.

⁵⁹¹ Industry Commission, *Work, Health and Safety*, Commonwealth Government, Industry Commission, Volumes 1 and 2, September 11 1995, pp344-347 and the *Mines Safety and Inspection Act 1994*, Part 1 Objects, p2.

- basic rights for workers and their representatives; and
 - tripartite structures (government, employers and employees) to foster cooperation and consultation in the formulation and implementation of health and safety standards, optimum workplace standards, and legislation.
- 5.10 All jurisdictions in Australia have adopted a statutory expression of the duty of care on employers, employees, and others to provide healthy and safe conditions at work, which is similar to the traditional common law duty of care. The object of imposing these duties is to ensure that those with authority or control over particular aspects of the working environment exercise that authority or control in a manner that is not harmful to the health and safety of any person.⁵⁹²
- 5.11 The duty of care allows the occupational health and safety regime to address emerging hazards as they arise, for new information to be taken into account and new technologies to be adopted as they become known. It does not depend on specific legislation being created to address changing circumstances. The nature of the duty of care places an onus on employers to take account of the particular circumstances and characteristics of their workforces and workplaces.⁵⁹³
- 5.12 The MSI Act (Parts 2 and 4) sets out the duties of employers and managers of mines and those of employees.

Alcoa's responsibility under the regulatory regime

- 5.13 Dr Galton-Fenzi, Occupational Physician for DMPR, informed the Committee by way of letter dated July 24 2002 that at all times Alcoa was responsible for occupational health issues at its Wagerup refinery.
- 5.14 Dr Galton-Fenzi noted that the DMPR:⁵⁹⁴

has no responsibility for Occupational Health and Safety at this site. The Department has its regulatory responsibility with its requirements, for all mining operations, to meet the provisions of the Act and Regulations, and ensure their compliance.

The Department has no duty of care responsibilities in relation to the workforce and exposures. The use of Inspectorial duties and International, National and State Standards remains the

⁵⁹² Industry Commission, *Work, Health and Safety*, Commonwealth Government, Industry Commission, Volumes 1 and 2, September 11 1995, p347.

⁵⁹³ Ibid.

⁵⁹⁴ Attachment, point 3 to the letter from Dr Galton-Fenzi, Occupational Physician, DMPR, July 24 2002.

responsibility of the Department to ensure compliance with all Regulations, Codes and Standards.

- 5.15 Dr Galton-Fenzi also noted that *“Alcoa remains responsible for the occupational health and safety of all its employees and exercises its duty of care directly.”*⁵⁹⁵

Alcoa’s health and safety training program

- 5.16 The WorkSafe Western Australian Commission (**WorkSafe**) is responsible for accrediting occupational health and safety training courses in Western Australia in accordance with the OSH Act.⁵⁹⁶
- 5.17 The DMPR has the regulatory responsibility for Alcoa’s health and safety representative training.
- 5.18 Alcoa informed the Committee that it conducts accredited training of health and safety representatives under the MSI Act.⁵⁹⁷ Alcoa advised that it is one of only 10 organisations in Western Australia that has accredited health and safety courses and submitted that *“This reflects Alcoa’s long standing commitment to health and safety performance and external recognition for Alcoa’s health and safety systems.”*⁵⁹⁸ The other organisations are mainly training course providers such as Unions WA, Edith Cowan University, Great Southern Technical and Further Education and the Chamber of Industry and Commerce.⁵⁹⁹
- 5.19 Alcoa advised that in relation to its health and safety training program, WorkSafe reviews the training material every two years and trainers delivering the course include mines inspectors, union representatives and Alcoa’s health and safety professionals.⁶⁰⁰ Alcoa advised the Committee that it has conducted almost 200 training courses since it first became accredited in 1988.⁶⁰¹

Alcoa’s occupational health and safety management process

- 5.20 Alcoa advised the Committee that its occupational health and safety management process is characterised by:⁶⁰²

⁵⁹⁵ Ibid.

⁵⁹⁶ For more detailed information on education and training courses refer to www.safetyline.wa.gov.au/PageBin/edcngenl0072.htm (accessed January 15 2003).

⁵⁹⁷ Letter from Mr Bill Knight, Alcoa, Wagerup Refinery Manager, October 20 2003.

⁵⁹⁸ Ibid.

⁵⁹⁹ www.safetyline.wa.gov.au/PageBin/edcnshrs0001.htm (accessed October 24 2003).

⁶⁰⁰ Letter from Mr Bill Knight, Alcoa, Wagerup Refinery Manager, October 20 2003.

⁶⁰¹ Ibid.

⁶⁰² Appendix 7 of Submission No. 15 from Alcoa, February 18 2002.

- visible leadership by senior management;
- acceptance of health and safety as line management responsibilities;
- support from experienced occupational health and safety professionals;
- involvement of the workforce in all aspects of the health and safety programs; and
- continuous improvements that focus on the ultimate goal of an incident free workplace.

5.21 Alcoa's occupational health and safety management systems and procedures are evaluated by its corporate audit protocols and by self-assessment. In 2002 Alcoa informed the Committee that it had recently introduced into its occupational health and safety management system a more comprehensive risk evaluation and risk reduction program, including operational hazard analysis and fault free analysis.⁶⁰³ Alcoa also advised that improvements were being made by:⁶⁰⁴

- reviews of job safety and standardising job procedures;
- improving training programs and instigating behavioural safety initiatives; and
- sharing knowledge and best practice between similar facilities worldwide.

5.22 Alcoa stated that its health management has two broad activity streams:⁶⁰⁵

- managing the work environment by recognising, evaluating and controlling physical and chemical agents and ergonomic hazards; and
- employee health programs involving medical examinations, injury management and health promotion.

5.23 These programs are supported by occupational physicians, industrial hygienists, nurses, physiotherapists and other health professionals, and guided by Alcoa's Worldwide Health Standards.⁶⁰⁶ Yale University's School of Medicine and several

⁶⁰³ Ibid.

⁶⁰⁴ Ibid.

⁶⁰⁵ Ibid.

⁶⁰⁶ For further details see Alcoa's website at www.alcoa.com.au (accessed November 19 2003).

Australian universities also provide expert advice to Alcoa on occupational health and safety.⁶⁰⁷

- 5.24 A corporate audit system of occupational health and safety applies to all Alcoa locations worldwide and it is supplemented by a self-audit system to prepare locations for external audit and to improve internal control processes. Alcoa advised the Committee that it had audit protocols to cover areas such as qualitative and quantitative exposure assessments, ergonomics, health hazard controls and medical services.⁶⁰⁸ Alcoa advised that these form part of a system that tracked its occupational health and safety performance.⁶⁰⁹

OCCUPATIONAL HEALTH AND SAFETY ISSUES ASSOCIATED WITH ALCOA'S WAGERUP REFINERY

- 5.25 The Committee has set out below a summary of some of the evidence it received in relation to occupational health and safety issues associated with Alcoa's refinery at Wagerup.

Background

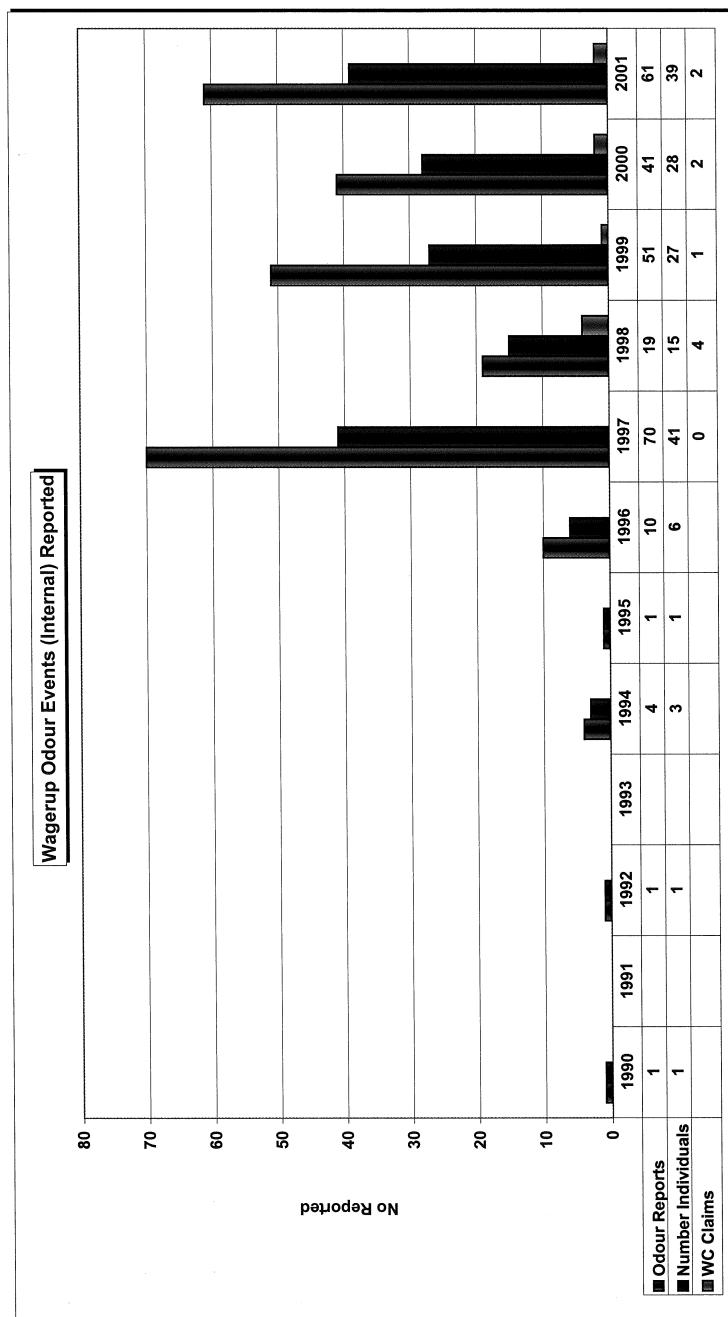
- 5.26 As previously noted, concerns and complaints from workers and nearby residents increased significantly at the Wagerup refinery when Alcoa commissioned its liquor burner facility (**LBF**) in 1996.⁶¹⁰
- 5.27 Figure 5.1 (provided by Alcoa) shows internal odour/emission events reported by workers at the Wagerup refinery.

⁶⁰⁷ Appendix 7 of Submission No. 15 from Alcoa, February 18 2002.

⁶⁰⁸ Ibid.

⁶⁰⁹ Ibid.

⁶¹⁰ Appendix 5 and 13 of Submission No. 15 from Alcoa, February 18 2002.

Figure 5.1**Alcoa Wagerup Odour (Internal) Report for the period 1990 to 2001**

5.28 Mr Marc Bell, Manager, Alcoa Workers Compensation and Employee Benefits, provided the Committee with information on the number and types of injuries Wagerup refinery employees had experienced over the six years from 1996 to 2002.

Mr Bell made the following comparison between inhalation and liquor burner/multiple chemical sensitivity (MCS) injuries compared to the total number of injuries:⁶¹¹

To put this issue into context, of the 425 claims notified in this period of just over 6 years [1996 to year to date 2002], 20 (4.7% of claims) can be attributed to general inhalation injury/illness, of which 9 (2.1% of claims) relate to liquor burning/MCS (with one of these subsequently returning to work.

- 5.29 The Committee notes Alcoa's advice that the nine injuries associated with liquor burning/MCS represented almost 60 percent (\$3.6 million) of the compensation payments made by Alcoa over the six year period 1996 to February 2002.⁶¹² For further details refer to paragraph 5.73 and following of this report.

Evidence from Alcoa workers

- 5.30 During the course of the inquiry the Committee received evidence from five Wagerup refinery workers regarding what they maintained were serious health impacts the refinery's emissions had on the workforce at Wagerup.⁶¹³ The majority of the evidence was with regard to emissions produced by the LBF between 1996 and 1998. However, the Committee continued to receive evidence throughout the course of its inquiry in relation to emissions produced by the LBF, as well as evidence in relation to emissions from other parts of the refinery, such as digestion, the oxalate kiln and calciners.⁶¹⁴
- 5.31 In his evidence to the Committee on November 28 2001 Mr van der Pal, Alcoa employee and safety representative, gave his perspective regarding the onset of the health problems associated with emissions from the refinery:⁶¹⁵

All the workers who work there are subjected to horrendous fumes and odours day in and day out. The fumes did not have an impact on our health, although at times they would take ones breath away and,

⁶¹¹ Submission No. 16, Mr Marc Bell, Manager, Workers' Compensation and Employee Benefits, Alcoa, February 18 2002, p3.

⁶¹² Attachment 2 of Submission No. 62 from Alcoa, April 11 2003.

⁶¹³ Mr William van der Pal, Alcoa employee and safety representative, *Transcript of Evidence*, November 28 2001 and his Submission Nos. 10, November 28 2001 and 13, December 4 2001. Submission No. 11 from Mr Darryl Puzey, Alcoa Wagerup employee, November 29 2001. Submission No. 8 from Mr Allingham, Alcoa Wagerup employee, November 22 2001. Mr John Swales, former Alcoa Wagerup employee, *Transcript of Evidence*, November 21 2001 and his Submission No. 1, November 21 2001. Mr Eric Walmsley, Farmer and Alcoa Wagerup mine operator, *Transcript of Evidence*, November 21 2001. Letters from Mr David Puzey, employee, October 24 2003 and February 10 2004.

⁶¹⁴ Ibid.

⁶¹⁵ Mr William van der Pal, Alcoa employee and safety representative, Alcoa Wagerup, *Transcript of Evidence*, November 28 2001, p2.

on moving away to fresh air, they did not appear to have a lasting effect on health. Only since the introduction of the liquor burner in 1996, when workers appeared to have lingering health impacts, were complaints made.

- 5.32 At that hearing Hon Kate Doust MLC queried with Mr van der Pal whether Alcoa had informed workers about the chemicals from the LBF and whether workers had received any training or material safety data sheets in relation to the hazards of exposure to them. Mr van der Pal advised that *“There are some basic MSDSs, [material safety data sheets] but that complicated list that I showed you is what is actually coming out of the burner. You cannot find MSDSs for those chemicals.”*⁶¹⁶

Personal protective equipment

- 5.33 The Committee received information from two people who alleged that workers at Alcoa’s Wagerup refinery who received chemical injuries were not adequately advised of the risks of being exposed to refinery emissions, particularly non-condensable gases and volatile organic compounds (VOC).⁶¹⁷ These people also alleged that they were not adequately advised of the need to use personal protective equipment in such an environment.⁶¹⁸
- 5.34 At its hearing on February 18 2002 the Committee was informed by Dr Andrew Harper, a private medical practitioner and occupational physician, that since 1996 when he first became involved in what he described as the ‘public health issues’ associated with the Wagerup refinery, to his knowledge workers had not been provided with respiratory protective equipment for use when they were exposed in their workplace to emissions from the refinery.⁶¹⁹
- 5.35 Dr Moira Somers, a general medical practitioner who treated ill Wagerup workers, expressed her view to the Committee at its hearing in April 2002 that personal protective equipment for use against emissions exposure should be a last resort in a refinery like Wagerup.⁶²⁰

Evidence from the Australian Manufacturing Workers’ Union

- 5.36 In his evidence to the Committee on July 8 2002, Mr Jock Ferguson, Secretary of the AMWU, stated that the AMWU had 600 to 800 members spread across Alcoa’s

⁶¹⁶ Ibid, p11.

⁶¹⁷ Letter from Mr David Puzey (Alcoa employee until October 2003), October 24 2003 and Submission No. 8 from Mr Paul Allingham, Alcoa Wagerup employee, November 22 2001.

⁶¹⁸ Ibid.

⁶¹⁹ Dr Andrew Harper, private medical practitioner and occupational physician, *Transcript of Evidence*, February 18 2002, p8.

⁶²⁰ Dr Moira Somers, general medical practitioner, *Transcript of Evidence*, April 10 2002, p11.

operations in Western Australia at any one time, including contractors. He informed the Committee that a dispute regarding occupational health and safety issues, emanating from the installation of the LBF at the Wagerup refinery in 1996, had been ongoing between the AMWU and Alcoa for approximately six years.⁶²¹

5.37 In July 2002 Mr Ferguson expressed his view to the Committee that:⁶²²

Until six or nine months ago Alcoa had performed abysmally in its responsibilities for its employees and the people who live in close proximity to its operations, as well as in its responsibility for what has been happening at Wagerup.

Alcoa has been in a state of denial. It has been very slow to recognise that there is a problem, particularly with the eight or 10 individuals who are suffering from multiple chemical sensitivity.

Only recently has it [Alcoa] said that it considers that it is responsible but not necessarily liable.

5.38 In a submission to the Committee in 2002 the AMWU also stated that in 1996 it had taken industrial action at Wagerup over the issue of health effects of emissions on AMWU members. The AMWU expressed the view that the outcome of the industrial action was that Alcoa agreed to install emissions controls on the LBF at Wagerup.⁶²³

5.39 During a Committee hearing in July 2002, in response to a question from Hon Kate Doust MLC regarding Alcoa's development and delivery of its occupational health and safety program, Mr Ferguson said:⁶²⁴

The safety of the workforce should be paramount. I do not think that Alcoa or any other employer, should be in a privileged position, in which it can do its own training and regulate itself in occupational health and safety or any other issue. The company should be mainstream and maybe that should be looked at.

Evidence from the Australian Workers' Union

5.40 At its hearing on November 21 2001, the Committee heard evidence from Mr Tim Daly and Mr Norm Dicks, the Branch Secretary and State President of the AWU respectively.

⁶²¹ Mr Jock Ferguson, Secretary, AMWU, *Transcript of Evidence*, July 8 2002, p1.

⁶²² Ibid, pp1-2.

⁶²³ Submission No. 35, from the AMWU, July 8 2002, p2.

⁶²⁴ Mr Jock Ferguson, Secretary, AMWU, *Transcript of Evidence*, July 8 2002, pp5-6.

- 5.41 Mr Daly informed the Committee that the AWU had approximately 280 members employed at Wagerup and that many of them lived locally in Waroona, Yarloop and other areas near the refinery.⁶²⁵
- 5.42 Mr Daly submitted that that he was aware of only one ex-AWU member who had raised concerns with the AWU about his health arising from his employment at Alcoa's Wagerup refinery.⁶²⁶ He advised the Committee that during his tenure as the Secretary of the Western Australian branch of the AWU, that worker had been the only member to express concern about health issues to him or to any other representative of the AWU.⁶²⁷
- 5.43 Mr Dicks provided similar evidence that he was not aware of anyone who had worked in the liquor burner unit who had become ill or who had displayed any of the symptoms that members of the community had displayed.⁶²⁸
- 5.44 The Committee was advised by Mr Daly that:⁶²⁹

Alcoa has taken considerable steps to address concerns raised about noise levels, smells emanating from the liquor burner and other emissions at the site.

We must do what we can to ensure that the plant operates safely and that people's health and safety are not put in jeopardy. I would be very concerned if concerns that were not founded on scientific fact lead to the closure, partial closure or refusal to expand [the Wagerup refinery].

- 5.45 Mr Daly also stated that the AWU would not like to see the opportunity for expansion of the Wagerup refinery and the consequent provision of further jobs for people in the community delayed or lost due to unfounded health allegations or perceptions that were not supported by scientific fact.⁶³⁰
- 5.46 The Committee notes that it received conflicting evidence from a number of people disputing the information given by the AWU that there had been no serious impacts

⁶²⁵ Mr Tim Daly, Branch Secretary, AWU, *Transcript of Evidence*, November 21 2001, p1.

⁶²⁶ Ibid, p1.

⁶²⁷ Ibid, pp1-2.

⁶²⁸ Mr Norm Dicks, State President, AWU, *Transcript of Evidence*, November 21 2002, p2.

⁶²⁹ Mr Tim Daly, Branch Secretary, AWU, *Transcript of Evidence*, November 21 2001 p2.

⁶³⁰ Ibid.

on the health of AWU members at Alcoa's Wagerup refinery.⁶³¹ Those AWU members claimed that they had experienced serious adverse health impacts.⁶³²

Evidence from Stack Air

5.47 The Committee received evidence from Mr Keith James, the Director of Stack Air, a company that specialises in monitoring emissions from industrial stacks and other static point sources.

5.48 In his November 2001 submission, Mr James made the following observation:⁶³³

In my view, what is in doubt is whether they [Alcoa] were diligent in monitoring the stack emissions on a regular basis, particularly during process upset and/or pollution control upset conditions. Without sufficient control, there is little doubt in my mind that the release of the organic compounds in question could impact adversely on human health in the vicinity of the refinery.

Evidence from Alcoa

5.49 In his evidence to the Committee in September 2003 Mr Wayne Osborn, Managing Director, Alcoa, provided the following summary of the history of emissions and health issues at Wagerup:⁶³⁴

The emissions problems at Wagerup date back to the installation of the liquor burner in late 1996, early 1997 and its subsequent failure to perform as promised. A very long commissioning period initially produced noise and subsequently a significant amount of odour, which had an unacceptable impact on employees and the community. Throughout 1997 Alcoa persevered in trying to get the equipment to perform to its original specifications and all monitoring indicated that although emissions were odorous, the substances being emitted were at very low levels and were well below applicable environmental limits.

However, our employees and some neighbours continued to express concerns about health issues. Alcoa now realises that it placed too much emphasis on scientific and technical issues and not enough

⁶³¹ Mr John Swales, former Alcoa Wagerup employee, *Transcript of Evidence*, November 21 2001, p1 and Submission No. 8 from Mr Paul Allingham, Alcoa Wagerup employee, November 22 2001.

⁶³² Ibid.

⁶³³ Submission No. 9 from Mr Keith James, Director of Stack Air, November 26 2001, p2.

⁶³⁴ Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, *Transcript of Evidence*, September 8 2003, p3.

emphasis on the human aspect or response. People had genuine concerns and they were being impacted upon. With the clarity of hindsight Alcoa should have immediately shut down the liquor burner. By the time it did so in 1997, the damage to Alcoa's relationship with some of its workforce and the community had already been done. Alcoa intruded on people's daily lives. It stumbled and lost their trust and confidence.

- 5.50 In his March 2002 report to Alcoa on the health issues associated with the Wagerup refinery emissions, Dr Cullen, Alcoa's Chief Medical Officer, made 13 recommendations. One of Dr Mark Cullen's recommendations was as follows:⁶³⁵

In view of current relations and Alcoa values, the company should make clear, to its workforce, 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.

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.

- 5.51 Dr Cullen also made the following observation in his report:⁶³⁶

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.

- 5.52 Regarding the safety of the Wagerup refinery, Dr Cullen made the following statement:⁶³⁷

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.

⁶³⁵ Submission No. 19 from Alcoa, March 12 2002. Dr Mark Cullen, Wagerup Alumina Refinery. *Health Issues. Visit to Alcoa World Alumina Australia, West Australian Operations.* February 2002, p9.

⁶³⁶ Ibid, p4.

⁶³⁷ Ibid, p6.

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.

- 5.53 At the Committee's hearing in September 2003 Mr Osborn submitted that since 1998, Alcoa had worked hard to address employee and community concerns about emissions and health issues by investing approximately \$36.5 million in emission reduction projects. Mr Osborn advised that these projects had eliminated 90 percent of LBF VOCs and 96 percent of LBF odour.⁶³⁸ For a summary of Alcoa's emission reduction projects, refer to paragraph 2.100 and following of this report.
- 5.54 Mr Osborn continued "*Alcoa now believes that Wagerup is a world benchmark refinery for emissions control.*"⁶³⁹ He also expressed Alcoa's commitment to continuing to work towards creating a safe environment.
- 5.55 In relation to communications processes, Mr Osborn made the following comments to the Committee:⁶⁴⁰

Hon KATE DOUST: *My other question goes to some of the other occupational health and safety practices that existed within Alcoa. The company has always been quite high profile, since legislation came into place, in terms of programs it ran for its staff and safety reps. As a result of what has happened for the workers down there and the people who have developed health problems, when we first started this inquiry we were able to identify that there was a breakdown in the communication process and the complaints process for raising these sorts of issues. Has the company had to sit down and reassess how it deals with occupational health and safety in terms of grievance procedures and the resolution of issues? It has been pretty much in-house; it has been unique in that way. Alcoa is one of the few companies that runs its own show. Has the company thought about inviting more external monitoring of its programs and outcomes for health and safety?*

Mr Osborn: *No, I think - I guess I do not totally understand the issue you raised in terms of the breakdown of complaints procedures and such. One of the recognitions for us coming from this is that just working to a base of limits, even when you may take those limits down*

⁶³⁸ Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, *Transcript of Evidence*, September 8 2003, p3.

⁶³⁹ Ibid.

⁶⁴⁰ Ibid, p9.

well below what contemporary standards are, is not enough in itself. You need to be looking at individual responses overall and have a process in place for managing that. I do not think there is any objection whatsoever to an outside view of practice in that area or verification of an open system of complaint. In fact, I guess if you look at the protracted issue of the small number of employees that did have problems, that may have persisted in that process, in hindsight.

- 5.56 A further exchange between Mr Osborn and the Committee took place in relation to this matter:⁶⁴¹

Hon BRUCE DONALDSON: *Given the formal process with the employees on-site, is there any formal process between the company and the employees on a regular basis to talk about different issues, whether it is emission controls or whatever?*

Mr Osborn: *The health and safety committees at the sites meet regularly. That sort of information is covered with people. If people are not satisfied with the information they are getting, if they go to their supervisor and cannot get an adequate answer they also have a contact officer who looks after any issues of discrimination, equal opportunity or any other concerns they want to have or may have.*

A compliance line was recently put in place. It is a 1800 number, which means that anybody can ring in with a concern, a complaint or an issue and that will be addressed through our legal people. There is a hierarchy of ways in which somebody can have a concern addressed. We hope that if somebody had a problem he would first go to his supervisor and it would be resolved there. There is also a process of going to the union representative for the resolution of issues. There is a range of different paths. In terms of keeping people informed about what is happening, there would normally be some sort of meeting during the shift to cover contemporary issues of the day or particular safety hazards or whatever. Routine safety meetings are held approximately on a monthly basis. There are those other contact processes I mentioned also.

- 5.57 The Committee explored the matter further with Mr Osborn:⁶⁴²

Hon KATE DOUST: *You referred earlier to the various avenues that your workers can use to raise issues. I want to get a better idea*

⁶⁴¹ Ibid, p11.

⁶⁴² Ibid, pp16-17.

of how it all fits. You said in the first instance they should go to the supervisor, which, of course, is the best way to deal with problems. You said they have the option of going to a union delegate. At what point does the safety representative kick in?

Mr Osborn: *It is the same issue. They always have access to a safety representative.*

Hon KATE DOUST: *You also referred to safety committees on site. Do you have a number of safety committees operating at Wagerup on various parts of the plant or one committee where all the safety reps come together with management to go through issues?*

Mr Osborn: *There is usually a hierarchy of structures. It may vary from plant to plant. I cannot tell you exactly what is in play at Wagerup today. Usually there is an area health and safety committee and a plant safety and health committee.*

Hon KATE DOUST: *How do you make the connection between the two?*

Mr Osborn: *Issues that are plant wide tend to be dealt with by the plant safety committee and issues relating to the area are dealt with at an area level. Many of the same people attend the meetings.*

Hon KATE DOUST: *I assume that the area level safety committee consists of elected safety representatives and some members of management.*

Mr Osborn: *Elected safety representatives.*

Hon KATE DOUST: *And some members of management.*

Mr Osborn: *Some members of management and additional employers from that area.*

Hon KATE DOUST: *Does the plant safety committee effectively mirror that? What is the break-up of elected safety representatives and management on the plant safety committee?*

Mr Osborn: *I cannot give you the structure of that. We can come back to you with exactly what works at Wagerup today. It varies a little from plant to plant but there is generally a hierarchical structure.*

Hon KATE DOUST: *What is your understanding of the issues dealt with by the representatives and management at that plant safety committee level?*

Mr Osborn: *They deal with pretty much all the major health and safety issues that a location deals with. We would expect hygienists, for example, to present exposure data to it; it would examine results of audits of areas; it would consider safety performance per se; and it would raise issues and talk about resolutions of issues.*

Hon KATE DOUST: *Is that committee also used as a guide to assist the company with a direction for changes in health and safety measures at the plant?*

Mr Osborn: *New initiatives are normally introduced through that committee in a communication.*

Hon KATE DOUST: *Are they instigated by that committee or just approved by it?*

Mr Osborn: *They could be instigated by that committee or it may be a company-wide initiative in a particular area that would then come through that committee.*

Hon KATE DOUST: *If a safety issue had worked its way up through the various levels to the plant committee and no resolution occurred, where would it go to then?*

Mr Osborn: *I do not know because I am not aware of where it would go. I think at that stage it has the potential to become an industrial issue or whatever.*

REHABILITATION AND COMPENSATION

5.58 The Committee has set out below:

- information regarding the legal position in Western Australian in relation to workers' compensation and rehabilitation, particularly in relation to MCS;
- a brief explanation of the Medicare system, particularly in relation to MCS; and
- a summary of evidence in relation to Alcoa's rehabilitation and workers' compensation processes and management.

Workers Compensation and Rehabilitation Act 1981

- 5.59 Section 3 of the *Workers Compensation and Rehabilitation Act 1981 (WCR Act)* sets out its purposes. These are to make provision for the compensation of workers who suffer a disability and certain dependents of those workers where the death of the worker results from such a disability, to promote the rehabilitation of those workers, to promote safety measures in and in respect of employment to prevent or minimize disabilities occurring, and to provide for the hearing and determination of disputes between parties involved in workers compensation matters.
- 5.60 Disability is defined in section 5 of the WCR Act. MCS does not come within this definition. As a result, a person with symptoms associated with MCS would not be able to claim compensation for MCS as a distinct entity (that is, a distinct disease or injury) under the WCR Act.
- 5.61 However a person may be able to claim compensation under the WCR Act for symptoms associated with MCS if they come within the list of specified industrial diseases set out in column 1 of Schedule 3 of the WCR Act. The disease must have been due to the nature of the employment in which the worker was employed at any time within one year previous to the date of the disablement (emphasis added).⁶⁴³ The Committee notes:
- the exceptions in relation to time previous to disablement in relation to pneumoconiosis, mesothelioma and lung cancer;⁶⁴⁴ and
 - the exclusion from benefit of certain workers employed in, on or about a mine within the meaning of the MSI Act.⁶⁴⁵
- 5.62 A disease will be deemed to have been due to the nature of the employment (unless the employer proves to the contrary) if the worker was at, or immediately before, the disablement employed in any process mentioned in column 2 of Schedule 3 of the WCR Act.⁶⁴⁶ The worker must produce a certificate from a medical practitioner that the disease contracted is one of the diseases in column 1 set opposite the description of the process.⁶⁴⁷

⁶⁴³ Section 32 *Workers Compensation and Rehabilitation Act 1981*.

⁶⁴⁴ Ibid and section 33.

⁶⁴⁵ Section 47 *Workers Compensation and Rehabilitation Act 1981*.

⁶⁴⁶ Section 44 *Workers Compensation and Rehabilitation Act 1981*.

⁶⁴⁷ Ibid.

Medicare

- 5.63 The Australian Medicare Program provides access to medical and hospital services for all Australian residents and certain categories of visitors to Australia. Legislation covering the major elements of the program is contained in the *Health Insurance Act 1973* (Commonwealth).
- 5.64 Where an eligible person incurs medical expenses in respect of a professional service, Medicare will pay benefits for that service as outlined in the Medicare benefits scheme.⁶⁴⁸
- 5.65 Professional services which attract Medicare benefits include medical services by or on behalf of a medical practitioner.⁶⁴⁹
- 5.66 The Committee notes Professor Holman's comments at the Committee's hearing on August 18 2003 that people who experience symptoms of MCS would be entitled to Medicare payments.

Evidence received from Alcoa employees in relation to Alcoa's rehabilitation and workers' compensation processes and management

- 5.67 In 2001/2002 the Committee heard evidence from a number of workers at Alcoa's Wagerup refinery concerning their injuries, which they attributed to emissions for the refinery.⁶⁵⁰ In some cases workers were critical of what they perceived to be Alcoa's reluctance and slowness to address their health concerns, particularly those workers diagnosed with MCS.⁶⁵¹
- 5.68 Evidence received by the Committee indicates that at least one former Alcoa employee is continuing to experience dissatisfaction with Alcoa's workers' compensation and rehabilitation processes as evidenced by claims made in a letter to the Committee dated October 24 2003 that "*Alcoa have always said that they were going to strictly play by the rules with all compensation claims from now on*

⁶⁴⁸ http://www.health.gov.au/pubs/mbs/mbs/css/mbs_book_november_2002_21.htm (accessed September 18 2003).

⁶⁴⁹ http://www.health.gov.au/pubs/mbs9/MBSMay2003_DHTML/MBS_BOOK_Including_May_2003_Supplement_36.htm (accessed September 18 2003).

⁶⁵⁰ Mr John Swales, former Alcoa Wagerup employee, *Transcript of Evidence*, November 21 2001, Mr William van der Pal, Alcoa employee and safety representative, *Transcript of Evidence*, November 28 2001, p11, Submission No. 8 from Mr Allingham, Alcoa Wagerup employee, November 22 2001, Submission No. 11 from Mr David Puzey, November 29 2001 and letter from Mr Darryl Puzey, October 24 2003.

⁶⁵¹ Mr John Swales, former Alcoa Wagerup employee, *Transcript of Evidence*, November 21 2001 and letter from Mr Darryl Puzey, October 24 2003.

(statement made in early December 2002). Despite this claim, Alcoa have failed to live up to their obligations.”⁶⁵²

Evidence from Alcoa in relation to its rehabilitation and workers’ compensation processes and management

Background

5.69 The Committee was advised by Mr Marc Bell, Manager, Alcoa’s Workers’ Compensation and Employee Benefits, that:⁶⁵³

Alcoa is guided at all times by its core values of creating and maintaining a workplace free of injury and work-related illness. Whenever an injury or illness results in a disability to an employee, the company policy is to make all reasonable attempts to ensure the employee is returned to her/his pre-illness or pre-accident state of health in as short as time as possible. Importantly, this policy does not discriminate between non-work caused and work-caused illness and injury.

5.70 Mr Bell also submitted that:⁶⁵⁴

Our commitment to these goals can be demonstrated by the many resources and activities Alcoa commits to health, safety, environment, and rehabilitation. Alcoa maintains world class occupational health medical facilities, staffed by professionals including occupational physicians, industrial hygienists, nurses, physiotherapists, and rehabilitation professionals.

5.71 Alcoa defines rehabilitation as the “combined and coordinated use of medical, psychological, social, educational and vocational measures to restore function or achieve the highest possible level of function of an individual following illness or injury”.⁶⁵⁵

⁶⁵² Letter from Mr Darryl Puzey, October 24 2003.

⁶⁵³ Submission No. 16 from Mr Marc Bell, Manager, Workers’ Compensation and Employee Benefits, Alcoa, February 18 2003, p1.

⁶⁵⁴ Ibid.

⁶⁵⁵ Ibid, p4.

5.72 The Committee was advised by Mr Bell that Alcoa's rehabilitation framework consists of the following:⁶⁵⁶

- A rehabilitation team, which consists of the injured employee, rehabilitation coordinator, human resource department, medical staff, the work group, supervisor and union representatives.
- The rehabilitation teams, in consultation with the injured employees and their doctors, designs and implements individual rehabilitation programs to assist the injured employee's return to work.
- A time frame for monitoring the injured employees' progress is established and includes a medical review as well as regular reviews of their programs.
- Referral to a medical specialist or an approved vocational rehabilitation provider may be recommended by the rehabilitation team and treating doctor.
- If a successful rehabilitation outcome is not achieved, a decision is made regarding continuation of rehabilitation services.

Compensation

5.73 The Committee was advised by Alcoa that there were a total of 425 claims for workers compensation for all injuries at its Wagerup refinery from 1996 to February 2002.⁶⁵⁷

5.74 Of these, 20 (4.7 percent of claims) were attributed to general inhalation injuries/illness of which nine (2.1 percent of claims) related to liquor burning/MCS (with one of those subsequently returning to work).⁶⁵⁸

5.75 Alcoa advised that as at April 2003, it had not accepted liability under the workers compensation regulatory regime for any of these claims.⁶⁵⁹ However Alcoa also advised that all these employees continue to be paid their pre-absence wages on a without prejudice basis.⁶⁶⁰

⁶⁵⁶ Ibid, pp4-5.

⁶⁵⁷ Ibid, p3.

⁶⁵⁸ Ibid.

⁶⁵⁹ Ibid.

⁶⁶⁰ Ibid.

- 5.76 The Committee notes that it has received evidence since April 2003 that at least one Alcoa employee, who maintains that his health was seriously affected by emissions from the Wagerup refinery, has had his employment terminated by Alcoa.⁶⁶¹
- 5.77 In April 2003 Alcoa provided information on the amount of compensation it had paid for various types of injuries at its Wagerup refinery since 1996. According to their records, Alcoa advised that the total amount of compensation paid was \$6 031 869.⁶⁶² Of this, \$3 596 409 was paid for injuries attributed to liquor burning/MCS.⁶⁶³
- 5.78 According to Alcoa, chemical injury, reactive airways dysfunction syndrome and multiple chemical sensitivity have presented problems in structuring a rehabilitation process using its existing methodologies.⁶⁶⁴ Alcoa submitted that finding suitable positions and workplaces (a key attribute in Alcoa's normal process) has posed challenges in an environment where the source of the symptoms cannot be identified and the entire refinery is thought to be potentially aggravating the employees' conditions.⁶⁶⁵
- 5.79 Alcoa advised that it had returned to basic principles in order to find a way of improving the prospects of returning affected employees to the workplace. It advised in April 2003 that it had ceased to focus on what caused the health complaints and was focusing on finding an individualised rehabilitation for affected workers.⁶⁶⁶ Alcoa also advised that rehabilitation of affected employees is usually attempted at one of Alcoa's mine sites.
- 5.80 Alcoa advised that at that time rehabilitation attempts for affected employees had met with mixed success. It advised that it had enlisted the support of an expert external rehabilitation provider to review progress of the existing program for each employee. This approach had the support of each employee's union at the site and State level.⁶⁶⁷
- 5.81 In relation to MCS, in November 2001, Ms Ann Whitty made the following statement to the Committee regarding workers' compensation claims where it was alleged that refinery emissions had caused MCS.⁶⁶⁸

⁶⁶¹ Letter from Mr David Puzey, former Alcoa employee, February 10 2004.

⁶⁶² Attachment 2 of Submission No. 62 from Alcoa, April 11 2003; and Submission No.16 from Mr Marc Bell, Manager, Workers' Compensation and Employee Benefits, Alcoa, February 18 2002, p3.

⁶⁶³ Ibid.

⁶⁶⁴ Submission No. 16 from Mr Marc Bell, Manager, Workers' Compensation and Employee Benefits, Alcoa, February 18 2002, p6.

⁶⁶⁵ Ibid.

⁶⁶⁶ Ibid.

⁶⁶⁷ Ibid, pp6-7.

⁶⁶⁸ Ms Ann Whitty, Wagerup Refinery Manager, Alcoa World Alumina Australia, *Transcript of Evidence*, November 21 2001, p3.

We have taken advice from medical and scientific specialists in a range of disciplines and do not believe any such condition could be caused by the refinery's emissions. Alcoa is defending these claims but, at the same time, is attempting to work with each of these employees to investigate all possibilities of their return to work.

5.82 Ms Whitty informed the Committee in February 2002 that:⁶⁶⁹

a small number of employees experience ongoing symptoms and have been diagnosed with multiple chemical sensitivity, even though the exposure levels are 1000 times below national and international health standards. Alcoa is focused on rehabilitation of these employees.

5.83 In his March 2002 report to Alcoa on the health problems associated with Alcoa's refinery at Wagerup, Dr Mark Cullen, Alcoa's Chief Medical Officer, made the following comments with regards to Alcoa's rehabilitation regime:⁶⁷⁰

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.

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 acknowledgment that the company believes its employees are sincere about their disabilities.

5.84 Dr Cullen also recommended that the "aggressive program for rehabilitation of previously affected workers needs to go forward with all deliberate speed."⁶⁷¹

⁶⁶⁹ Ms Ann Whitty, Wagerup Refinery Manager, Alcoa World Alumina Australia, *Transcript of Evidence*, February 18 2002, p1.

⁶⁷⁰ Submission No. 19 from Alcoa, March 12 2002. *Wagerup Alumina Refinery - Health Issues*, Report by Dr Cullen, February 2002, p6.

⁶⁷¹ *Ibid*, p9.

5.85 In relation to Dr Cullen's recommendation for a rehabilitation program for affected workers, Alcoa advised in April 2002 that "*Previously affected workers who can realistically be rehabilitated back to normal work in the organisation are well advanced in this process*".⁶⁷²

5.86 Alcoa also noted that:⁶⁷³

With the remainder, we are in the final stages of concluding mutual agreements with the relevant union on behalf of the people involved. These agreements allow for financial assistance for the employees to be rehabilitated into a different occupation, and will lead to their termination from Alcoa.

5.87 Alcoa informed the Committee in April 2002 that it had redesigned its rehabilitation procedures to specifically deal with people who may in the future report they have MCS and similar situations. Alcoa advised that the new procedure included having a direct relationship with the employee's treating physician.⁶⁷⁴

5.88 In February 2002 Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, was quoted in Dr Cullen's report with regard to the health problems experienced by its Wagerup employees:⁶⁷⁵

The Company acknowledges that it has been too slow in reaching a point of resolution on appropriate treatment and rehabilitation programs for affected employees and regrets the impacts this may have had on their personal lives.

5.89 Mr Osborn also advised the Committee in September 2003 that:⁶⁷⁶

Nine of our 650 employees at Wagerup and one contractor were diagnosed as unfit to work in a refinery environment and we face significant challenges in managing their rehabilitation. The lack of acceptable diagnostic criteria, differing opinions within the medical field, the intermittent and unpredictable manifestations of symptoms,

⁶⁷² Letter from Mr Geoff Hayward, Executive Director, WA Operations, Alcoa World Alumina Australia, April 23 2002.

⁶⁷³ Ibid.

⁶⁷⁴ Ibid.

⁶⁷⁵ Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, quoted in Submission No. 19 from Alcoa, March 12 2002. *Wagerup Alumina Refinery - Health Issues*, Report by Dr Cullen, February 2002, p6.

⁶⁷⁶ Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, *Transcript of Evidence*, September 8 2003, p4.

and the unknown causation and lack of recognition of MCS as an illness were all issues.

5.90 Mr Osborn continued:⁶⁷⁷

We did act with a duty of care and with the intent of helping employees to return to productive work. We tried to make every effort to accommodate the needs of individuals in respect of their workplace. Employee's own medical practitioners were included to the extent possible. Alcoa met all rehabilitation and retraining costs, as well as employees' medical and other expenses. We provided salary and leave support for times when employees were not working, including up to five years for some individuals.

5.91 The Committee notes Mr Osborn's statement that:⁶⁷⁸

When internal rehabilitation processes did not achieve the objective, we provided employees with a further ex gratia payment of \$350 000 to cover future external rehabilitation and retraining expenses. These payments were not contingent on employees' giving up any legal right and the payments were not workers compensation. They were also completely separate from any superannuation issues.

COMMITTEE FINDINGS

5.92 The Committee notes that despite Alcoa's occupational health and safety training processes for employees being in place since 1988, workers at its refinery at Wagerup experienced injuries allegedly associated with workplace emissions exposures.

5.93 Based on evidence provided to the Committee by Mr Osborn and Mr van der Pal, it is apparent to the Committee that the communication processes that existed under the occupational health and safety system on site were not operating satisfactorily.⁶⁷⁹

5.94 The Committee notes that specific concerns were raised with it that material safety data sheets relating to emissions from the LBF were not readily available to occupational health and safety representatives or workers.

5.95 The Committee notes that Alcoa has accepted that it was too slow to respond to the concerns of workers affected by chemical emissions from its refinery at Wagerup and that it had implemented an improved rehabilitation regime for its employees.

⁶⁷⁷ Ibid.

⁶⁷⁸ Ibid.

⁶⁷⁹ For some discussion on this issue, refer to paragraphs 5.33, 5.55 to 5.57 and 9.61.

- 5.96 The Committee notes that it received evidence that the training provided by Alcoa to its employees at Wagerup in the need for, and use of, personal protective equipment was inadequate with regard to protection from refinery emissions. The Committee draws Alcoa's attention to these claims and, to the extent that the evidence may indicate a systemic issue or problem with Alcoa's procedures and processes with regard to personal protective equipment, encourages Alcoa to review its procedures and processes to address any inadequacies.
- 5.97 The Committee notes that despite injuries attributed to liquor burning/multiple chemical sensitivity being only 2.1 percent of all injury claims at Wagerup, claims for those injuries accounted for 59.6 percent of the total amount paid in compensation. This payment figure highlights the significant debilitating effect of multiple chemical sensitivity on people's health, quality of life and ability to earn an income.
- 5.98 The Committee finds that a lack of recognition of MCS means it has been a struggle for such workers to have their claims for compensation properly assessed.
- 5.99 The Committee notes that the payment and ex gratia compensation for MCS was negotiated on a confidential basis between Alcoa and the unions for the workers involved. This may have, in part, been due to the lack of recognition of MCS within the current workers' compensation regime. That regime currently provides, for other injuries, a transparent statutory process for the assessment and negotiation of payments and compensation.
- 5.100 The Committee supports compensation for MCS, however is concerned that the lack of statutory process governing the assessment of such conditions means that:
- issues of liability may not be resolved;
 - other similarly affected workers have no access to legal precedent; and
 - the real cause of injury or illness may not be identified which inhibits appropriate solutions being put in place to prevent the exposure of other workers.
- 5.101 The Committee has made further findings in relation to the adequacy of the regulatory system in Chapter 9 (Adequacy of Regulatory Mechanisms).

RECOMMENDATION

Recommendation 11: The Committee recommends that the Government consider amending the *Workers Compensation and Rehabilitation Act 1981* in relation to the recognition of cover for those people who may have symptoms of multiple chemical sensitivities and in so doing to seek advice from the proposed Environmental Health Foundation and other relevant stakeholders.

CHAPTER 6

ENVIRONMENTAL IMPACTS

OVERVIEW OF CHAPTER

6.1 In this chapter the Committee deals with the environmental issues surrounding Alcoa's refinery at Wagerup. The Committee has focused on issues within the jurisdiction of the Department of Environmental Protection (**DEP**) (now the Department of Environment (**DoE**)), particularly air emissions, as distinct from health issues, which are covered in detail in Chapter 4 (Public Health) and Chapter 5 (Occupational Health and Safety). Due to the overlap of these areas, however, some mention is also made of health related issues in this chapter.

6.2 The following information is provided in this chapter:

- a summary of the regulation of environmental protection with regard to the operation of Alcoa's Wagerup refinery;
- a summary of community submissions regarding environmental impacts;
- summaries, in chronological order, of the large number of detailed and technical submissions and reports provided to the Committee by the DEP and Alcoa regarding the alleged impacts on the environment of emissions from the refinery. This includes information on modelling, measuring and monitoring emission levels and emissions dispersion;
- a summary of those parts of the *Wagerup Refinery and Bauxite Residue Operations Triennial Environmental Review 2000-2002*, and the *Environmental Audit Alcoa World Alumina Australia Wagerup Refinery, April 2002 - May 2003* that relate to environmental impacts;
- the DEP's response to the environmental audit;
- discussion on issues relating to dust emissions from the Alcoa refinery at Wagerup;
- a description of the effect of meteorological conditions on the dispersion of air pollutants at Alcoa's Wagerup refinery;
- the CSIRO Wagerup Air Quality Study; and
- Committee findings and recommendations regarding environmental issues at Alcoa's Wagerup refinery.

- 6.3 In this chapter the Committee has commented on the environmental impacts of emissions produced from Alcoa's refinery at Wagerup. Refer to paragraph 2.26 and following of this report for a discussion on the types of emissions produced at the refinery.

REGULATION OF ENVIRONMENTAL PROTECTION

- 6.4 As previously noted, Alcoa's Wagerup refinery operates under a number of State Agreement Acts. It also operates under Ministerial Conditions that relate to environmental reviews conducted since the inception of the project in 1978.

The Department of Environmental Protection

- 6.5 The DEP is responsible for the administration of the *Environmental Protection Act 1986 (EP Act)*, which is the principal environmental legislation governing environmental issues in Western Australia.⁶⁸⁰
- 6.6 Under the EP Act the DEP has responsibility for the prevention, control and reduction of pollution (for example, air pollution), and the protection and management of the environment. The DEP has statutory authority to require pollution matters to be investigated and addressed.
- 6.7 Under the EP Act and *Environmental Protection Regulations 1987 (EP Regulations)*, the DEP regulates industry through the licensing system and works approvals process. Using the licensing system, the DEP controls the operations of refineries such as Alcoa's refinery at Wagerup.
- 6.8 For more information on the DEP's licensing system and works approvals process refer to paragraphs 9.6 to 9.21 of this report.

Alcoa refinery at Wagerup

- 6.9 Emissions from Alcoa's refinery at Wagerup are regulated by the DEP under the provisions of the EP Act. Specifically:
- Part V of the EP Act, which covers Pollution Control; and
 - Ministerial Conditions set under the provisions of Part IV of the EP Act, which cover Environmental Impact Assessments.
- 6.10 Alcoa's refinery at Wagerup operations are prescribed under Category 46 (Bauxite Refining) of the EP Regulations.

- 6.11 The DEP first licensed Alcoa's Wagerup refinery in 1987. The licence is reviewed annually.
- 6.12 Conditions are placed on the licence for Alcoa's Wagerup refinery in relation to reporting requirements, air monitoring, emission control, water monitoring and solid waste management.
- 6.13 In April 2002 the DEP advised the Committee that "*generally Alcoa has been operating in compliance with its licence conditions, with the exception of minor technical non-compliances.*"⁶⁸¹

Emissions monitoring

- 6.14 Alcoa is required, as a condition of its licence, to monitor and report on all major emissions.⁶⁸²
- 6.15 Alcoa, however, does not have a full range of emissions limits in its licence. The DEP advised the Committee in April 2002 that in lieu of a comprehensive range of emissions criteria, the DEP uses annual and half-yearly production levels as a 'surrogate' to control the potential for pollution. The DEP advised that this had raised concerns by members of the local communities that emissions may not be adequately regulated.⁶⁸³
- 6.16 In October 2003 the DEP advised the Committee that it was moving towards a comprehensive emissions based licence to replace the existing annual production condition.⁶⁸⁴ The DEP also advised that it would determine appropriate specific licence limits as soon as possible.⁶⁸⁵
- 6.17 For more details on emissions monitoring requirements and the DEP's proposed emissions based licence refer to paragraphs 9.22 to 9.25 and 9.36 to 9.42 of this report.

⁶⁸⁰ The provisions of the EP Act prevail over all other statutes, other than Acts assented to before January 1 1972 which ratify or approve State Agreements. For a more detailed account of the regulatory mechanism see Chapter 9 of this report.

⁶⁸¹ Submission No. 53 from the DEP, April 9 2002, p36.

⁶⁸² Ibid, pp28-29.

⁶⁸³ Ibid, p43.

⁶⁸⁴ An emissions based licence has as its focus specific licence conditions which limit the mass rate or concentration of significant emissions of waste from that premises into the environment; for example five grams per minute of sulfur dioxide. The limits may be technology based but are always designed to ensure that relevant health guidelines are comfortably met at appropriate locations. The emissions based licence is focussed on outcomes rather than process or throughput controls. This explanation was provided by Mr Peter Skitmore, Manager, Special Projects, DEP in correspondence dated October 22 2003.

⁶⁸⁵ Submission No. 53 from the DEP, April 9 2002, p35.

6.18 The Committee observes that the October 2004 DoE Material, in the context of an emissions based licence and emissions limits:⁶⁸⁶

- notes that the DoE has not yet finalised the limits for each of the emissions/chemical/compounds and discusses a range of options and approaches;
- notes that the matters of: averaging over time; whether or not an emission will be allowed to exceed the limit for any period of time; if a limit can be exceeded then for what period it may be exceeded; and the maximum emission limits, are matters yet to be determined in consultation with the ‘Tripartite Group’;⁶⁸⁷
- makes comment on the management of short term ‘peaks’ in emissions and the impact of health of workers at the refinery and the members of the local community.

SUMMARY OF SUBMISSIONS FROM MEMBERS OF THE LOCAL COMMUNITY REGARDING ENVIRONMENTAL IMPACTS

6.19 In November 2001 the Committee was informed by Mrs Cheryll Borserio, a resident living in the vicinity of Alcoa’s Wagerup refinery, that she believed six batches of her chickens had died due to emissions from the Wagerup refinery.⁶⁸⁸ She also submitted that other people had expressed their belief to her that their chickens, budgerigars, ducks, geese and cattle had been affected by emissions from the refinery.⁶⁸⁹

6.20 Mrs Borserio made the following statements regarding what she believed were the effects of emissions from the refinery on animal health in the area:⁶⁹⁰

We have sick and dying animals; we cannot keep poultry in our area - it is a death sentence to bring them here.

We have bulls going lame within a short time of coming onto our property from other properties, cows coughing and getting funny rashes on their backs where the skin peels off for no explained reason.

⁶⁸⁶ Submission from the DoE, pp4-6, attached to letter from the Minister for the Environment, October 5 2004.

⁶⁸⁷ The tripartite process is referred to at paragraphs 4.302 and 5.9; also refer to the submission from the DoE, pp13-19, attached to letter from the Minister for the Environment, October 5 2004.

⁶⁸⁸ Mrs Cheryll Borserio, *Transcript of Evidence*, November 21 2001, pp5-6.

⁶⁸⁹ Ibid.

⁶⁹⁰ Ibid.

There now is an infertility problem with the cattle in the area, to the point that when we sold our dairy herd 12 months ago, we received veterinary validation that after three tests over three consecutive months, 30 percent of our herd was barren.

- 6.21 Mrs Borserio also expressed her view that wildlife numbers had been significantly reduced and vegetation had been affected on properties close to the refinery.⁶⁹¹

On our property now we do not have frogs, butterflies, bees or dragonflies. The plants and trees are in distress and dying. Standard plants I have had in my garden for 15 years have died within two or three weeks of a severe emission.

- 6.22 Mr Eric Walmsley, who lives on a farm in the vicinity of the Wagerup refinery, told the Committee on November 21 2001 that he came from a farming background and that he was aware of what was happening to animals and vegetation. Mr Walmsley stated.⁶⁹²

Unfortunately, our chooks died last month as well.

We had three and they were all dead within a week of each other.

- 6.23 Mr Walmsley also stated that he had many problems with animals and wasting disease. He described the situation on his farm as follows:⁶⁹³

We get an elevated view of the refinery and residue areas. We see a fair bit of dust, mist smoke, haze and whatever. That comes from the residue areas and the refinery and blows all over the countryside. We have had many problems with animals and wasting disease. We did not know what it was at the time, or whether it was caused by emissions from the mud lakes. I still do not know. However, it is the only farm I have worked, on which animals have wasted away and died for no apparent reason.

- 6.24 Refer to the DEP's response to the claims made regarding the effect of emissions on animals at paragraphs 6.65 and 6.66 of this report.

- 6.25 Regarding animal health concerns raised in submissions, Alcoa advised the Committee that it runs approximately 3000 head of cattle around the Wagerup

⁶⁹¹ Ibid, p6.

⁶⁹² Mr Eric Walmsley, Farmer and Alcoa mine operator, *Transcript of Evidence*, November 21 2001, p4.

⁶⁹³ Ibid.

refinery, including some 2000 breeding cows that have a fertility rate amongst the highest in the district and a mortality rate of less than two percent.⁶⁹⁴

- 6.26 In relation to the condition of cattle on Alcoa's property, the Committee notes that an article published in the *Farm Weekly* on March 18 2004 commented on a sale of 772 of Alcoa's steers and heifers. The article stated that the sale was an outstanding success and significantly exceeded vendor and agent expectations.⁶⁹⁵
- 6.27 The article stated that "*The quality of the Alcoa Farmlands breeding herd is well known, and the steers and heifers penned for the sale were in excellent order, showing the benefits of a good season and a breeding program that uses only high indexing Angus, Murray Grey and Euro bulls from some of WA's better known studs.*"⁶⁹⁶
- 6.28 For further discussion in relation to the condition of cattle in the vicinity of Alcoa's Wagerup refinery, refer to paragraphs 7.97 to 7.101 of this report.

SUMMARY OF SUBMISSIONS FROM THE DEPARTMENT OF ENVIRONMENTAL PROTECTION REGARDING ENVIRONMENTAL IMPACTS

- 6.29 The DEP provided a large volume of information to the Committee over the course of the inquiry. A significant amount of this information was provided to the DEP by Alcoa, in the form of reports, responses to specific questions and information updates. Alcoa also provided the Committee with the same information. Most of the duplicated information is presented under this section on the DEP's submissions. If it is referred to in the section on Alcoa's Submissions on Environmental Impacts (refer to paragraphs 6.120 to 6.142) only a brief summary is provided.

DEPARTMENT OF ENVIRONMENTAL PROTECTION SUBMISSION: APRIL 2002

- 6.30 The DEP provided a written submission to the Committee dated April 2002. The Committee has provided a summary of the major points from the submission below.

Overview

- 6.31 In its submission dated April 2002 the DEP advised that considerable community concern had existed for several years with respect to noise, odour and health issues associated with emissions from Alcoa's Wagerup Refinery.⁶⁹⁷

⁶⁹⁴ Submission No. 60 from Alcoa, April 9 2003, p1.

⁶⁹⁵ Mr Travis King, *Farm Weekly*, March 18 2004, p65.

⁶⁹⁶ Ibid.

⁶⁹⁷ Submission No. 53 from the DEP, April 9 2002, p5.

- 6.32 The DEP advised the Committee that it accepted the community concerns and treated them seriously. The DEP submitted that it responded to those concerns by implementing three key elements in parallel. The DEP.⁶⁹⁸
- attempted to identify the cause of the health concerns raised by the community;
 - implemented an emissions reduction strategy across all significant refinery emissions; and
 - undertook consultations with the community, Alcoa and relevant government agencies in progressing the above actions.
- 6.33 The DEP submitted to the Committee that it allocated considerable resources to this matter commensurate with its commitment to helping resolve community concerns. The DEP also submitted in April 2002 that Alcoa had expressed its commitment to resolving this issue and had cooperated with the DEP and other agencies.⁶⁹⁹
- 6.34 The Committee was informed by the DEP that extensive emissions and ambient monitoring for a large range of chemicals and investigations by medical experts and several environmental consultants had been undertaken to determine the cause of environmental and health impacts.⁷⁰⁰
- 6.35 The DEP noted what it believed had been significant reductions in noise emissions and additional projects that were in progress to further reduce all emissions from the refinery by mid-winter 2002. The DEP informed the Committee that the additional projects were expected to result in a major reduction in emissions from the refinery, which would result in a significant reduction in ground level emissions concentrations.⁷⁰¹
- 6.36 In April 2002 it was the DEP's view, however, that it was unlikely engineering solutions alone would resolve all identified community concerns. The DEP submitted that by the end of winter 2002, all of the significant emissions sources from the refinery would have been addressed and any further reductions achieved, short of plant closure, would be marginal.⁷⁰²

⁶⁹⁸ Ibid.

⁶⁹⁹ Ibid.

⁷⁰⁰ Ibid.

⁷⁰¹ Ibid.

⁷⁰² Ibid.

History of significant events identified by the Department of Environmental Protection

- 6.37 In its submission the DEP provided a history of what it believed to be the significant events up to 2002 in relation to environmental issues relating to Alcoa's refinery at Wagerup. This history is summarised below.

Prior to 1999

- 6.38 As previously noted, Alcoa's Wagerup refinery commenced operation in 1984 and was first licensed by the DEP under the provisions of the EP Act in 1987.
- 6.39 In 1995, Alcoa received Ministerial approval under Part IV of the EP Act for an increase in alumina production to 3.3 million tonnes per annum. Part IV of the EP Act covers Environmental Impact Assessments undertaken by the Environmental Protection Authority (EPA). Subsequently, Alcoa's operating licence was amended to allow a partial increase in production to 2.2 million tonnes per annum.⁷⁰³
- 6.40 As previously noted, the liquor burner facility (LBF) was installed and commissioned at the Wagerup refinery in 1996. The operation of this facility gave rise to worker and community complaints and as a result Alcoa shut the facility in 1997 and installed a CTO. The LBF was re-commissioned in 1998. The DEP submitted that the catalytic thermal oxidiser (CTO) had reduced VOC emissions from the LBF by approximately 90 percent.⁷⁰⁴
- 6.41 In its submission in April 2002 the DEP maintained that while there was community concern and complaints to Alcoa about noise and emissions from the refinery, it was not aware of the high level of community concern prior to 1999 as it had only received four complaints in the preceding two years.⁷⁰⁵

During 1999

- 6.42 The DEP required Alcoa to install a new meteorological station at Wagerup in order that complaints data and monitoring programs could be linked to weather conditions actually measured close to the community. Analysis of complaints and weather data revealed that complaints were generally linked to specific weather conditions and wind direction from the refinery.⁷⁰⁶

⁷⁰³ Submission No. 53 from the DoE, April 9 2002, p7.

⁷⁰⁴ Ibid.

⁷⁰⁵ Ibid.

⁷⁰⁶ Ibid, p8.

- 6.43 An on-site inspection of the Alcoa refinery at Wagerup was conducted by the DEP during 1999. As a result of this inspection, the DEP advised Alcoa of the following.⁷⁰⁷
- the separation distance between the refinery and residences appeared to be inadequate, especially to the south at Yarloop;
 - considerable opportunities existed for emissions reduction; and
 - the emission stacks were too low.
- 6.44 In 1999 Alcoa undertook a dynamic olfactometry odour survey to identify major emissions sources from the refinery and identify areas where reductions could be achieved. The digestion area of the refinery was identified as the largest single source of emissions generation.⁷⁰⁸
- 6.45 The WCHAG Working Group commenced its first round of independent testing of ambient air quality and a range of other monitoring; for example, roof gutter sludge sampling, rainwater tanks, local creek water and body residue sampling.

During 2000

- 6.46 In response to the outcomes of the emissions study conducted by Alcoa, work was undertaken to seal off vents in the digestion area of the refinery. Other works and modifications were made to the calcination area, which resulted in significant emissions reductions.⁷⁰⁹
- 6.47 The oxalate kiln, which was identified as a significant source of emissions, was de-commissioned indefinitely. Oxalate, which was previously disposed of in the kiln, was provided to another industry as a raw material.⁷¹⁰

During 2001

- 6.48 Works were undertaken on the vacuum seals on water tank covers and changes made to hydrate washing and calciner operating parameters. These changes resulted in further reductions in emissions. Opportunities for improvements in hydrate washing and the calcination area were also identified by the DEP.⁷¹¹

⁷⁰⁷ Ibid.

⁷⁰⁸ Ibid. For a discussion of the 'digestion area' refer to paragraph 2.39 of this report.

⁷⁰⁹ Ibid, p9. For a discussion of the 'calcination area' refer to paragraph 2.48 of this report.

⁷¹⁰ Ibid.

⁷¹¹ Ibid, p9.

- 6.49 In June 2001, the DEP received a request from Alcoa for an increase in annual production from 2.2 million tonnes per annum to 2.35 million tonnes per annum. The DEP advised the Committee that it approved this licence amendment, as it believed Alcoa had demonstrated that the increase in throughput would not result in an increase in emissions.⁷¹² The rationale behind the DEP's decision to allow the increase in throughput is explained in the report produced by the DEP in response to community appeals against the licence amendment.⁷¹³
- 6.50 The Minister for the Environment determined the appeals against Alcoa's refinery at Wagerup licence amendment for an increase in annual production in September 2001. The increase in production was allowed to stand, provided additional emissions safeguards were incorporated into the licence when it was due for renewal, that is, prior to October 1 2001. The Minister also requested the DEP to undertake additional consultations with the community prior to the issue of the new licence.⁷¹⁴
- 6.51 The Minister for the Environment required that a de-humidifier be installed on the LBF in December 2001. The DEP anticipated that this would reduce emissions from the LBF by a further 70 percent. The DEP expressed its belief that in combination with the other pollution control equipment, the emissions from the LBF would be reduced by approximately 97 percent from its original level.⁷¹⁵
- 6.52 In response to the Minister for the Environment's request to undertake community consultation, the DEP held meetings in Yarloop and Waroona on September 19 and 24 and October 2 2001. The DEP provided a copy of the new licence to the community and explained how it had incorporated the issues raised by the community into the licence conditions.⁷¹⁶
- 6.53 The DEP renewed Alcoa's licence in late September 2001 (to come into effect on October 1 2001). The community subsequently lodged appeals against some of the conditions of the new licence.

During 2002

- 6.54 In February 2002 the Minister for the Environment determined the appeals against the licence that had been issued to Alcoa in September 2001. Essentially, the Minister required Alcoa to reduce production at Wagerup to an average of 6000 tonnes per day (2.2 million tonnes per annum equivalent) unless three major emissions reduction

⁷¹² Ibid.

⁷¹³ Ibid, Appendix 2 of the Submission, p2.

⁷¹⁴ Ibid, p9.

⁷¹⁵ Ibid.

⁷¹⁶ Ibid, pp9-10 and Appendix 3 of the Submission.

projects were operational by June 30 2002.⁷¹⁷ Refer to paragraph 6.80 and following of this report for discussion on the Minister's appeal determination.

- 6.55 In February 2002, the Ministerial Council and a Coordinating Taskforce were established to develop strategies and coordinate individual agency action plans.⁷¹⁸ Refer to paragraphs 4.251, 4.252 and 4.253 respectively for further discussion on the Ministerial Council and the Coordinating Taskforce.
- 6.56 In June 2002 two water cooled condensers were installed to condense the vapour normally emitted by the containment tank vents in the digestion area pursuant to emission reduction requirements arising from by the Minister's appeal determination.⁷¹⁹

Issues identified by the Department of Environmental Protection

- 6.57 In its April 2002 submission the DEP outlined what it considered to be key issues with regard to Alcoa's Wagerup refinery. A summary of those issues is set out below.
- 6.58 The DEP submitted in April 2002 that concerns with regard to emissions at Alcoa's Wagerup refinery had focused on the LBF. It also advised that extensive emissions and ambient air monitoring by Alcoa and independent monitoring undertaken for the Wagerup Working Group had been unable to identify any elevated levels of compounds which would explain the reported environmental or health concerns raised by the community. The DEP submitted that, despite the low level of emissions recorded, since 1999 it had focused on reducing the level of emissions from the refinery.⁷²⁰
- 6.59 The Committee was informed by the DEP that pollution control equipment installed on the LBF by Alcoa had reduced emissions from that source by approximately 97 percent. The DEP expressed its belief that this emission source was no longer a significant source of emissions, although it submitted that the community's perception that the LBF was a major emissions source still existed. To support its view, the DEP pointed to the fact that a significant number of odour complaints had been received when the LBF was not operational.⁷²¹
- 6.60 The Committee notes that community complaints about emissions and odour recorded during periods when the LBF was not operational may have been due to other

⁷¹⁷ Ibid, p10.

⁷¹⁸ Ibid.

⁷¹⁹ Submission from the DoE, p21, attached to letter from the Minister for the Environment, October 5 2004.

⁷²⁰ Ibid, p6.

⁷²¹ Ibid.

significant sources of emissions from the refinery's other processes, such as the oxalate kiln, digesters and calcinators.

6.61 In its April 2002 submission the DEP advised that in 1999, the Chemistry Centre (WA) (CCWA), on behalf of the Wagerup Working Group, collected a series of water samples from residential rainwater tanks in the vicinity of the refinery, Bancell Brook (which flows south-south-west from the refinery) and from the Yarloop scheme water. The rationale behind this testing was that if air-borne particulates carrying pollutants were being emitted from the refinery at significant concentrations, elevated levels of pollutants might be found in the water samples due to particulate deposition on roofs or in the catchments of the surface water bodies.⁷²²

6.62 The DEP advised the Committee that:

- analysis of water samples and comparison of results with the National Health and Medical Research Council *Australian Drinking Water Guidelines 1996* indicate no elevated levels of any contaminants and all parameters met the drinking water guidelines;⁷²³
- there was no evidence that surface water quality was affected by emissions from the refinery; and
- water quality in rainwater tanks near the refinery was of similar quality to the control site some six kilometres further south.⁷²⁴

6.63 In its April 2002 submission the DEP maintained that all sampling conducted to that time had indicated there were no significant levels of any chemical contaminants in air or water samples. The DEP submitted that it expected, therefore, that no environmental damage was occurring. However, the DEP advised that a study had found synthetic aluminium hydrate in gutter sludge samples from houses close to the refinery, and to a lesser extent at the control site. The DEP advised that the aluminium hydrate was inert and elevated levels of aluminium were not found in associated rainwater tanks. The DEP expressed its belief that the source of the aluminium hydrate was a temporary, open hydrate stockpile at the refinery, which Alcoa had permanently removed.⁷²⁵

6.64 The Committee notes the information provided at paragraph 2.65 and following regarding the health effects of aluminium oxide. In particular that it is a known

⁷²² Ibid, p11.

⁷²³ Ibid, Appendix 5 of the Submission.

⁷²⁴ Ibid, p11.

⁷²⁵ Ibid.

adjuvant, that is a chemical that can make people more sensitive to other environmental contaminants.

- 6.65 The DEP advised the Committee that whilst concerns had been raised with the DEP by a community member regarding the health of domestic animals, it had received no evidence to substantiate those concerns. The DEP expressed its opinion that any investigation into this issue would need to be undertaken by an agency with the relevant expertise, such as Agriculture Western Australia. The DEP noted that Alcoa operated a cattle farm on its land immediately surrounding the refinery and residue disposal areas and that no adverse impacts on its cattle had been reported.⁷²⁶
- 6.66 The DEP informed the Committee that it had three samples of cows' milk tested for cadmium, aluminium, arsenic, chromium, lead and mercury. Two of the samples were taken from a local farm in the area, while the third sample was taken from a carton purchased from a supermarket (control sample). The tests found no heavy metals in any of the samples and all samples complied with the relevant food standards.⁷²⁷
- 6.67 In April 2002 the DEP expressed its belief that it had maintained close contact with community representatives. It advised the Committee that it had developed a consultation protocol to ensure that the community was consulted and had adequate input into the DEP's statutory processes. The DEP also advised that further improvements in this consultation process were proposed.⁷²⁸
- 6.68 The DEP advised that it made significant changes to Alcoa's Wagerup licence in September 2001, including requiring:⁷²⁹
- the installation of additional pollution control equipment on the LBF;
 - additional extensive monitoring of emissions, including a comprehensive emissions inventory;
 - a new ambient air monitoring station;
 - all monitoring programs, emissions inventory, results and reports to be independently audited;
 - limits on a wider range of emissions;
 - reduced emission limits for some parameters; and

⁷²⁶ Ibid, pp11-12.

⁷²⁷ Ibid, p12 and Appendix 6 of the Submission

⁷²⁸ Ibid.

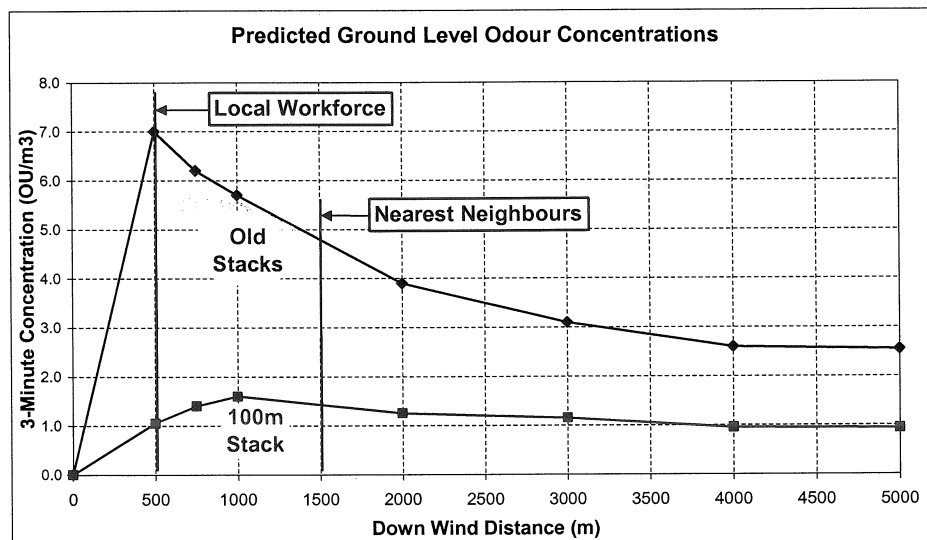
⁷²⁹ Ibid, pp 6-7.

- the establishment of an emissions baseline level, based on an annual production of 2.2 million tonnes of alumina. The DEP advised that expansion of production beyond 2.2 million tonnes of alumina per annum baseline was seen by the community as undesirable, and that as a result, from April 1 2002, emissions would be limited to below that baseline level.

6.69 In its April 2002 submission the DEP estimated that by mid 2002 emissions should be 80 percent of 1995 levels, being levels which many members of the community had advised the DEP were acceptable. In 2002 the DEP estimated that a proposed increase in the height of the stacks for the calciner and the LBF would reduce ground level odour concentrations by 70 percent at approximately 1000 to 1500 metres from the refinery as shown in Figure 6.1 below.⁷³⁰

Figure 6.1

Comparison of the modelled ground level emission concentrations from the calciner stacks



DEPARTMENT OF ENVIRONMENTAL PROTECTION SUBMISSION: JULY 2002

6.70 The DEP provided the Committee with a second submission on July 8 2002, in response to a number of issues that had arisen since its original submission in April 2002. The Committee has summarised the main points below.

⁷³⁰

In January 2003 the DEP advised the Committee that this reduction had been achieved. Refer to paragraph 6.114 of this report for further information.

Benzene emissions

- 6.71 In July 2002 the DEP advised that concerns in relation to benzene in emissions from the LBF at the Wagerup refinery had recently been raised. The DEP advised that extensive testing had been undertaken on emissions from the LBF which showed that very low levels of compounds, including benzene, were being emitted. The highest in-stack concentration measurement of 2.6 milligrams per cubic metre, was below the 16 milligrams per cubic metre WorkSafe and DMPR eight hour time weighted limit (TWL)⁷³¹ for workers' exposure.⁷³²
- 6.72 The DEP expressed its belief that based on the information available as at July 2002, and in comparison with relevant occupational and ambient health guidelines, benzene was not an issue in emissions from the Wagerup refinery.⁷³³

Metals testing - liquor burner facility

- 6.73 In July 2002 the DEP advised that it made a requirement of Alcoa's Wagerup 2001/2002 licence, that Alcoa conduct emission sampling both prior to and following the installation of the de-humidifier on the LBF in November 2001. The DEP advised the Committee that it requested the sampling of metal emission levels prior to the installation of the de-humidifier to allow a comparison with emission levels after its installation. The DEP submitted that the sampling showed very low levels of heavy metals present in the emissions, and it expressed its hope that the results would allay community concerns on this issue.⁷³⁴

Heavy metals testing - ambient air and calciner emissions

- 6.74 Following concerns raised by a member of the community about heavy metals levels found in dust on a fan blade in a house in Yarloop, the DEP advised that it undertook testing of the dust from the fan and the calciner at the refinery. The DEP concluded that the levels were of no concern.⁷³⁵
- 6.75 The DEP also arranged for some further dust sampling from inside the house to be undertaken by Murdoch University in an effort to obtain more data on heavy metals and to attempt to identify a possible likely source of the dust. The DEP stated that

⁷³¹ See glossary for full definition.

⁷³² Submission No. 36 from the DEP, July 8 2002, points 17-21.

⁷³³ Ibid.

⁷³⁴ Ibid, points 23-24.

⁷³⁵ Ibid, points 25-27.

Murdoch University had advised it that the heavy metal levels were generally not high and were not a health risk.⁷³⁶

Fluoride

6.76 Professor Frank Murray of Murdoch University was commissioned by the DEP to conduct a vegetation survey as a direct response to community concerns about the possible effect of fluoride emissions from the refinery. Professor Murray concluded that vegetation in the area did not show any typical signs of fluoride damage, even in those species known to be very sensitive to fluoride.⁷³⁷

6.77 Professor Murray also undertook a desktop study of fluoride emissions from the refinery. He concluded that due to the fact that the majority of the 390 kilograms of fluoride emitted annually was unlikely to be very soluble, it would have limited bio-availability, and hence it was unlikely to represent a high risk to the environment. However, Professor Murray maintained that this was not to suggest fugitive dusts from red mud or other sources have no effect on human health, animals or plants.⁷³⁸

Bi-monthly monitoring of emissions

6.78 In July 2002 the DEP advised the Committee that it required Alcoa to undertake bi-monthly monitoring of 26 VOCs, measure total VOCs from all significant emission sources at the refinery and to report the results to the DEP every six months. Alcoa had submitted its first bi-monthly monitoring program report to the DEP covering the period October 2001 to March 2002. The DEP advised that it had the report independently audited.⁷³⁹

6.79 In the October 2001 to March 2002 bi-monthly monitoring program report Alcoa noted, among other things, that:⁷⁴⁰

- the program targeted 12 emission sources and 27 specific compounds;
- a number of the VOCs, organosulphides and alcohols measured were not detected in the majority of emission sources;
- the digestion vacuum pump emissions contained the greatest distribution and concentration of compounds;

⁷³⁶ Ibid, point 28.

⁷³⁷ Ibid points 29-31 and Attachment 4 of the Submission.

⁷³⁸ Ibid, points 29-31 and Attachment 5 of the Submission.

⁷³⁹ Ibid, points 34-35.

⁷⁴⁰ Ibid, points 34-35 and Attachment 7 of the Submission.

- the calciner stacks emitted the greatest mass of VOCs, due to their high emissions flow rate; and
- aldehydes and ketones were the major emission components from the refinery.

Minister's Appeal Determination: February 15 2002

6.80 Appeals were lodged by local community members against the conditions of Alcoa's 2001/2002 licence for Alcoa's refinery at Wagerup. The DEP advised that the Minister for Environment upheld the community appeals in her determination of February 15 2002 by requiring Alcoa's production to be restricted to 2.2 million tonnes per annum, unless it undertook major emissions reduction works by June 30 2002.⁷⁴¹

6.81 The DEP advised that on July 1 2002, a DEP officer undertook an on-site physical/visual audit of Alcoa's Wagerup refinery to assess compliance with the new licence requirements. The DEP officer confirmed that all works associated with meeting the conditions relating to the Minister for the Environment's appeal determination had been completed.⁷⁴²

6.82 The Committee notes that the October 2004 DoE Material includes details regarding the 2004/2005 licence (issued on August 12 2004 for one year) and the Minister's determination of appeals against the 2004/2005 licence.⁷⁴³

DEPARTMENT OF ENVIRONMENTAL PROTECTION SUBMISSION: JANUARY 2003

6.83 The DEP provided a third submission for the Committee in response to information requested at the Committee's hearing on July 8 2002. The submission also included updates on other relevant issues. A summary of the DEP's submission follows.

Consultation process regarding Alcoa's Wagerup licence for 2002/2003

6.84 The DEP provided the Committee with information on the consultation process leading up to it issuing the 2002/2003 licence for Alcoa's Wagerup refinery.⁷⁴⁴ The Committee has summarised that process below.

6.85 The 2002/2003 licence for Alcoa's Wagerup refinery was issued by the DEP on September 27 2002 (effective October 1 2002).⁷⁴⁵ The formulation of this licence was

⁷⁴¹ Ibid, point 38.

⁷⁴² Ibid, Attachment 8 of the Submission.

⁷⁴³ Submission from the DoE, pp12 and 19-20, attached to letter the Minister for the Environment, October 5 2004.

⁷⁴⁴ Submission No. 52 from the DEP, January 24 2003, points 2-14.

⁷⁴⁵ Ibid, Attachment 1 of the Submission.

based on a series of objectives determined by the DEP and a strategy that was developed to achieve those objectives.⁷⁴⁶

- 6.86 The DEP advised that it commenced community consultation on the 2002/2003 licence on May 23 2002 when it sent out correspondence to approximately 65 community members. This correspondence invited the community to put forward any issues or concerns relating to the refinery that should be considered or addressed through the licence renewal process.
- 6.87 The DEP advised that it conducted a total of four community consultation meetings in August and September 2002. At the request of community representatives, an independent facilitator recommended by the community was engaged. The DEP advised that the most significant issue for the community was retaining the condition limiting annual production.⁷⁴⁷
- 6.88 The DEP also advised the Committee that community representatives were provided with a copy of a draft set of licence conditions prior to the final meeting on September 17 2002. The DEP advised that community members wanted to discuss a wider range of issues than anticipated and as a result, insufficient time was available to discuss specific aspects of the new licence.
- 6.89 The DEP advised the Committee that it encouraged the community to provide a list of issues regarding the draft licence conditions. The DEP advised that it did not receive any further submissions from the community in relation to the draft licence conditions.
- 6.90 The DEP advised the Committee that its aim was to move to a full emissions based licence at the renewal of the 2002/2003 licence, which would remove the need for an annual production limit. This was based on the principle of managing the emissions issue, which was central to the concerns of the community.
- 6.91 The Committee notes that the October 2004 DoE Material discusses the 2004/2005 licence (issued on August 12 2004 for one year). In relation to production limits for the 2004/2005 licence the DoE states:⁷⁴⁸

The licence also initially constrains annual production to 2.35 million tonnes. However, it makes a provision for an increase in annual alumina production of up to 2.5 million tonnes, but only if there is a clearly demonstrated emissions benefit in real terms from the calcination process. Retaining the annual production limit during the

⁷⁴⁶ Ibid, Attachment 2 of the Submission.

⁷⁴⁷ Ibid, Attachment 3 of the Submission.

⁷⁴⁸ Submission from the DoE, p20, attached to letter from the Minister for the Environment, October 5 2004.

licence period ensures the community has a 'safety net' in relation to refinery impacts, whilst providing the opportunity to further develop emissions limits.

The licence also specifies an absolute daily production limit of 7400 tonnes, thereby reducing emissions peaks associated with production peaks. Previously, daily throughput had fluctuated as high as 8400 tonnes, generating daily emissions up to 12 percent above those at the new permissible level.

A new condition has been imposed to limit the level of key volatile organic compounds (VOCs) emissions from calcination over the period of the licence, with additional limits specified for each quarter. This ensures a community benefit before any increase in annual production is allowed.

This is a transition arrangement between the purely production based approach and an emissions base approach. It also includes a frequent monitoring and reporting provision through the Tripartite Group.

Licence conditions: 2002/2003

- 6.92 The DEP expressed its belief that due to the small amount of emissions data available, “if emission limits were set for the new licence they may not have reflected current operations.”⁷⁴⁹ The DEP advised that this, combined with the community’s concerns, resulted in the a production limit of 2.35 million tonnes per annum being retained and a new six month production limit of 1.2 million tonnes being added to the 2002/2003 licence conditions.⁷⁵⁰ The DEP also advised that at the time it was not confident it could formulate a comprehensive list of emissions criteria for an emissions based licence.⁷⁵¹
- 6.93 The DEP informed the Committee that the 2002/2003 licence required continuous VOC and sulphur dioxide monitoring for the purpose of obtaining a better understanding of actual levels and variability in emissions.⁷⁵² The DEP submitted that this monitoring assisted in determining the optimal operational parameters that may provide opportunities for further emission reductions. The DEP provided the

⁷⁴⁹ Submission No. 52 from the DEP, January 24 2003, point 10 and Attachment 3.

⁷⁵⁰ Ibid, point 10.

⁷⁵¹ Ibid.

⁷⁵² Ibid, point 11.

Committee with a summary detailing the main changes that were made to the 2002/2003 licence, which included:⁷⁵³

- the emissions limits from the 2001/2002 licence were retained;
- the annual production limit of 2.35 million tonnes was retained and a six monthly production limit of 1.2 million tonnes was added;
- further emission reduction opportunities were identified and Alcoa was required to report every three months to the DEP on what progress it had made in reducing emissions;
- emission sampling and analysis was required to be undertaken by National Association of Testing Authorities (NATA) accredited consultants;
- the approval to operate the oxalate kiln was removed;
- continuous emissions monitoring was required for key emissions from major sources (including oxides of nitrogen in Yarloop);
- health based heavy metal monitoring of dust from the residue areas and a revised ambient dust monitoring program were required;
- a field odour study was required;
- an expanded incident reporting, including complaints, was required;
- the LBF was to operate only when all pollution equipment was operating;
- monitoring of emissions was to include mass emissions rates;
- monitoring was to be in accordance with specified United States of America Environmental Protection Authority methods; and
- restrictions were imposed on the operation of the calciners.

6.94 The Committee was informed by the DEP that it intended to review the 2002/2003 licence once it had received and evaluated the independent auditor's report, validation of the emissions reduction program and data from continuous monitoring. The DEP advised that this would achieve its objective of implementing an emissions based

⁷⁵³

Ibid, Attachment 4A of the Submission.

licence and at some later stage the possibility of removing the refinery's annual production ceiling limit.⁷⁵⁴

- 6.95 The DEP advised the Committee that it had undertaken to consult with the relevant stakeholders, including community representatives, when reviewing Alcoa's 2002/2003 licence and setting emission limits. It advised that all emission limits would be set so as to achieve the relevant health guidelines and, where possible, the health 'goals' recommended by the DoH.⁷⁵⁵ These 'goals' are lower than the relevant health guidelines and were specifically developed by the DoH for application to the Wagerup situation. The goals are primarily based on odour thresholds for sensitised communities.⁷⁵⁶
- 6.96 The Committee observes that the October 2004 DoE Material contains some comment on an emissions based licence and emissions limits and a report from Alcoa on field odour surveys.⁷⁵⁷ The Committee also notes that the October 2004 DoE Material discusses the 2004/2005 licence (issued on August 12 2004 for one year) and the new production limits.⁷⁵⁸

Ground water

- 6.97 As part of its submission in January 2003, the DEP provided information with respect to ground water at Alcoa's Wagerup refinery. In its submission the DEP referred to *Alcoa World Alumina Australia, Wagerup, Western Australia - Review of Impacts on Waters* (March 2002).⁷⁵⁹
- 6.98 The Committee notes that as a condition of its 2003/2004 licence Alcoa is required to undertake ground water quality monitoring from a number of monitoring bores at the Wagerup refinery, have those samples analysed and report the results to the DEP in its annual report to the DEP. The licence also requires Alcoa to report to the DEP any results that exceed guideline values as soon as practicable.

Residue disposal areas

- 6.99 In January 2003 the DEP advised the Committee that there were a number of groundwater monitoring bores adjacent to the Residue Disposal Area (**RDA**) which had detected seepage. The DEP advised that the cause of this seepage had not been

⁷⁵⁴ Ibid, point 13.

⁷⁵⁵ Ibid, point 14 and Attachment 4B of the Submission.

⁷⁵⁶ Ibid, point 14.

⁷⁵⁷ Appendix K of the Submission from the DoE, pp4-6, and 12 - attached to letter from the Minister for the Environment, October 5 2004.

⁷⁵⁸ Submission from the DoE, p20, attached to letter from the Minister for the Environment, October 5 2004.

⁷⁵⁹ Submission No. 52 from the DEP, January 24 2003, Attachment 7.

precisely determined, but that it was thought to originate from historical RDA construction or monitoring bores acting as contamination conduits. The DEP advised in January 2003 that the double-lined pond system that was now used in RDA construction was not used in the construction of earlier RDAs.⁷⁶⁰

- 6.100 The DEP also advised that groundwater quality around the RDAs had remained relatively constant; that is, seepage was not migrating away from underneath the RDAs but had remained localised. The DEP expressed its belief that this was due to the high clay content of the soil, which limited movement of seepage. The Committee was advised that groundwater monitoring bores located away from RDA embankments were not detecting significant changes in groundwater quality.⁷⁶¹

Refinery

- 6.101 The DEP advised that there were essentially three plumes of contaminated water underneath the refinery site and that as at January 2003 all three plumes were contained within the boundary of the refinery premises.⁷⁶²
- 6.102 The Committee was advised that where the source of contamination had been identified, remedial action had been taken and groundwater quality was improving. Where the source of the plume contamination had not been identified, further investigative work was being undertaken.⁷⁶³ The DEP submission noted that the water plume under the refinery, which was caused by the stockpiling of hydrate, had moved 400 meters down gradient from its source.⁷⁶⁴

Water and Rivers Commission

- 6.103 As part of its submission, the DEP advised that the Water and Rivers Commission (WRC) was consulted on the groundwater issues.⁷⁶⁵ The DEP informed the Committee that the WRC considered the management of groundwater at Alcoa's Wagerup refinery was appropriate given that the water plumes were contained within the refinery boundary and other groundwater users were not at risk of drawing on contaminated groundwater from beneath the Wagerup refinery or the RDAs.
- 6.104 The DEP expressed the opinion that, based on the information provided to it by the WRC, the situation did not pose an environmental risk on a catchment basis. It submitted that should water plume behaviour change significantly and migrate outside

⁷⁶⁰ Ibid, point 24.

⁷⁶¹ Ibid, point 25.

⁷⁶² Ibid, point 27.

⁷⁶³ Ibid, point 28.

⁷⁶⁴ Ibid, Appendix 7 of the Submission, piii.

⁷⁶⁵ Ibid, point 30.

localised areas, it would initiate appropriate action to ensure that Alcoa managed the issue appropriately.⁷⁶⁶

Emissions inventory report

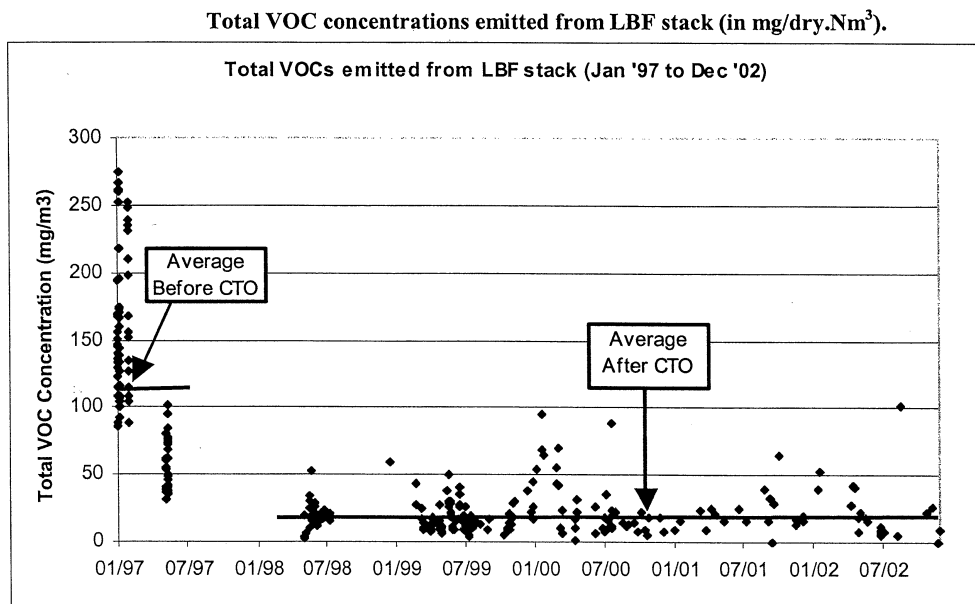
6.105 Alcoa's licence for the period 2001/2002 required it to complete a comprehensive survey of emissions from all significant sources at the refinery. The purpose of the inventory was to characterise all of the emissions and provide an additional data set on the levels of those emissions. Alcoa submitted a final report to the DEP containing all the emissions data from this survey. The DEP provided a copy of the report to the Committee.⁷⁶⁷

6.106 The DEP noted that some of the major emissions sources identified in the report had been eliminated through the emissions reduction works completed by Alcoa on June 30 2002.⁷⁶⁸

6.107 Figure 6.2 is a figure from Alcoa's report on *Emissions from Wagerup's Liquor Burner Facility - October 1996 to December 2002* showing VOC concentrations from the LBF from 1997 to 2002.

Figure 6.2

VOC concentrations from the LBF from 1997 to 2002



⁷⁶⁶ Ibid.

⁷⁶⁷ Ibid, points 78-81 and Attachment 8 - Alcoa Australia's, *Wagerup Air Emissions Inventory - Final Report*, Alcoa Australia, September 25 2002.

⁷⁶⁸ Ibid, points 78-81.

6.108 According to the DEP, with the exception of sulphur dioxide from the calcination process, the results of the emissions inventory did not identify any unexpected compounds or levels of compounds that were obviously significant or would explain the cause of the reported health effects of some members of the community.⁷⁶⁹

Winter air monitoring 2002

6.109 In its submission dated January 2003 the DEP advised the Committee that:⁷⁷⁰

- the WCHAG Working Group had been undertaking independent environmental monitoring programs around the refinery each winter since 1999;
- it had worked closely with the WCHAG Working Group and the CCWA to develop a comprehensive winter monitoring program for 2002;
- the winter 2002 independent air quality monitoring program had been completed and the CCWA had completed its report;
- the monitoring equipment was community activated, at sites selected by the community and during events which the community believed were from refinery emissions; and
- essentially the monitoring did not identify any compounds at significant levels.

6.110 The DEP also advised the Committee that it had suggested to the WCHAG Working Group that there was merit in combining the various emissions monitoring programs that were being run by Alcoa, the DEP and the WCHAG Working Group and that an independent credible body such as the CSIRO could design and run such a program.⁷⁷¹

6.111 The Committee was informed in December 2003 that the CSIRO had prepared a plan in relation to a Wagerup air quality study. The Committee was advised that as at December 2003 Alcoa was in the process of examining the project detail and had not made a final decision.⁷⁷²

6.112 For more information regarding the CSIRO program refer to paragraphs 6.243 to 6.247 this report.

⁷⁶⁹ Ibid.

⁷⁷⁰ Submission No. 52 from the DEP, January 24 2003, Attachment 8 and 8B - Alcoa Australia's, *Wagerup Air Emissions Inventory - Final Report*, Alcoa Australia, September 25 2002, points 82-89.

⁷⁷¹ Ibid.

⁷⁷² Letter from the DEP, December 23 2003.

6.113 The DEP informed the Committee in January 2003 that seven months of continuous monitoring of ozone at a residence in north Yarloop had not found any elevated ozone levels.⁷⁷³

Emissions reductions program

6.114 The DEP noted in its January 2003 submission that it had:⁷⁷⁴

- received on July 1 2002 from Alcoa, documents that, based on computer modelling of the installation of the 100 meter high multi flue stacks, had achieved a 70 percent reduction in emissions impacts at a distance of 1500 metres from the refinery;
- reviewed the documentation, queried the approach that Alcoa had taken to demonstrate the 70 percent reduction, and requested Alcoa to conduct additional modelling and validation; and
- received final documents from Alcoa which demonstrated to the DEP's satisfaction that a modelled 70 percent reduction in emissions impacts in the community had been achieved as a result of the installation of the 100 metre high multi-flue stack.

6.115 The DEP informed the Committee that the community had provided feedback on the effectiveness or otherwise of the tall stacks project and other odour reduction works. The community's feedback varied between the view that the tall stacks had improved their situation to the view that they had made their situation worse.⁷⁷⁵

Community based ambient air sampling

6.116 In January 2003 the DEP advised the Committee that it had instigated a community based air sampling program to assess ambient air quality when refinery emissions were perceived by the community to be impacting on their health or amenity.⁷⁷⁶

6.117 The DEP released a report detailing the results of the community sampling for the period June to October 2002, and a copy was provided to the Committee.⁷⁷⁷

6.118 According to the DEP the results of the community sampling showed:⁷⁷⁸

⁷⁷³ Submission No. 52 from the DEP, January 24 2003, Alcoa Australia, *Wagerup Air Emissions Inventory - Final Report*, Alcoa Australia, September 25 2002, Attachment 8C.

⁷⁷⁴ Ibid, points 90-94 and Attachment 9 of the Submission.

⁷⁷⁵ Ibid.

⁷⁷⁶ Ibid, points 95-101.

⁷⁷⁷ Ibid, Attachment 11A of the Submission.

- VOC concentrations during emissions events were generally low, although they were higher than control background samples;
- aldehydes and ketones concentrations were below WHO guidelines, but above the DoH's three minute exposure goal; and
- accidental contamination of some samples may have occurred.

State Air Environmental Protection Policy

6.119 The Committee was informed by the DEP in January 2003 that it was in the process of developing a *State Air Environmental Protection Policy* as part of the Government's response to the Commonwealth Government's *Ambient Air Quality National Environmental Protection Measure*.⁷⁷⁹

ALCOA'S SUBMISSIONS ON ENVIRONMENTAL IMPACTS

6.120 Alcoa provided a large volume of information to the Committee over the course of the inquiry. It also provided most of this information to the DEP and in turn the DEP provided it to the Committee as part of its submissions. Where the information in Alcoa's submissions has already been presented in the section headed 'Submission of the Department of Environmental Protection regarding Environmental Impacts' (refer to paragraph 6.29), it is not repeated in this section. Information provided by Alcoa on public health issues, loss of amenity (for example noise) and social impacts (for example Alcoa's land management strategy) are dealt with elsewhere in the report.

ALCOA SUBMISSION: NOVEMBER 2001

6.121 As part of its submission dated November 2001, Alcoa provided the Committee with its summary of the *Wagerup/Yarloop Local Air Quality Assessment, Volume One and Two* (Volume One - November 1997 and Volume Two - February 1998) (together referred to as the Kinhill Report). This report was commissioned from Kinhill Pty Ltd by Alcoa in 1997 to carry out a number of tasks in relation to emissions issues at Alcoa's refinery at Wagerup.

6.122 The Committee also obtained a complete copy of the Kinhill Report from Alcoa during its inquiry. The Committee considers that the Kinhill Report is significant as it was the first comprehensive report commissioned by Alcoa dealing with emissions issues at Alcoa's refinery at Wagerup. The Committee has summarised the Kinhill Report and its findings and recommendations in Appendix 9 of this report.

⁷⁷⁸ Ibid.

⁷⁷⁹ Ibid, points 115-120.

Emission levels and monitoring

6.123 In its November 2001 submission, Alcoa expressed the following view:⁷⁸⁰

Heavy industry by its very nature, will have unpleasant smells and will make some noise. We are working extremely hard to minimise those emissions.

Some people are reporting irritation. The irritation has not been linked to any emission from the refinery.

...This issue has been extensively studied by Alcoa, government agencies and other independent experts over a number of years. There is no component of the emissions from the refinery at a level that is known to account for the reported symptoms.

6.124 Alcoa submitted that the air quality monitoring and analysis which had taken place at Wagerup had been reviewed by a number of independent consultants (including the DEP, DMPR, CCWA and Curtin University School of Public Health). Alcoa also submitted that those reviews found the methods it used were of a high standard.⁷⁸¹

6.125 Dr Armanios of Alcoa's Technology Delivery Group provided the following summary regarding emissions sampled from the Wagerup LBF in August 2000:⁷⁸²

A comprehensive investigation of Wg [Wagerup] Liquor Burning stack gas composition has identified around 70 organic compounds and 14 metals. All these constituents were present at trace levels. Based on comprehensive data, it is clearly evident that the measured levels of particulates, metals and organics emitted from Wagerup's Liquor Burner stack would not result in occupational exposure levels higher than any published ambient air quality standards.

6.126 Alcoa's conclusions from its odour [emissions] survey undertaken at Alcoa's refinery at Wagerup in 2001 included the following:⁷⁸³

- significant odour [emissions] reductions had been measured;
- variability of emissions from some sources was high;

⁷⁸⁰ Submission No. 2 from Alcoa, November 21 2001, p2.

⁷⁸¹ Ibid, Appendix 2 of the Submission.

⁷⁸² Ibid, Appendix 7 of the Submission.

⁷⁸³ Ibid, Appendix 8 and 9 of the Submission.

- odour [emissions] monitoring at source should continue and alternative means of measuring odour [emissions] should be progressed;
 - modelling was able to reproduce odour [emissions] impacts with a reasonable degree of accuracy, however a better understanding of dispersion was desirable;
 - modelling and field surveys indicated that odour impacts on the refinery were continuing at values above regulatory guidelines, although they were approaching these; and
 - high variability in [emission] source strength made the accurate calibration of models difficult.
- 6.127 Alcoa's submission provided details of the emissions reductions projects that had been approved (for example, the installation of the dehumidifier on the LBF) and those that were at the engineering feasibility and development stages (for example calcination and digestion emission reductions).⁷⁸⁴
- 6.128 Alcoa advised that it had more recently taken a broader approach to plant wide emission sources, which were being intensively evaluated and then eliminated, reduced or controlled through stable optimised operating conditions.
- 6.129 Alcoa advised that it intended to work towards increasing production capacity at Wagerup in the future, but that this would not be contemplated until it had clearly demonstrated to the Government and the community that there would not be any significant adverse impact on peoples' health or the environment.⁷⁸⁵

ALCOA SUBMISSION: FEBRUARY 2002

- 6.130 In this submission Alcoa provided information the Committee had requested at its public hearing on November 21 2001 and additional information to supplement its written and oral evidence given at that time.

Emissions Reduction Program

- 6.131 Alcoa informed the Committee that it was continuing an aggressive emissions reduction program at its refinery at Wagerup. Alcoa claimed that since the commissioning of the LBF in 1996, VOCs from that source had been reduced by over 95 percent and that further plant wide emissions reduction work in 2002 was expected to reduce overall refinery emissions by 60 percent compared to levels measured in

⁷⁸⁴ Ibid, Appendix 10 and 11 of the Submission.

⁷⁸⁵ Ibid, Appendix 3 and Appendix 5 of the Submission.

2000. In addition, it expected the level of oxides of nitrogen emissions for the powerhouse to be reduced by 40 percent by June 2002.⁷⁸⁶

Monitoring

6.132 According to Alcoa's February 2002 submission it had continued extensive monitoring of emissions from the refinery and additional activities had included:⁷⁸⁷

- a full emissions inventory of the refinery which, when completed, would be the most comprehensive for any alumina refinery in the world. It included the measurement of VOCs, SVOCs, many other organic compounds, inorganics, and metals from all major emission points; and
- a review of Alcoa's current emissions sampling, reporting and knowledge base, which involved experts from local and interstate universities and government departments.

ALCOA SUBMISSION: JUNE 2002

6.133 Alcoa provided this submission to the Committee in response to information requested at the Committee's public hearing on February 18 2002 and to supplement its written submission and oral evidence given at that time.

Atmospheric dispersion modelling

6.134 The following information was provided by Alcoa regarding atmospheric dispersion modelling conducted for the LBF and other emissions sources since the original modelling work was undertaken in 1978:⁷⁸⁸

- June 1994: The AUSPLUME Model (in which generic meteorological data rather than Wagerup specific data) was used to model atmospheric dispersion of emissions. The model predicted that levels of carbon monoxide and benzene were well within health guidelines. It also predicted that odour frequency above the detection threshold would be experienced approximately 13 times per year in Yarloop and 43 times per year within the refinery. The model also showed that a 60 meter high exhaust stack would be sufficient to adequately disperse LBF emissions.
- November 1995: All Wagerup meteorological data was reviewed by consultants and the 1989 and 1991 data sets were chosen as model inputs.

⁷⁸⁶ Submission No. 15 from Alcoa, February 18 2002, pp3-4 and Appendix 9 of the Submission.

⁷⁸⁷ Ibid, p4 and Appendix 10.

⁷⁸⁸ Appendix 1 of Submission No. 31 from Alcoa, June 13 2002.

- 1996: The AUSPLUME model, with some modifications, was used with Wagerup specific meteorological data. The predicted frequency of odour events above the detection level experienced in Yarloop was 200 times per year and at the refinery was 1100 times per year.
- 1997 to 2000: The modified AUSPLUME model, together with Wagerup specific meteorological data, were used to predict the peak hourly and annual mean levels of alkenes, benzene, and total VOCs. They were predicted to be well within workplace TLV.
- 2001-02: The AUSPLUME and other air dispersion models were tested to determine which model would give the best predictions, based on Wagerup micrometeorological data collected in 2000 and 2001. Consultants found that Calpuff was the most robust model, particularly for lower level emissions. Based on the Calpuff model, the consultants predicted that proposed changes to the refinery's emissions would result in a 50 to 75 percent reduction in emissions concentrations.

6.135 The October 2004 DoE Material makes reference to modelling emissions dispersion.⁷⁸⁹

Fluoride and arsenic

6.136 Alcoa advised that sampling for fluoride and arsenic was undertaken by the WCHAG Working Group as part of its air quality monitoring study in winter 2001. No arsenic or fluoride was detected in the air sampling. Another survey found that fluoride was not impacting on vegetation.⁷⁹⁰ For further details concerning fluoride refer to paragraphs 6.76 and 6.77 of this report.

ALCOA SUBMISSION: MARCH 2003

6.137 This submission from Alcoa provided an update on Alcoa's emissions reductions projects, monitoring and sampling activities and its environmental management systems.

⁷⁸⁹ Submission from the DoE, pp6-7, attached to letter from the Minister for the Environment, October 5 2004.

⁷⁹⁰ Submission No. 31 from Alcoa, June 13 2002, p2.

Emissions reduction program

6.138 Alcoa advised that its 2002 emissions reduction program had built on the work done since the CTO was installed on the LBF in 1998. Alcoa submitted that:⁷⁹¹

- it accepted the health problems were real and that it had worked hard to address worker and community concerns and reduce refinery emissions;
- since 1996 the VOC emissions from the LBF had been reduced by approximately 95 percent;
- refinery emissions [odour] levels were approximately 45 percent lower than in 1995, despite an increase in production from 1.68 million tonnes in 1996 to 2.35 million tonnes in 2002; and
- oxides of nitrogen emissions from the refinery's powerhouse had been reduced by approximately 59 percent.

Monitoring and sampling

6.139 In its March 2003 submission Alcoa advised that air quality monitoring and sampling of ambient, refinery and workplace environments undertaken in 2002 detected no compounds at levels that would indicate a health risk.⁷⁹²

6.140 Alcoa provided information on its comprehensive emissions inventory that had been completed in September 2002. This indicated that, after dispersion, no compound was found at a level likely to exceed any minimum health or environmental standards.⁷⁹³

6.141 Extensive monitoring of a wide range of emission compounds was required under Alcoa's 2002/2003 Wagerup licence. This included continuous monitoring of:

- ambient particulates, oxides of nitrogen, ozone and residue disposal area dust; and
- source particulates, formaldehyde, benzene and sulphur dioxide.

Alcoa's environmental management systems

6.142 Alcoa informed the Committee in March 2003 that it had environmental management systems in place at all its operating locations. It advised that all its environmental

⁷⁹¹ Submission No. 51 from Alcoa, March 4 2003, and covering letter from Ms Ann Whitty, Wagerup Refinery Manager, March 4 2003, p1 and the first attachment.

⁷⁹² Ibid, and second attachment.

⁷⁹³ Ibid.

management systems had been ISO 14001 certified.⁷⁹⁴ Alcoa advised that the environmental management systems for Wagerup focused on ensuring compliance with licence conditions and regulations, and continuing improvement of the environmental performance of the refinery.

ALCOA WAGERUP TRIENNIAL ENVIRONMENTAL REVIEW 2000 TO 2002

- 6.143 The *Wagerup Refinery and Bauxite Residue Operations Triennial Environmental Review 2000 - 2002 (Triennial Review)* was published by Alcoa in March 2003 and submitted to the DEP as a requirement of Alcoa's licence. The review of operations and relevant research at the Wagerup refinery summarises performance for the 2002 calendar year and provides trend information where appropriate for the period 2000 to 2002.
- 6.144 Alcoa noted in its Triennial Review that during the reporting period it complied with reporting obligations under the National Pollutant Inventory and that the list of substances for which emissions estimates were required increased from 36 to 90 during the 2001 to 2002 National Pollutant Inventory reporting period.
- 6.145 Alcoa reported in its Triennial Review that during the reporting period there were two environmental incidents that required notification to the DEP under its licence conditions. One incident (March 2002) related to dust levels from the calciner exceeding allowed levels and the other incident (November 2002) related to dust emission from the residue disposal area.⁷⁹⁵
- 6.146 Alcoa noted in its Triennial Review that, in relation to the first incident, the DEP determined that there was no evidence of pollution or any adverse impact from the event. The DEP performed an investigation into the second incident, however as at the date of publication of the Triennial Review a decision had not been made.⁷⁹⁶
- 6.147 In view of the drought currently being experienced in Western Australia and the fact that Alcoa is sourcing its water supply from public water catchment dams, the Committee considered the Triennial Review in light of Alcoa's water supply.
- 6.148 Alcoa's Triennial review notes that during 2002 Alcoa reviewed its long-term water supply options. A project to extract excess winter run-off from the Harvey River was approved by the WRC. Alcoa noted in its Triennial Review that the Harvey pump-back station to extract water from the Harvey River would be established prior to the

⁷⁹⁴ ISO 14001 is an environmental management system of international standards. ISO is a network of the national standards institutes of 146 countries and the world's largest developer of standards: ISO website, <http://www.iso.org>, (accessed October 22 2004).

⁷⁹⁵ Alcoa, *Wagerup Refinery and Bauxite Residue Operations Triennial Environmental Review 2000 - 2002*, Alcoa, Perth Western Australia, March 2003, pp4-6.

⁷⁹⁶ Ibid.

winter of 2003 and would allow up to 4400 mega litres to be taken from the Harvey River between May and October 2003.⁷⁹⁷

- 6.149 According to Alcoa's Triennial Review, the harvesting of this lower quality, winter run-off from the Harvey River, instead of using much higher quality run-off from the Darling Range, would have significant environmental benefits for the lower Harvey River and to a lesser extent the Harvey Estuary.⁷⁹⁸
- 6.150 Alcoa expressed its belief that this would allow the available run-off from the Darling Range to be used as an environmental flow, thereby potentially reducing nutrient levels in downstream water bodies.⁷⁹⁹
- 6.151 The Committee sought clarification from the DoE regarding water extraction from the Harvey Dam and was advised by the Minister for the Environment in April 2004 that the DoE has been monitoring water flows and samples collected fortnightly for nutrient analysis in the Harvey River at Clifton Park for over twenty years.⁸⁰⁰ The Committee was advised that analysis of information to date shows nutrient loads usually peak in either June or July with initial winter flow events. These peaks usually last for one month.⁸⁰¹
- 6.152 The Minister for the Environment advised that:⁸⁰²
- no monitoring program had been put in place to assess the short or long term effect of Alcoa's pumping on water quality;
 - the granting of Alcoa's licence was not contingent on any improvement in water quality; rather this was seen as a potential beneficial effect of the pumping;
 - discussions with Alcoa have indicated that it is not feasible to only take water when nutrient levels are high, as nutrient peak loading may not coincide with high river flows;
 - the current pumping scenario is designed to maintain a base flow in the river for downstream environmental considerations; and

⁷⁹⁷ Ibid, 79.

⁷⁹⁸ Ibid, pp4-6.

⁷⁹⁹ Ibid.

⁸⁰⁰ Letter from the Minister for the Environment, April 1 2004, p1.

⁸⁰¹ Ibid.

⁸⁰² Ibid.

- the licence condition restricting Alcoa to pump only between May and October is considered to be the most appropriate method of ensuring continuation of base flows with the highest likelihood of capturing elevated nutrient water.

ENVIRONMENTAL AUDIT OF ALCOA'S WAGERUP REFINERY FROM APRIL 2002 TO MAY 2003

6.153 In March 2002 AWN (Air Water Noise) Consultants (AWN) were appointed by the DEP to conduct an independent environmental audit of Alcoa's Wagerup refinery for the period April 2002 to May 2003. The audit objectives were to provide independent technical reviews of:⁸⁰³

- methods and results used by Alcoa to establish a baseline odour emission level representative of a 2.2 million tonne annual production;
- methods and results used by Alcoa to demonstrate that odour emissions at a production of 2.35 million tonnes per annum were at or below the baseline;
- all six monthly and annual monitoring reports submitted by Alcoa for the 2002/2003 licence;
- Alcoa's ambient air monitoring program;
- methods used and results for metals testing of LBF emissions; and
- Alcoa's emissions inventory.

6.154 As auditor, AWN undertook consultations with the community during the audit period.

6.155 The auditor made the following general observations regarding emissions monitoring and the use of long term average emissions data:⁸⁰⁴

- there is inevitably significant emissions variability in industrial processes, which needs to be taken into account when designing emissions monitoring programs. Sufficient samples must be collected to adequately characterise the source and provide an estimate of maximum emissions rates under 'worst case' conditions; and

⁸⁰³ AWN, *Environmental Audit Alcoa World Alumina Australia Wagerup Refinery, April 2002 - May 2003*, AWN Pty Ltd, Ferntree Gully Victoria, May 19 2003. Report prepared for Department of Environmental Water and Catchment Protection (now DoE), Perth Western Australia, p1.1.

⁸⁰⁴ Ibid, p6.22.

- concurrent velocity and atmospheric contaminant monitoring must also be performed to ensure that the average flow rate measured corresponds to the atmospheric contaminant concentration determined at the time.

6.156 The auditor also questioned the use of average emissions data:⁸⁰⁵

Maximum community impacts typically relate to short term duration events, not to long term average emissions.

6.157 In considering the data used to evaluate a baseline of emissions at a production level of 2.2 million tonnes per annum compared to the then level of production of 2.31 million tonnes, the auditor stated:⁸⁰⁶

It is considered that the odour emissions monitoring programme and subsequent assessment conducted by Alcoa do not adequately demonstrate that site odour emissions have either decreased or remained the same following an increase in site production from 2.2 mtpa to 2.31 mtpa, however, they do demonstrate reductions for specific sources, namely the digester blow-off stacks and the vacuum pumps, liquor burner and calciners.

6.158 The auditor continued:⁸⁰⁷

The task faced by Alcoa in conducting a retrospective assessment is acknowledged, as is the extent of the project work conducted to reduce refinery odour emissions to air.

However, from an audit perspective, sufficient quality data is not available to demonstrate a reasonable and accurate assessment.

6.159 The Committee notes that the local community had expressed concern to the DEP about to Alcoa increasing its annual production in 2001 from 2.2 to 2.31 million tonnes and the likely increase in emissions that this could cause (refer to paragraphs 6.15, 6.49 and 6.50 of this report). The DEP wrote to the auditor in May 2003 seeking clarification regarding whether or not there had been an increase in emissions with the 2001 increase in annual production at Alcoa's Wagerup refinery.

6.160 The auditor responded to the DEP in a letter dated May 23 2003 where it was stated that on the basis of the available data:⁸⁰⁸

⁸⁰⁵ Ibid.

⁸⁰⁶ Ibid, p6.26.

⁸⁰⁷ Ibid.

a reduction in odour emissions at the production level of 2.31 mtpa, as compared to 2.2 mtpa, is verified, for the sources listed in Table 4 of the audit report. This comment specifically does not apply to fugitive odour emission sources noted in the audit report, the residue disposal area, Area 26 sand removal building and lower dam, for which no odour emissions data is available.

Audit outcomes

6.161 The auditor documented the audit outcomes as either major or minor. A summary of some of the major outcomes is provided below.

Odour emissions monitoring

6.162 In relation to odour emissions monitoring the auditor:⁸⁰⁹

- concluded that there was considerable doubt over the results of odour emissions testing;
- was critical of flow rate testing and the use of mass balance calculations instead of concurrent exhaust gas velocity/flow rate measurements; and
- stated that future emissions monitoring should include the determination of fugitive emissions from the Area 26 sand removal building, residue disposal area and the lower dam.

Bi-monthly emissions monitoring

6.163 In relation to bi-monthly emissions monitoring the auditor:⁸¹⁰

- was critical of how some of the samples were collected by Alcoa's environmental consultants (particularly samples of ketones) and the analytical techniques used by one of the consultants;

⁸⁰⁸ Letter from Mr Frank Fleeer, AWN, to DEP, May 23 2003, p3; attached to a letter to the Committee from the Acting Director, Environmental Regulation Division, DEP, May 2 2003. The Committee notes that 2.31 million tonnes was the annual production level of Alcoa's refinery at Wagerup refinery that was available to be used by the auditor (to compare to the baseline annual production of 2.2 million tonnes) in his assessment of emission reductions. Since the auditor's assessment of the available information was made, Alcoa completed additional significant emission reduction work in June 2002. The production limit set on Alcoa's Wagerup refinery licence in 2002/2003 and 2003/2004 is 2.35 million tonnes. Refer also to the letter from Mr Fleeer, AWN, to the DEP, May 23 2003, attached to correspondence from the Acting Director, Environmental Regulation Division, DEP, May 2 2003.

⁸⁰⁹ AWN, *Environmental Audit Alcoa World Alumina Australia Wagerup Refinery, April 2002 - May 2003*, AWN Pty Ltd, Ferntree Gully Victoria, May 19 2003. Report prepared for Department of Environmental Water and Catchment Protection (now DoE), Perth Western Australia, pp13.1-13.2.

⁸¹⁰ Ibid, pp13.2-13.3.

- recommended that the DEP require both atmospheric contaminant concentration and mass rate for process source emissions monitoring programs to be licence conditions; and
- stated that Alcoa should not determine atmospheric contaminant mass rates of emissions based on flow rate mass balance calculations. Actual measured rates of emissions should be used where possible.

Alcoa's Wagerup Refinery Air Emissions Inventory

6.164 As previously noted, Alcoa's licence for the period 2001/2002 required it to complete a comprehensive survey of emissions from all significant sources at the refinery in order to characterise all of the emissions and provide an additional data set on the levels of those emissions.

6.165 In relation to the air emissions inventory, the auditor noted that:⁸¹¹

- where identical emissions test methods were used, his comments regarding the bi-monthly monitoring would equally apply to the emissions inventory;
- there should be further sampling of the powerhouse boiler emissions to verify the destruction of the non-condensable emissions from other parts of the refinery that were now put through the powerhouse boilers;⁸¹²
- additional sampling should be undertaken to estimate the level of atmospheric contaminants emitted from the cooling lake and residue disposal areas;
- the LBF fine dust (PM₁₀ and PM_{2.5}) emissions were not measured as required under the emissions inventory scope; and
- he supported, in general terms, Alcoa's proposal to limit the number of atmospheric contaminants monitored in future emissions monitoring programs.

Contractor/consultant selection

6.166 In relation to contractor/consultant selection, the auditor:⁸¹³

⁸¹¹ Ibid, pp13.3-13.4.

⁸¹² The DoE advised that destruction of the non-condensable gases has been effective; letter from the Acting Director, Environmental Management Division, DoE, February 25 2004, Attachment - *Wagerup Refinery Emissions Reduction Program. Project Evaluation Report Reduction of Odorous Non-condensable Emissions from the Digestion Area by Thermal Oxidation in the Powerhouse Boilers*. Second Edition, July 2003. Alcoa Technical Department, Alcoa World Alumina Australia, 2003.

- noted that Alcoa's contract and service agreements for emissions sampling, analysis and reporting provided insufficient guidance on matters such as test methods and quality control requirements. He recommended that Alcoa should establish a formal tender evaluation procedure for the selection of emissions sampling and analytical contractors and insist that they be NATA accredited. The auditor also recommended that Alcoa should conduct routine audits of these contractors as allowed for under their service agreement; and
- recommended that the DEP specify NATA accreditation as a licence condition for all emissions monitoring. The auditor noted that if this requirement had been in place, test/sampling method non-conformance noted during the audit would have been significantly reduced.

Opportunities for improvement

6.167 The auditor documented a number of areas that could be significantly improved. These included aspects of odour emissions monitoring, bi-monthly emissions monitoring, emission inventory and ambient air quality monitoring.⁸¹⁴

RESPONSE FROM THE DEPARTMENT OF ENVIRONMENTAL PROTECTION TO THE ENVIRONMENTAL AUDIT OF THE WAGERUP REFINERY

6.168 The DEP Acting Director of the Environmental Regulation Division stated in a media statement dated May 23 2003 that the DEP had adopted the following seven point plan in response to the auditor's report on Alcoa's Wagerup refinery:⁸¹⁵

- Alcoa was required to respond to all findings and recommendations in the auditor's report;
- Alcoa (or their contractors) would be required to correct any outstanding audit findings within a fixed timeframe;
- the auditor's contract to audit Alcoa would be extended, and where relevant it would include the actions the DEP had taken to address the audit recommendations;

⁸¹³ AWN, *Environmental Audit Alcoa World Alumina Australia Wagerup Refinery, April 2002 - May 2003*, AWN Pty Ltd, Ferntree Gully Victoria, May 19 2003. Report prepared for Department of Environmental Water and Catchment Protection (now DoE), Perth Western Australia, pp13.4-13.5.

⁸¹⁴ Ibid, pp13.9-13.12.

⁸¹⁵ Letter from Mr R Atkins, Acting Director, Environmental Regulation Division, DEP, received May 28 2003; Attachment - Media Statement, *Alcoa Wagerup emissions audit report released*, May 23 2003.

- the DEP would require, as a condition of Alcoa's 2003/2004 Wagerup licence that all emissions monitoring and analysis be undertaken by NATA accredited consultants;
- the auditor's contract would also be extended to identify additional opportunities for further emissions reductions at the Wagerup refinery;
- the DEP expressed its belief that the Environmental Improvement Plan process recommended by the Welker Review⁸¹⁶ of the DEP's licensing system should be adopted as a means of achieving appropriate community engagement. This was being developed through the Stakeholder Reference Group, set up by the DEP to provide for community and industry input into regulatory reform; and
- the DEP would provide further responses to the auditor's report and was committed to addressing any issues related to improving its own regulatory operations.

6.169 The Committee notes that the October 2004 DoE Material includes comment on the Alcoa's response to the auditor's report. The DoE advised the Committee that:⁸¹⁷

As a requirement of a previous licence condition, DoE required Alcoa to have an independent auditor examine all monitoring data and reporting, audit odour emissions at different levels of annual production and audit the six monthly and Annual Reports for a particular year.

The independent auditor's report was released and Alcoa were required to develop a program to address all of the audit findings. This program was developed as required and Alcoa has progressively closed out almost all the items raised by the auditor.

6.170 The October 2004 DoE Material included a copy of the status report (as at June 25 2004) which the DoE said details how and when each item has been addressed. The DoE noted:⁸¹⁸

There were only a few items outstanding at that time and since then, the only remaining two matters have been included as specific licence requirements with fixed times for completion in the August 2004

⁸¹⁶ Welker Environmental Consultancy, *Western Australian Licence Conditions Independent Strategic Report - Final Report*, February 2003. Prepared for the DEP.

⁸¹⁷ Submission from the DoE, p12, attached to letter from the Minister for the Environment, October 5 2004.

⁸¹⁸ Submission from the DoE, p12, attached to letter from the Minister for the Environment, October 5 2004.

licence. The only remaining issues are monitoring emissions from the RDA's and the cooling lake. ... Now that these matters have been essentially completed, DoE is contracting the same independent auditor to examine the adequacy of Alcoa's actions to address the original audit findings. This contract is currently being arranged.

6.171 In addition the DOE noted:⁸¹⁹

One of the issues which came from the independent auditor's work was to undertake further examination of the potential for acid gas emissions from calcination and liquor burning. Some concerns regarding this issue had also been raised by the community.

As part of its broader program to address audit findings, Alcoa has undertaken this work ... Essentially it confirms the screening tool utilised by Alcoa and that acid gases are at negligible levels from calcination and liquor burning stacks.

DUST

6.172 The Committee notes that dust emissions from Alcoa's refinery at Wagerup have been a source of health concerns for workers at the refinery, members of the local community and researchers.⁸²⁰ The Committee notes the following regarding dust from the Wagerup refinery:⁸²¹

- fine particles (less than two microns) can be carriers for other chemicals/pollutants; for example, alkaline materials aldehydes and VOCs, that could cause health problems;
- alkaline mists and particles are known to cause impacts within the refinery, the main symptoms being eye and throat irritation;
- the very fine particles tend to behave more like gases when they are transported in a plume; and
- very fine particles are difficult to sample.

6.173 The Committee notes that a review commissioned by Alcoa and conducted by CSIRO Atmospheric Research into Wagerup air quality noted that dust samples on filters collected by members of the Yarloop community between late 2002 and early 2003

⁸¹⁹ Submission from the DoE, p12, attached to letter from the Minister for the Environment, October 5 2004.

⁸²⁰ Dr P Dingle, the Committee's consultant.

⁸²¹ Ibid, and Submission No. 2 from Alcoa, November 21 2001, *Report to Alcoa on Issues Related to Wagerup Refinery Emissions*, by B Carbon, October 2001, p2.

found that dust levels varied between 38 and 115 micrograms per cubic metre, with an average of 61 micrograms per cubic metre.⁸²² The review noted that this is a somewhat elevated level compared to typical ambient air concentrations. It also noted that these concentrations are also elevated compared with the record of 'background' concentrations observed at the RDA.⁸²³

- 6.174 The Committee notes that aluminium oxide is a known adjuvant, which amplifies the effect of chemicals in the body.⁸²⁴
- 6.175 The Committee notes the auditor's comments that the LBF fine dust (PM₁₀ and PM_{2.5}) emissions were not measured as required under the emissions inventory scope.⁸²⁵
- 6.176 Alcoa's Triennial Review provided information on dust emissions from the residue disposal areas, the calciners, LBF and the oxalate kiln. All dust emission levels were reported by Alcoa to be below the licence limits for the period of the review,⁸²⁶ except on two occasions (see paragraph 6.145 for further details). The Triennial Review also contained information regarding the number of complaints received from the community regarding dust.⁸²⁷
- 6.177 The Committee notes that aluminium powder can affect people when it is breathed in, and that contact can irritate the skin and eyes.⁸²⁸ Exposure to aluminium can cause 'metal fume fever', a flu-like illness with symptoms of metallic taste in the mouth, headache, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last for a day or two.⁸²⁹
- 6.178 The Committee notes the similarity of these symptoms with many of the symptoms reported by the workers at Alcoa's Wagerup refinery and people living in communities in the vicinity of the refinery.

⁸²² CSIRO Atmospheric Research; *Wagerup Air Quality Review*, Report C/0936, May 2004, p8.

⁸²³ Ibid.

⁸²⁴ Refer to the glossary for a definition of 'adjuvant'.

⁸²⁵ AWN, *Environmental Audit Alcoa World Alumina Australia Wagerup Refinery, April 2002 - May 2003*, AWN Pty Ltd, Ferntree Gully Victoria, May 19 2003. Report prepared for Department of Environmental Water and Catchment Protection (now DoE), Perth Western Australia, pp13.3-13.4.

⁸²⁶ *Wagerup Refinery and Bauxite Residue Operations Triennial Environmental Review 2000-2002*, pp18-21.

⁸²⁷ Ibid, pp75-76.

⁸²⁸ New Jersey Department of Health and Senior Services, *Hazardous Substance Fact Sheet*, Aluminium (Dust and Fume) accessed at <http://www.state.nj.us/health/eoh/rtkweb/0054.pdf> (accessed June 1 2004).

⁸²⁹ Ibid.

- 6.179 The auditor's report shows that the RDAs were not sampled for particulates for the purposes of the Wagerup air emissions inventory.⁸³⁰ It has been previously noted that the auditor commented that additional sampling should be undertaken to estimate the level of atmospheric contaminants emitted from the RDAs.⁸³¹
- 6.180 Licences issued to Alcoa by the DEP specify that the 'background corrected' 24 hour average total suspended particulate levels measured at each of the RDAs must be below 200 micrograms per cubic metre for 95 percent of the time and never exceed 260 micrograms per cubic metre.⁸³²
- 6.181 The CSIRO review on Wagerup air quality prepared for Alcoa noted that analysis of the background corrected 24 hour total suspended particulate data for the 2000 to 2002 period indicates that concentrations were greater than 200 micrograms per cubic metre on eight separate days over all RDA sites. On five of these days, the background corrected 24 hour values were greater than 260 micrograms per cubic metre.⁸³³
- 6.182 The CSIRO review also noted that data provided by Alcoa of hourly-averaged total suspended particulate concentration measured at two monitoring sites between March 2002 and March 2003 showed that some extremely high total suspended particulate levels were found on rare occasions. Hourly-averaged total suspended particulate values exceeded 500 micrograms per cubic metre approximately 0.03 percent and 0.07 percent of the time at the two monitoring sites.⁸³⁴ Hourly-averaged values of background corrected total suspended particulates were in excess of 100 micrograms per cubic metre for 1.8 percent and 2.4 percent of the total number of values measured at the two monitoring sites.⁸³⁵
- 6.183 The CSIRO review noted that total suspended particulate loadings above 100 micrograms per cubic metre are generally considered high for urban atmospheres, with total suspended particulate levels exceeding 200 micrograms per cubic metre corresponding to bad pollution events.⁸³⁶

⁸³⁰ AWN, *Environmental Audit Alcoa World Alumina Australia Wagerup Refinery, April 2002 - May 2003*, AWN Pty Ltd, Ferntree Gully Victoria, May 19 2003. Report prepared for Department of Environmental Water and Catchment Protection (now DoE), Perth Western Australia, p13.3 and p10.3 Table 11.

⁸³¹ Ibid.

⁸³² CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, May 2004, p66.

⁸³³ Ibid.

⁸³⁴ Ibid.

⁸³⁵ Ibid, p67.

⁸³⁶ Ibid.

- 6.184 It was noted in the CSIRO review that the extent to which these elevated total suspended particulate levels at the boundary of the RDA will spread depends on wind transport, the dispersion and the deposition of the particles.⁸³⁷
- 6.185 The CSIRO review recommended, among other things, that given the potential for alkaline dust emission from the refinery, including the RDA, to be transported to the surrounding district, including the Yarloop township, further studies of aerosol including fine particle concentrations, dust deposition and rainfall, and the chemical composition of these components be undertaken, in a more comprehensive fashion.⁸³⁸
- 6.186 The WCHAG Working Group Interim Report of August 2001 provided the following information regarding dust (particulate) sampling around Alcoa's refinery at Wagerup that was undertaken between July and August 1999:⁸³⁹
- Alcoa's refinery at Wagerup is the most likely source of the synthetic alumina that is reaching sites both close to and remote from the refinery;
 - lesser amounts and finer particles are deposited at the more remote sites;
 - the pure alumina and other minerals found in the dust were not considered to be the cause of the range of health complaints reported, however the analysis did not characterise the nature of the surface of the minerals and whether any impurities could be present; and
 - personal dust monitors (activated by community members at their own residences) did not demonstrate high levels of total or respirable dust, which could pose a health risk. However, no sampling took place during a major event, therefore further sampling needed to be undertaken during these times.
- 6.187 The WCHAG Working Group Interim Report of August 2001 also provided the following information regarding dust (particulate) emissions from the calciner stacks at Alcoa's refinery at Wagerup:⁸⁴⁰
- the dust being emitted was highly alkaline and very fine and would constitute an irritant to humans if exposure occurred; and

⁸³⁷ Ibid.

⁸³⁸ Ibid.

⁸³⁹ *Interim Report of the Alcoa Wagerup Community Health Awareness Group Working Group*, August 2001, pp 7-8.

⁸⁴⁰ Ibid, p10.

- only small samples, insufficient for meaningful chemical analysis, could be collected from the calciner stacks due to the very low level of dust in the emissions.
- 6.188 In its appeal against Alcoa's Wagerup licence issued on October 1 2003, the YDCRC raised the following issues concerning dust emissions from the RDAs:⁸⁴¹
- Alcoa had been given approval to subtract background dust (total suspended particulate) levels from levels recorded at the refinery;
 - the community was not consulted regarding that subtraction of background dust levels;
 - the community believed that Alcoa's mining operations to the east of the refinery contributed significantly to background dust levels;
 - the community was concerned about the effect of the total dust level to which it was exposed and that this should not exceed the WHO ambient air total suspended particulate of 0.15-0.23 mg/m³; and
 - the approval for Alcoa to subtract background dust levels from levels it records at the refinery be removed.
- 6.189 In an email to the Chairman dated February 11 2004 Mr Tony Hall, Chairperson of the YDCRC, raised the concerns of some members of the local community regarding dust emissions from Alcoa's refinery at Wagerup.⁸⁴² The concerns included:⁸⁴³
- anomalies in the results of dust, water and gutter sludge samples taken at residences around the Wagerup refinery and the fact that there had not been any follow up studies to clarify the anomalies;
 - levels of analytical detection of some substances that were above the guideline values for drinking water;
 - high levels of alumina, lead and other substances in some samples collected by residents and independently analysed;

⁸⁴¹ Letter from Mr David Puzey, Alcoa employee (until October 22 2003), October 24 2003; YDCRC, *Appeal to Alcoa Wagerup License 6217/7*, undated, tabled at a Committee meeting on October 27 2003, p4.

⁸⁴² Email from Mr Tony Hall, Chairperson, YDCRC, February 11 2004.

⁸⁴³ Ibid.

- high levels of dust containing contaminants entering homes around the refinery and the effect this could have on people's health, especially young children;
- serious problems experienced by some residents with high concentrations of dust blowing off the RDAs;
- Alcoa's use of a 24 hour averaging for dust concentrations from the RDAs, when major dust events usually last only a few hours;
- lack of dust monitoring during summer months when most dust events occur; and
- the potential for the dust problem at Wagerup to increase significantly if the refinery's RDAs are expanded due to an increase in annual alumina production.

6.190 The Committee notes that a lot of the dust found at residences around Wagerup contains alumina (aluminium oxide), which is a known adjuvant; that is, a chemical that can make a person more sensitive to other pollutants and environmental contaminants generally. See paragraphs 2.65 to 2.67 and following of this report for further information.

6.191 As part of its research into dust emissions from Alcoa's refinery at Wagerup the Committee requested specific information from the DoE. The DoE advised in April 2004 that:⁸⁴⁴

- complaints received by the DoE in 2001 about dust amounted to one percent of all complaints compared with 74 percent for complaints about air quality and odour. In 2002 dust complaints accounted for three percent, air quality and odour complaints were 67 percent and complaints regarding noise accounted for 29 percent of all complaints;
- emissions levels for dust from the calciners, the most significant particulate refinery source, are low and have a licence limit of 80mg/m³ which is one of the lowest licence levels for industry in Western Australia;
- long term continuous ambient monitoring in the community for dust when winds are from the direction of the refinery have not shown elevated levels. The same data has not shown a correlation between dust levels and complaints about air quality; and

⁸⁴⁴ Letter from the Minister for the Environment, April 21 2004.

- an independent study into ultrafine particles has not shown dust to be an issue or correlated with air quality complaints.
- 6.192 The Committee is unclear about the reasons for the distinction between complaints about dust and air quality made by the DoE in its advice to the Committee referred to above.
- 6.193 The DoE informed the Committee that based on the above facts, it considered that *“dust emissions from the refinery at current levels do not constitute an area of significant concern and are unlikely to be a major cause of community complaints about air quality associated with emissions from the refinery.”*⁸⁴⁵
- 6.194 However the DoE also advised that ongoing surveillance dust monitoring (emission and ambient) should be continued to *“ensure that current performance in this area is maintained and if possible improved. This monitoring is already required under the DoE licence, was recently upgraded and will be the subject of further evaluation and improvement via the tripartite consultation process.”*⁸⁴⁶
- 6.195 The CSIRO review on Wagerup air quality prepared for Alcoa noted that between late 2002 and early 2003, members of the Yarloop community collected a series of 12 to 48-hour duration dust samples on filters for analysis. The filters were analysed by a commercial laboratory for dust mass and a number of heavy metals. Dust levels varied between 38 micrograms per cubic metre and 115 micrograms per cubic metre, with an average of 61 micrograms per cubic metre. The review noted that this is a somewhat elevated level compared to typical ambient air concentrations.⁸⁴⁷
- 6.196 The Committee notes that the DEP is currently prosecuting Alcoa for allegedly causing pollution and breaching a licence condition in relation to dust. Refer to paragraph 9.27 for further information.
- 6.197 In its letter to the Committee in April 2004 the DoE noted this alleged incident and advised that *“Improvements have been made in this area as a result of that event to minimise a recurrence.”*⁸⁴⁸
- 6.198 The Committee notes the DoE’s advice that Alcoa’s 2003/2004 licence required a series of trials to be undertaken over that summer period to determine the most effective dust suppression agent for future use on roads and embankments at the RDAs. These trials were undertaken in close consultation with community representatives.

⁸⁴⁵ Letter from the Minister for the Environment, April 21 2004, p5.

⁸⁴⁶ Ibid.

⁸⁴⁷ CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, May 2004, p87.

⁸⁴⁸ Letter from the Minister for the Environment, April 21 2004, p5.

- 6.199 The Committee notes the advice from the DoE that investigations into dust as carriers of other materials has focused on calciner dust which is the prime (only significant) source of dust from the refinery. The DoE advised that attempts were made to capture dust for analysis from the calciner stack, however the dust emissions from the calciners was so low that even an eight hour sample was not enough to conduct meaningful chemical analysis with low limits of detection.⁸⁴⁹
- 6.200 The DoE advised that the only other alternative was to use calciner dust captured in the electrostatic precipitators. The DoE advised that chemically, this dust would be similar to that emitted but of a much larger size fraction. This dust was analysed for alkalinity using a standard soak test and was found to be between 9.8 and 10pH. The DoE advised that it was known that actual emissions of this type of dust is very low.⁸⁵⁰
- 6.201 The Committee has made a recommendation in relation to dust suppression at the Alcoa refinery at Wagerup (Refer to Recommendation 17).
- 6.202 The October 2004 DoE Material makes reference to the issue of fine particulate measurement and concentrations and dust suppression: refer to Appendix 16 of this report. The Committee observes the comments of the DoH which considered a December 2003 *Wagerup Ambient Air Quality Monitoring Report* by Alcoa that:⁸⁵¹

The report indicated that the Kwinana Environmental Protection Policy Standard for Total Suspended Particulates (90ug/m3 as a 24h average) was exceeded on five occasions between November 2002 and March 2003. This indicates that there may be a general dust problem in the area, although this may not be entirely related to the refinery.

From the air monitoring results presented [by Alcoa], DoH is satisfied that the indicated levels of NOx, ozone and particulates are unlikely to present a public health risk. However the frequent occurrence of elevated levels of Total Suspended Particles may require further investigation to identify the source and to exclude the possibility of the large particle fraction presenting such an exposure risk.

- 6.203 The DoE advised the Committee that:⁸⁵²

⁸⁴⁹ Ibid, p3.

⁸⁵⁰ Ibid.

⁸⁵¹ Letter from the Mr Jim Dodds, Director, Environmental Health, DoH to Mr Robert Atkins, Acting Director, Environmental Management Division, Alcoa dated June 11 2004. The letter refers to a report by Alcoa, *Wagerup Ambient Air Quality Monitoring Report*, December 2003, First edition.

⁸⁵² Submission from the DoE, p2, attached to letter from the Minister for the Environment, October 5 2004.

*This [that is, the elevated levels of Total Suspended Particulates] is being addressed by Alcoa continuing to measure [Total Suspended Particulates] levels at this site. In addition, the DoE required as licence conditions, two new dust monitoring stations (one north and one south of the [residue disposal areas] to be established, which will provide further ongoing information, including two summer seasons of PM¹⁰ continuous monitoring at the same sites. The results of this study will be incorporated into a review of [residue disposal area] monitoring and performance via the Tripartite Group and may result in further licence improvements.*⁸⁵³

- 6.204 With reference to paragraph 6.198, the October 2004 DoE Material also makes reference to trials of effective dust suppression agents on roads and embankments at the residue disposal areas: refer to Appendix 16 of this report. The Committee observes the comments of the DoE that the trials were:⁸⁵⁴

required as a condition of licence following concerns raised by a community member about the use of emulsified oil on roads within the [residue disposal areas]. The trials have been completed and the assessment panel included community representatives. The report was provided to the Wagerup Community Consultative Network (CCN) and as a result of comments made, it was amended to take those comments into account. The CCN endorsed the amended report.

AIR POLLUTION METEOROLOGY

- 6.205 The Committee notes that members of the Yarloop community and Wagerup refinery workforce who experienced health or odour problems that they believed were associated with the Wagerup refinery (particularly the LBF) were the first to suggest that the greatest impact of emissions from the refinery were linked to particular weather conditions.⁸⁵⁵
- 6.206 A brief outline of the effect of meteorological conditions on the dispersion of air pollutants at Alcoa's Wagerup refinery is provided below. A more detailed discussion regarding the effect of meteorological conditions on the behaviour of emission plumes generally is contained in Appendix 10 of this report.

⁸⁵³ The tripartite process is referred to at paragraphs 4.302 and 5.9; also refer to the submission from the DoE, pp13-19, attached to letter from the Minister for the Environment, October 5 2004.

⁸⁵⁴ Submission from the DoE, p2, attached to letter from the Minister for the Environment, October 5 2004.

Prevailing synoptic wind conditions around Wagerup

Topography

6.207 The Darling Range escarpment is a major topographical feature in the area close to Alcoa's Wagerup refinery and could affect the refinery plume. The Darling Range escarpment may also affect the behaviour of local winds and hence the behaviour of the plume.⁸⁵⁶ Refer to paragraphs 6.241 and 6.242 of this report for more information.

Wind flow

6.208 Wind flow at Alcoa's refinery at Wagerup from November to April:⁸⁵⁷

- is generally from the east and southeast in the morning due to the relatively southerly track of the high pressure anticyclones during these months; and
- in the afternoon and evening, is generally from the southwest (and occasionally from the northwest) due to the reliable occurrence of the sea breeze.

6.209 From May to October, wind flow at Alcoa's refinery at Wagerup varies from north through west to south due the influence of low pressure systems passing across the south west of Western Australia.⁸⁵⁸

6.210 Marked inversion conditions during winter nights and early mornings trap the plume from the refinery close to the ground. Katabatic down draughts from the Darling Range escarpment may further prevent effective emissions dispersal, especially on summer evenings.

Stable air conditions and inversions

6.211 The mixing depth is the height of the atmospheric layer through which pollutants released at ground level could be expected to mix, primarily as a result of thermal turbulence. Mixing depth can often be limited by the formation of an inversion.⁸⁵⁹

⁸⁵⁵ Mr William van der Pal, Alcoa employee and safety representative, *Transcript of Evidence*, November 28 2001, p9; Mr Giglio Martelli, Vice President, Wagerup Community Health Awareness Group, *Transcript of Evidence*, November 21 2001, p4; Mr Norm Dicks, State President, AWU, *Transcript of Evidence*, November 21 2001, p4.

⁸⁵⁶ Alcoa Australia, *Wagerup Alumina Project Environmental Review and Management Programme*, May 1978, pp327-328.

⁸⁵⁷ Ibid, p326.

⁸⁵⁸ Ibid.

⁸⁵⁹ Ibid, pp326-327.

- 6.212 In the winter months at Wagerup, over-night inversions in the first 100 to 200 metres of air can form during anticyclonic periods (usually clear, cold, still nights). In addition, subsidence inversions can occur at between 600 and 1500 metres.⁸⁶⁰ Generally, the inversions lift by late morning as the ground heats up and thermals begin to rise.⁸⁶¹

Wagerup refinery plume

- 6.213 The Committee was advised that the Swan Coastal Plain is characterised by shallow winds that do not mix well with upper air.⁸⁶² Further, the north-south alignment of the Darling Range escarpment can prevent the normal mixing of air expected in other locations. The Committee was advised that this can result in poorly mixed air around the refinery that can linger for unusually long periods, referred to as ‘fumigation conditions’.⁸⁶³
- 6.214 The CSIRO review on Wagerup air quality prepared for Alcoa noted that the combination of emissions and atmospheric processes determines the location, duration and intensity of air pollution episodes. Wind generally serves to carry pollutants, whereas high-frequency variations of wind speed and direction dilute the pollutants within the air.⁸⁶⁴
- 6.215 In simple cases, pollutants can be considered to travel in straight lines following the direction of the prevailing wind. However, the pathways from the source to a receptor are often more complicated. For example, wind tends to be deflected around hills and to line up along valleys. The pattern of winds is also different at different heights above the ground.⁸⁶⁵
- 6.216 Much of the complexity in the wind fields is caused by the temperature structure of the atmosphere. Cooling of the ground at night can produce a shallow layer of cool air less than a few tens of metres deep, which is not influenced by the winds above. In the lower atmosphere during the day, heating of the ground generates thermals (updrafts) which can mix the air from many hundreds of metres aloft down to the ground and produce strong turbulence.⁸⁶⁶

⁸⁶⁰ For an explanation of subsidence inversions, refer to <http://homepage.ntlworld.com/booty.weather/FAQ/GL.htm>. (accessed March 26 2004).

⁸⁶¹ Alcoa Australia, *Wagerup Alumina Project Environmental Review and Management Programme*, May 1978, pp326-327.

⁸⁶² Submission No. 27 from Mr Barry Carbon, April 17 2002, p2.

⁸⁶³ Ibid.

⁸⁶⁴ CSIRO Atmospheric Research; *Wagerup Air Quality Review*, Report C/0936, May 2004, p25.

⁸⁶⁵ Ibid.

⁸⁶⁶ Ibid.

- 6.217 The meteorology of importance for local air quality issues, such as that which affects Wagerup and the surrounding district, occurs in the lowest 100 to 3000 metres of the atmosphere. This is known as the atmospheric boundary layer. This part of the atmosphere is most influenced by processes at the earth's surface.⁸⁶⁷
- 6.218 The atmospheric boundary layer is broadly classified into three stability categories: the neutral boundary layer, the stable boundary layer, and the unstable or convective boundary layer.⁸⁶⁸
- 6.219 The neutral boundary layer forms when winds are strong and/or when there is a negligible heating or cooling of the ground.⁸⁶⁹
- 6.220 The stable boundary layer forms during the night when the ground is substantially cooler than the air above it. The vertical diffusion is suppressed and a plume dilutes very slowly during its transport downwind. Horizontal spreading of the plume may be caused by light but variable winds to produce a fan shape when viewed from above. If the plume is near the ground, its path is strongly influenced by local topography and it can meander around hills and follow slight land depressions.⁸⁷⁰
- 6.221 The convective boundary layer occurs during the day with low to moderate wind speeds and clear to partly cloudy conditions. The ground is warmer than the surrounding air, giving rise to relatively large convective turbulent motions in the vertical direction, which are termed 'thermals' (or updrafts) and 'downdrafts'. A plume released in the convective boundary layer undergoes meandering and high diffusion as a result of large-scale convective motions.⁸⁷¹
- 6.222 Other important dispersion processes include very light wind conditions, nocturnal downslope flows and fumigation due to the break up of the nocturnal inversion.⁸⁷²
- 6.223 Fumigation is a transient process in which an elevated point-source plume travelling in a stable or neutral flow with relatively little diffusion is intercepted by the growing convective boundary layer in the morning. The plume is subsequently mixed down to the ground by the large-scale convective eddies generated within the convective boundary layer which may lead to high ground-level concentration of pollutants.⁸⁷³

⁸⁶⁷ Ibid, p26.

⁸⁶⁸ Ibid.

⁸⁶⁹ Ibid.

⁸⁷⁰ Ibid.

⁸⁷¹ Ibid.

⁸⁷² Ibid, p27.

⁸⁷³ Ibid.

- 6.224 Inversion break-up fumigation may typically last for approximately thirty minutes. When fumigation is dominant, increasing the source height dilutes the ground concentration but the plume can impact an even wider ground area and can still come down within the site under light winds.⁸⁷⁴
- 6.225 The CSIRO review concluded that “*Significant agreement is found between the time of day of complaints and the time of the day that odour events occur in an air pollution model involving the Refinery emissions. Meteorological and dispersion modelling is able to lend support to details of community reported complaints, and to characterise the meteorological processes that lead to events.*”⁸⁷⁵
- 6.226 Plume trapping, in which a plume becomes trapped in a shallow, weakly-stratified boundary layer below an intense capping inversion, may also be relevant at Wagerup.⁸⁷⁶
- 6.227 In his report to Alcoa, Mr Barry Carbon, Consultant to Alcoa, noted that for most of the year the emissions from the Wagerup refinery spread out and mixed with the air. However Mr Carbon noted that under some atmospheric conditions, emissions travel in a low narrow plume and not in a straight-line direction.⁸⁷⁷
- 6.228 In Mr Carbon’s view, this normally occurred on fine winter or early spring days, when there was a gentle breeze from the north. He noted that when the plume is first formed and leaves the refinery it is visible because of the steam, however this soon disappears making the plume invisible. Mr Carbon noted that when the plume comes to ground, it can be located by its smell or other impacts on people.⁸⁷⁸
- 6.229 Mr Carbon noted:⁸⁷⁹

The plume may stay quite intact as it travels across the landscape and can be less than 100 metres wide at northern Yarloop. Under these circumstances it appears that the impacts are more severe.

- 6.230 Mr Carbon stated that the behaviour of the plume under these sorts of atmospheric conditions make it difficult to monitor (or sample) and hence compare emission concentrations to normal air quality standards.⁸⁸⁰

⁸⁷⁴ Ibid, p118.

⁸⁷⁵ Ibid, p121.

⁸⁷⁶ Ibid, p27.

⁸⁷⁷ Submission No. 2 from Alcoa, November 21 2001, *Report to Alcoa on Issues Related to Wagerup Refinery Emissions*, by B Carbon, October 2001, p2.

⁸⁷⁸ Ibid.

⁸⁷⁹ Ibid.

Also because the plume may pass a location in a few minutes, ordinary or 'average' air quality standards may not be the best indicators of acceptability.

- 6.231 The CSIRO review on Wagerup air quality prepared for Alcoa noted that a preliminary meteorological and pollution investigation was conducted as part of CSIRO's Wagerup exploratory investigation by running the air pollution model for the winter months May to August 2002.⁸⁸¹
- 6.232 One result from the modelling indicated that the correlation between the modelled concentrations of events at any selected fixed location near Yarloop and those in the surrounding areas at the same times has a narrow footprint across the town. The correlation of events decreases to half within approximately 250 metres from a given location, indicating narrowness of the plume width when it is striking the ground.⁸⁸²
- 6.233 The Committee's consultant, Dr Peter Dingle, advised that under certain conditions, particularly light northerly winds and atmospheric inversions, the plume from the LBF stack and Alcoa's Wagerup refinery generally appeared to remain tightly formed and relatively undispersed. Very concentrated emissions could therefore be experienced in down wind population areas. Dr Dingle noted that it would also be very difficult to predict when and where the plume would hit. Dr Dingle advised that the situation at Wagerup was further complicated by the refinery's proximity to the Darling Range escarpment.⁸⁸³
- 6.234 At the Committee's hearing in November 2001 Ms Ann Whitty, Wagerup Refinery Manager, noted that the Alcoa refinery at Wagerup had close neighbours and very particular weather conditions. She explained that in winter, Wagerup experienced light to moderate north-north-easterly winds and temperature inversions, which she believed was part of what caused the community at Yarloop to be more able to hear and smell the refinery.⁸⁸⁴

Uncertainties in modelling plume behaviour

- 6.235 As part of its inquiry the Committee sought advice from the DoE in relation to whether there are uncertainties in modelling the behaviour of industrial plumes.

⁸⁸⁰ Ibid.

⁸⁸¹ CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, May 2004, p120.

⁸⁸² Ibid.

⁸⁸³ Committee's consultant, Dr P Dingle.

⁸⁸⁴ Ms Ann Whitty, Wagerup Refinery Manager, *Transcript of Evidence*, November 21 2001, p6.

6.236 The DoE advised that there are many, and varied, uncertainties. The DoE provided a non-exhaustive summary that indicates the range of modelling components/assumptions/inputs which are subject to uncertainty.⁸⁸⁵

- using mathematical approximations of average dispersion patterns to describe the complexity of pollutant dispersion in random atmospheric turbulence;
- accounting for the complexity of wind flows around topography or buildings;
- assuming meteorological measurements are representative of the region of interest;
- estimating meteorological information like vertical profiles of temperature and wind in the absence of local measurements;
- estimating emissions rates, stack volume flows and temperatures, and how to properly account for variability in these;
- estimating emissions from complex sources (for example, odour from a pond);
- accounting for all significant emissions in a complex industry; and
- representing atmospheric chemical transformations in mathematical form.

6.237 The Committee has made a recommendation in respect of emissions dispersion modelling using site specific data rather than generic meteorological data (Refer to Recommendation 15).

6.238 The October 2004 DoE Material makes reference to modelling emissions dispersion. The DoE noted that it does not currently require planning for all new industries to use site specific meteorological data to model emissions dispersion and provides reasons for why this does not occur noting that “*The use of site specific meteorological data for future planning of industrial complexes, while usually desirable, may sometimes not be necessary and may sometimes not represent the most practical and reliable solution*”.⁸⁸⁶

6.239 The DoE notes:⁸⁸⁷

To summarise, although good quality site specific meteorological data is always advantageous, and always provides additional

⁸⁸⁵ Letter from Mr D Carew-Hopkins, Acting Chief Executive, DoE, May 28 2004, p1.

⁸⁸⁶ Submission from the DoE, p6, attached to letter from the Minister for the Environment, October 5 2004.

⁸⁸⁷ Submission from the DoE, p7, attached to letter from the Minister for the Environment, October 5 2004.

confidence, there are cases where the expense, time taken and effort may not be warranted. Perhaps the best position would be a default requirement for site specific meteorological data, to be relaxed only if the proponent can demonstrate one of the exceptions described above.

6.240 The matter is further explored in the October 2004 DoE Material.⁸⁸⁸

Potential emissions dispersion problems highlighted in the Wagerup Refinery Environmental Review and Management Programme, May 1978

6.241 The Committee notes that potential problems with emissions dispersion (namely, oxides of sulphur and nitrogen, carbon monoxide, particulates and odour) were identified at the site proposed for Alcoa's Wagerup refinery in a report prepared by Alcoa in 1978 for the DEP.⁸⁸⁹

6.242 Those potential problems included that:⁸⁹⁰

- temperature inversions can inhibit pollutant dispersion, however it was noted that the inversions were likely to have lifted by mid morning so that pollution periods of 12 to 24 hours were unlikely;
- the sea breeze could be expected to reduce pollution potential, however it was noted that in some circumstances it could cause or intensify inversion conditions;
- prevailing westerly winds could transport the plume from the refinery onto the Darling Range escarpment, which could result in the effective stack height being reduced in this direction and the potential for higher ground level concentrations of pollutants; and
- standing eddies develop in the lee of the Darling Range escarpment under easterly wind conditions. Similar eddies could also form at Wagerup, though it was considered less likely. It was noted that if eddies did form, they could entrain the plume due to down-draft and recirculation in the eddy vortex. This could lead to severe short-term pollution episodes, likely to be confined to the immediate refinery area.

⁸⁸⁸ Submission from the DoE, pp6-7, attached to letter from the Minister for the Environment, October 5 2004.

⁸⁸⁹ Wagerup Alumina Project, Environmental Review and Management Programme, May 1978.

⁸⁹⁰ Ibid, pp325-328.

PROPOSED CSIRO WAGERUP AIR QUALITY RESEARCH PROGRAM

6.243 As noted in paragraph 6.111 of this report, in December 2003 the CSIRO prepared a plan in relation to a long-term program to provide a more complete understanding of Wagerup air quality.

6.244 The CSIRO objectives outlined in its draft proposal include:⁸⁹¹

- to conduct a study that is accepted and trusted by the regional community and other partners, with results interpreted in a meaningful way, and communicated openly in formats easily understood by all;
- to conduct a study that includes adaptive management that responds to ongoing outcomes;
- to collect physical and chemical air quality data to quantify air pollutants that may cause odour, amenity and/or health effects in the region. All air quality issues will be comprehensively addressed to the extent of current scientific knowledge and techniques;
- to undertake the design of an emissions study that will be conducted in co-ordination with the ongoing emissions monitoring program, as developed following the independent environmental audit of the Wagerup refinery. This is to ensure that the emissions data obtained during the period of the study is accepted and trusted by the regional community;
- to collect community generated historical information and ongoing data that can influence and inform the physical data collection and the overall direction of the study;
- to develop a program of soil, water, plant and animal monitoring in the vicinity of the air quality sampling stations and in other locations as may be identified by the community during the social data collection. This will be used to examine any wider environmental impacts of the air pollutants; and
- involving a toxicologist and other relevant health professionals to ensure that findings of the air quality program provide information in a form that is scientifically appropriate for parallel health studies.

6.245 In May 2004, the CSIRO released a preliminary report titled “Wagerup Air Quality Review”.⁸⁹² The aim of the preliminary review was to:⁸⁹³

⁸⁹¹ *The Wagerup Air Quality Study, Objectives*. CSIRO Atmospheric Research Land and Water, August 2003. Tabled by the Chairman on March 18 2004.

- review the current air quality information and related knowledge concerning Wagerup and the surrounding region; and
 - make recommendations concerning further air quality studies in the Wagerup region.
- 6.246 The Committee notes that Alcoa's Wagerup refinery is still emitting large quantities of chemicals. The CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, notes those that are toxic, for example, in 2003, an average of 52.5 kilograms of formaldehyde and 4.7 kilograms of benzene were being emitted per day.⁸⁹⁴ In fact average daily benzene emissions had increased to more than double the rate in the first half of 2002.⁸⁹⁵
- 6.247 The CSIRO made a number of recommendations in relation to air quality at Wagerup. The Committee notes in particular the following recommendations:⁸⁹⁶
- A surface meteorological site on the Darling Range escarpment during field studies would provide useful information during light drainage flows, which would help in understanding some of the meteorology on occasions of evening complaints.
 - A key issue for Wagerup air quality studies is to measure the key pollutants with a response time of a few minutes to determine what pollutants, at what concentrations are contained in the air associated with short-term high concentration air quality events, and what are the sources of these events and what processes control when they occur in the surrounding district.
 - An investigation of the key meteorological factors and dispersion processes that govern the frequency and intensity of pollution events in the areas surrounding Wagerup is needed.
 - To gain a better insight into, and better prediction accuracy of, air quality events in the Wagerup area, development and use of a model for estimating the short-term peaks in the air quality measurements is recommended.

⁸⁹² CSIRO Atmospheric Research; *Wagerup Air Quality Review*, Report C/0936, May 2004.

⁸⁹³ Ibid, p5.

⁸⁹⁴ CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, May 2004, Table 2.7, p54. Refer to Appendix 13 of this report in relation to the figures.

⁸⁹⁵ Ibid.

⁸⁹⁶ Ibid, p127.

COMMITTEE FINDINGS

- 6.248 The Committee notes the significant volume of evidence it has received that suggests that the plume from the Wagerup refinery is prevented from dispersing effectively during certain weather conditions. There appears to be a strong link between short-term acute pollution events and the restriction of localised air movements. This situation is exacerbated due to the refinery's location close to the steep topography of the Darling Range escarpment.
- 6.249 The Committee notes that the frequency of pollution complaints on winter mornings has been characterised by the CSIRO as inversion break-up fumigation.
- 6.250 The Committee notes the evidence it received from some workers at Alcoa's refinery at Wagerup and members of the local community that it was short duration emission events that had the greatest impact.
- 6.251 The Committee notes the concerns expressed by the independent auditor in his report on the Alcoa refinery at Wagerup in relation to the accuracy of average emissions data (refer to paragraphs 6.155 and 6.156). In particular, the Committee notes the auditor's observations that there is significant variability in emissions from industrial processes and that maximum community impacts typically relate to short term duration events rather than long term average events.
- 6.252 The Committee is concerned that current industrial emissions monitoring procedures and requirements may not capture short term acute pollution events, which have the greatest impact on workers and the local community. Short term acute pollution events (often no more than a few hours duration) are averaged over time periods of various length; for example 24 hours. In the instance where an acute pollution event of a few hours duration significantly exceeds the emission limit guidelines, but it is then averaged with much lower emissions levels, over a period of 24 hours no exceedance of the emissions guidelines may result. From the evidence received, the Committee is of the view that it is these short term acute emission events that are responsible for the impacts people can experience and should form part of the emissions limits/guidelines.
- 6.253 The Committee considers that the DEP should assess licensed industrial premises in Western Australia to determine the appropriateness, in each case, of requiring continuous emissions monitoring as a licence condition to ensure that the significant variability in emissions concentrations from industrial processes are measured. The Committee has made a recommendation to this effect – refer to Recommendation 16 of this report. The Committee notes that the October 2004 DoE Material contains

- information from the DoE on continuous emissions monitoring of licensed and regulated industrial premises: refer to Appendix 16 of this report.⁸⁹⁷
- 6.254 The Committee notes the auditor's comments that Alcoa's emissions monitoring program did not provide sufficient quality data to enable a reasonable and accurate assessment of its emissions reduction program.
- 6.255 The Committee notes that Alcoa has spent approximately \$36.5 million on emissions reductions programs since 1996 to reduce the level of emissions from Alcoa's refinery at Wagerup.
- 6.256 The Committee notes that emissions have been significantly reduced at Alcoa's Wagerup refinery.
- 6.257 The Committee finds that Alcoa's Wagerup refinery is still emitting large quantities of chemicals. The CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, notes those that are toxic, for example, in 2003, an average of 52.5 kilograms of formaldehyde and 4.7 kilograms of benzene were being emitted per day.⁸⁹⁸ In fact average daily benzene emissions had increased to more than double the rate in the first half of 2002.⁸⁹⁹
- 6.258 The Committee endorses the application of best practice standards in relation to emissions reduction, rather than relying only on production or emissions limits in reducing community impacts.
- 6.259 However the Committee notes the comments in the CSIRO air quality review that the available continuous air quality data indicates that occasional sharp pronounced peaks in ambient concentrations, between ten to 100 times more concentrated than typical ambient concentrations, occur at the monitoring sites.⁹⁰⁰
- 6.260 The Committee finds that on occasion dust emission levels from Alcoa's refinery at Wagerup correspond to bad pollution events. Furthermore, this dust may exacerbate the health impacts caused by the chemicals in the air emissions.
- 6.261 The Committee notes that the DoE has made it a condition of the 2003/2004 licence for Alcoa's Wagerup refinery that monitoring required under the licence be undertaken by NATA accredited consultants. The Committee considers that this condition will enhance the accuracy of sampling and analysis of emissions at Alcoa's

⁸⁹⁷ Submission from the DoE, p2-4, attached to letter from the Minister for the Environment, October 5 2004.

⁸⁹⁸ CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, May 2004, Table 2.7, p54. Refer to Appendix 13 of this report in relation to the figures for formaldehyde.

⁸⁹⁹ Ibid.

⁹⁰⁰ Ibid, p9.

Wagerup refinery. The Committee notes that this condition has been repeated in the 2004/2005 licence.⁹⁰¹

- 6.262 The Committee notes that Alcoa's atmospheric dispersion modelling that was undertaken prior to 1996 in relation to Alcoa's refinery at Wagerup used generic meteorological data rather than site-specific data to model emissions dispersions and plume behaviour. Site specific data enables more accurate modelling to be undertaken. The Committee has made a recommendation on this issue (Refer to Recommendation 15). The October 2004 DoE Material makes reference to modelling emissions dispersion.⁹⁰²
- 6.263 The Committee reiterates the finding made by the CSIRO that an investigation of the key meteorological factors and dispersion processes governing the frequency and intensity of pollution events in the areas surrounding Wagerup, is needed.⁹⁰³
- 6.264 The Committee notes that despite several groundwater pollution plumes below the refinery site, according to the DEP and the Water and Rivers Commission there is currently no problem with seepage of contaminated groundwater leaving Alcoa's refinery at Wagerup. The Committee notes that the 2003 amendments to the *Environmental Protection Act 1984* have clarified the DEP's (now DoE) ability to deal with on-site pollution. The Committee is concerned that any contamination of groundwater should be remediated as soon as possible in preference to waiting until the contamination leaves the site.
- 6.265 The Committee notes that a project allowing Alcoa to extract excess winter run-off from the Harvey River has been approved by the Water and Rivers Commission. The project allows Alcoa to pump up to 4400 mega litres (4.4 giga litres) from the Harvey River between May and October, when nutrient levels are estimated to be high. The Committee notes that Alcoa has expressed its view that taking this nutrient rich water out of the Harvey River will have significant environmental benefits for the lower Harvey River and to a lesser extent the Harvey Estuary.
- 6.266 The Committee is concerned that this water extraction may represent a significant reduction in the water flow available to the lower Harvey River and Estuary.

⁹⁰¹ Attachment M and pp19-20 to the submission from the DoE, attached to letter from the Minister for the Environment, October 5 2004.

⁹⁰² Submission from the DoE, pp6-7, attached to letter from the Minister for the Environment, October 5 2004.

⁹⁰³ CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, May 2004, p13.

RECOMMENDATIONS

Recommendation 12: The Committee recommends that the proposed CSIRO Wagerup Air Quality Research Program be undertaken as a priority.

Recommendation 13: The Committee recommends that the Department of Environment work with Alcoa to take immediate action to remediate contaminated ground water at Alcoa's refinery at Wagerup.

Recommendation 14: The Committee recommends that the Department of Environment investigate methods of extraction of water from the Harvey River to ensure that water being extracted by Alcoa occurs only during periods of peak nutrient levels.

Recommendation 15: The Committee recommends that at the planning stage for new industries and for the expansion of existing facilities in Western Australia, the Department of Environment should require emissions dispersion modelling to use site specific data rather than generic meteorological data unless a specific exemption is warranted.

Recommendation 16: The Committee recommends that the Department of Environment should assess licensed industrial premises in Western Australia to determine the appropriateness, in each case, of requiring continuous emissions monitoring.

Recommendation 17: The Committee recommends that the Department of Environment, as a matter of priority, cause an effective dust suppression program to be implemented at the residue disposal areas at the Alcoa refinery at Wagerup.

CHAPTER 7

LOSS OF AMENITY

OVERVIEW OF CHAPTER

- 7.1 The Committee has summarised many of the submissions it has received in relation to loss of amenity to give the reader an understanding of the volume of submissions received and the wide range of issues raised in relation to this matter during the course of the Committee's inquiry.
- 7.2 Loss of amenity includes the impacts on the lifestyles of people living in the vicinity of Alcoa's Wagerup refinery and the impacts of the refinery on the social demographics of neighbouring townships.
- 7.3 In this chapter the Committee discusses:
- Alcoa's Wagerup Land Management Strategy;
 - Alcoa's Standard Lease Agreement for Area A;
 - examples of evidence received in relation to loss of amenity;
 - evidence from the Minister for the Environment and the DEP;
 - a report by Dr Mark Cullen, Professor of Medicine and Public Health at Yale University and joint Chief Medical Officer of Alcoa in relation to Alcoa's Land Management Strategy, and Alcoa's response to that report;
 - the response of the Ministerial Council on Environment, Health and Industry Sustainability to recommendation 4 of the Wagerup Medical Practitioners' Forum (in relation to exposure reduction via a planned buffer zone); and
 - the Yarloop Edith Cowan University Alcoa Project.
- 7.4 The final part of the chapter contains Committee findings, analysis and conclusions as well as recommendations for the future.

ALCOA'S WAGERUP LAND MANAGEMENT STRATEGY

- 7.5 At the Committee's hearing on February 18 2002 Ms Ann Whitty, then Wagerup Refinery Manager, Alcoa World Alumina, advised that Alcoa was implementing a strategy for managing the land surrounding the Alcoa refinery at Wagerup. She

advised that the strategy was developed on the basis of extensive community consultation.⁹⁰⁴

Wagerup Land Management Draft Proposal: October 2001

7.6 Ms Whitty advised the Committee that Alcoa released a draft land management proposal for the residents of Yarloop and Hamel in October 2001.⁹⁰⁵ (**Wagerup Land Management Draft Proposal**).

7.7 The Wagerup Land Management Draft Proposal sets out two areas close to the refinery which are described as Area A and Area B. A map showing Area A and Area B is included at the beginning of this report immediately after the Time Line.

7.8 The Wagerup Land Management Draft Proposal states that the boundary of Area A was chosen for three reasons:⁹⁰⁶

- *People in this area may experience noise levels above the night time limit allowed under the Noise Regulations [Environmental Protection (Noise) Regulations 1997].*
- *It corresponds with where people may be most annoyed by refinery emissions.*
- *It allows for future expansion of Alcoa's bauxite residue area to the west.*

7.9 Area B comprises the remainder of the township of Yarloop and the township of Hamel. The Wagerup Land Management Draft Proposal states that the boundary of Area B was chosen to:⁹⁰⁷

- *Ensure all residents of Yarloop and Hamel have freedom of choice.*
- *Ensure property values are protected in Yarloop and Hamel.*

7.10 The offer set out in the Wagerup Land Management Draft Proposal for those people living in Area A who wish to move is that Alcoa will offer to purchase their property at the unaffected market value, plus 35 percent to cover replacement costs, plus \$7000 to cover relocation costs. The payment of \$7000 will only be made where there is a house on the property. The proposal provides that independent property valuers

⁹⁰⁴ Ms Ann Whitty, Wagerup Refinery Manager, Alcoa World Alumina, *Transcript of Evidence*, February 18 2002, p5.

⁹⁰⁵ A copy of Alcoa's Wagerup Land Management Draft Proposal was provided to the Committee under cover of a letter from Alcoa dated October 6 2003.

⁹⁰⁶ Wagerup Land Management Draft Proposal, p3.

⁹⁰⁷ Ibid.

- would be used to ascertain the value unaffected by media publicity or Alcoa's refinery at Wagerup operations.⁹⁰⁸
- 7.11 It was proposed that this offer for Area A residents would stand for the operating life of Alcoa's refinery at Wagerup.⁹⁰⁹
- 7.12 The offer set out in the Wagerup Land Management Draft Proposal for those people living in Area B is that Alcoa will underwrite the value of their property for five years (that is, until December 31 2006).⁹¹⁰ It further provides that in relation to those people in Area B who wish to sell their property (that is, as at October 2001), Alcoa will offer to purchase their property at the unaffected market value. This offer would stand until December 31 2002.⁹¹¹
- 7.13 In the event that people in either Area A or Area B decide to sell their property, the Wagerup Land Management Draft Proposal provides that two valuations would be conducted, one valuer appointed by Alcoa and one valuer appointed by the owner, at Alcoa's expense. A purchase price would then be negotiated on the basis of the two valuations. Where necessary, a third independent valuer appointed by the Australian Property Institute would settle the value.⁹¹²
- 7.14 Ms Whitty advised that Alcoa received a great deal of feedback in relation to the Wagerup Land Management Draft Proposal that *"said there was so much controversy and uncertainty at this point (October 2001) that a year was not long enough and that people would feel compelled to move."*⁹¹³
- 7.15 Ms Whitty advised the Committee that Alcoa did not want people to feel compelled to move, and to address this concern it amended the initial offer in a revised land management proposal released in January 2002.⁹¹⁴ (**Wagerup Land Management Revised Proposal**).

Wagerup Land Management Revised Proposal: January 2002

- 7.16 The Wagerup Land Management Revised Proposal states that *"Alcoa remains committed to: reducing odour and other emissions, reducing noise and investigating*

⁹⁰⁸ Ibid, p4.

⁹⁰⁹ Ibid.

⁹¹⁰ Ibid.

⁹¹¹ Ibid.

⁹¹² Ibid.

⁹¹³ Ms Ann Whitty, Wagerup Refinery Manager, Alcoa World Alumina, *Transcript of Evidence*, February 18 2002, p12. Note that as of April 2003 Ms Ann Whitty ceased to be the Wagerup Refinery Manager and Mr Bill Knight was appointed to the position.

⁹¹⁴ Ibid.

- health concerns.*⁹¹⁵ Alcoa also states its commitment to protecting property values, supporting the integral nature and quality of the community and encouraging people to stay, and making it easy for those who wish to leave to sell their properties.⁹¹⁶
- 7.17 The Wagerup Land Management Revised Proposal states that *“Alcoa will invest in the future of the local communities, and is determined to be a good neighbour, both now and in the future.”*⁹¹⁷
- 7.18 The Wagerup Land Management Revised Proposal extends the offer to purchase properties in the townships of Yarloop and Hamel (Area B) for five years. It provides that if, after five years, property values have declined due to Alcoa’s presence in the community, Alcoa will extend the offer for a further five years.
- 7.19 In response to its query as to how and by whom it would be decided whether any decline in property prices was due to Alcoa’s presence in the community, Alcoa advised by way of letter to the Committee dated October 6 2003 that it was intended two independent licensed valuers would conduct a valuation of a cross section of properties during 2002 and then value the same properties again in 2006. Any increase/decrease would then be measured against expected increases/decreases and a determination made as to whether or not Alcoa was impacting on any decrease in values.
- 7.20 The Wagerup Land Management Revised Proposal states that if people choose to stay, Alcoa will help to protect homes from refinery noise. If people choose to leave and Alcoa purchases their property, the Wagerup Land Management Revised Proposal states that Alcoa intends to lease the property to approved tenants.⁹¹⁸
- 7.21 Further residential development in Area A would be restricted and people would be encouraged to develop value adding land uses that complement Alcoa’s operations and that are compatible with the desires of the residents in the area.⁹¹⁹
- 7.22 In relation to Area A, the Wagerup Land Management Revised Proposal states that *“It is not expected to increase in the future, based on our best estimates of expansion opportunities, increasing environmental regulation, and increasingly better emissions control technology.”*⁹²⁰

⁹¹⁵ Wagerup Land Management Revised Proposal, January 2002, p2.

⁹¹⁶ Ibid.

⁹¹⁷ Ibid.

⁹¹⁸ Ibid, p5.

⁹¹⁹ Ibid.

⁹²⁰ Ibid, p6.

- 7.23 At the Committee's hearing on February 18 2002 Ms Whitty discussed Area A and submitted that *"The idea of controlling that land was to not further subdivide it and also only to have people there who are not sensitive to those types of emissions. It would also allow the people who are sensitive and do feel that they are intruded upon to leave."*⁹²¹
- 7.24 The Wagerup Land Management Revised Proposal states that Alcoa had commenced discussions with the Shires of Waroona and Harvey in relation to the best way to ensure compatible land use through the Town Planning Schemes.⁹²² Any amendments to the Town Planning Schemes must be put out for community consultation and approved by both Shire Councils, and then approved by the State Planning Commission.
- 7.25 The Committee notes that the area affected by the Alcoa refinery at Wagerup falls within the jurisdiction of both the Shire of Harvey and the Shire of Waroona. The need for jurisdictional cooperation may require additional consultation. If this leads to delays in the finalisation of matters pending before the Shires, the Committee believes that members of the local community may experience frustration.
- 7.26 Both the Shire of Harvey and the Shire of Waroona advised the Committee that there had been ongoing communication and meetings between the two Shire Councils but no formal communications.
- 7.27 The Committee notes that approximately half the township of Yarloop falls within Area A, while the remaining half falls outside the border. In a submission to the Committee dated June 26 2003 Alcoa advised that, in relation to the changes that were made to the Wagerup Land Management Draft Proposal:

*Despite Alcoa's best efforts, it was not however possible to address all of the feedback received since this would have resulted in conflicting outcomes. It was not possible to meet community demands to not divide Yarloop, while at the same time maintaining vitality of the town. A boundary was drawn in an attempt to keep the town viable, and on the basis of the scientific 35 decibel noise limit.*⁹²³

- 7.28 At the Committee's hearing on February 18 2002 Ms Whitty confirmed that Area A is defined by reference to noise levels only. Ms Whitty noted that Alcoa was non-compliant within Area A for noise limits during certain days. However she also noted that Area A has been the area from which most of the complaints about odour and

⁹²¹ Ms Ann Whitty, then Wagerup Refinery Manager, Alcoa World Alumina, *Transcript of Evidence*, February 18 2002, p12.

⁹²² Wagerup Land Management Revised Proposal, January 2002, p5.

⁹²³ Attachment 1, p2 of Submission from Alcoa, June 26 2003.

potential health effects have come. She stated that *“for the long term life of the refinery, we are trying to control that area [Area A] so that we do not get further residential development very close to the refinery.”*⁹²⁴ She submitted that *“In that way we will not have people who are very sensitive to these kinds of odour, for example, moving in and making the problem of close population to the refinery even bigger.”*⁹²⁵

- 7.29 As part of her evidence to the Committee regarding the boundary of Area A being defined by noise levels rather than emission levels, Ms Whitty stated that *“In order to have a buffer with a line like that, on my understanding, it has to be based on scientific data. The only data that we have that is science based is the noise boundary. Again, that is because the emissions are well below all recognised guidelines.”*⁹²⁶
- 7.30 In the Wagerup Land Management Revised Proposal Alcoa states its intention to lease the properties purchased in Area A to approved tenants.⁹²⁷
- 7.31 Alcoa states its intention to conduct a baseline study using independent consultants to determine the value of a cross section of properties in the townships.⁹²⁸ The study of property values in both townships will be repeated in five years to identify whether values have increased or decreased. If property values have decreased below current levels due to the presence of Alcoa or adverse publicity about Alcoa, then Alcoa will extend the offer to buy for a further five years.⁹²⁹ That is, the offer would stand until December 31 2011.
- 7.32 In response to a request for an update regarding this baseline study Ms Whitty advised the Committee by letter dated February 19 2003, that two groups had been formed (the Shire of Waroona Buffer Response Coordinating Committee and the Harvey Community Consultative Committee) to establish the process by which baseline values would be established.
- 7.33 These groups consisted of shire (Waroona only), community and Alcoa representatives, as well as two licensed valuers. Through these groups, a sample of properties representing a cross-section of property types in the Yarloop and Hamel towns was identified.

⁹²⁴ Ms Ann Whitty, Wagerup Refinery Manager, Alcoa World Alumina, *Transcript of Evidence*, February 18 2002, p17.

⁹²⁵ Ibid.

⁹²⁶ Ibid.

⁹²⁷ Wagerup Land Management Revised Proposal, January 2002, p5.

⁹²⁸ Ibid, p6.

⁹²⁹ Ibid.

- 7.34 The Committee was advised that Alcoa had commissioned two independent licensed valuers to value the sample properties to establish the ‘baseline’ data from which subsequent valuation movements will be assessed. Alcoa advised by way of letter dated October 6 2003 that all but three of the valuations had been completed.
- 7.35 The Wagerup Land Management Revised Proposal provides that Alcoa will only purchase individual properties once.⁹³⁰
- 7.36 Alcoa stated its intention in the Wagerup Land Management Revised Proposal to talk to people who live outside the townships who feel they might be affected by the refinery on a case-by-case basis to identify whether Alcoa can assist them.⁹³¹
- 7.37 At the Committee’s hearing on February 18 2002 Ms Whitty advised that Alcoa had been approached by a number of people who wished to sell their properties. Ms Whitty did not have the numbers with her but advised that Alcoa had “*sold some houses in area A and have been very successful in getting tenants back into those houses.*”⁹³²
- 7.38 During its inquiry, Alcoa provided the Committee with a number of submissions containing updates on the progress of properties acquired by it under the Wagerup Land Management Revised Proposal. The most recent figures provided by Alcoa were set out in a letter dated June 26 2003 and were for properties both within and outside Area A. They were current as at April 21 2003.
- 7.39 At that time Alcoa had purchased 86 properties in Area A (from a total of 233 properties, being 37 percent of the total properties in Area A). Of those 86 properties, 64 were residences and 22 were vacant blocks. Alcoa also advised that as at April 21 2003 it had leased 52 properties acquired in Area A to tenants, 19 of which had been leased back to their previous owners (including residents who previously registered complaints about refinery emissions).
- 7.40 In its letter to the Committee dated June 26 2003 Alcoa also advised that as at April 21 2003 it had purchased 99 properties outside Area A in Yarloop and Hamel (from a total of 301 properties, being 33 percent of the total properties outside Area A in Yarloop and Hamel). Of those 99 properties, 76 were residences and 23 were vacant lots. Alcoa also advised that as at April 21 2003, 32 of these properties had been re-sold by Alcoa to new owners and 25 properties were under offer.

⁹³⁰ Ibid, p7.

⁹³¹ Ibid, p7.

⁹³² Ms Ann Whitty, Wagerup Refinery Manager, Alcoa World Alumina, *Transcript of Evidence*, February 18 2002, p13.

- 7.41 The Committee received an update by way of letter from Alcoa dated October 6 2003, however the figures related to purchases in Area A only. Alcoa advised that as at September 4 2003 it had purchased 97 properties in Area A, comprising 71 houses and 26 vacant blocks. Alcoa advised that 39 properties were leased to tenants, including 18 properties leased back to their original owners.
- 7.42 Alcoa advised the Committee that a number of the original owners who had leased back their own houses had previously registered environmental or health complaints.⁹³³
- 7.43 At the Committee's hearing with Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia on September 8 2003, he discussed Alcoa's complaints data. Mr Osborn advised that for 2001 the data showed that "*seven households accounted for almost half the complaints during that period.*"⁹³⁴
- 7.44 In response to the Committee's query as to how many of the seven households are tenanted by the original owner, Alcoa advised by way of letter dated October 6 2003 that Alcoa has purchased six of the seven properties under the land management strategy and that of these, three properties are currently being leased back by their original owners.⁹³⁵
- 7.45 At the hearing on February 18 2002 in response to a question from the Chairman as to who would be liable in the event that tenants in Area A began to exhibit health problems, Ms Whitty submitted that it would depend on what health problems they incurred. She advised that Alcoa does not require people to sign an indemnity before they move into the rented houses in Area A.⁹³⁶
- 7.46 This issue was also raised by Hon Bruce Donaldson MLC at the Committee's hearing with Mr Osborn on September 8 2003:⁹³⁷

Hon BRUCE DONALDSON: *I turn now to the buffer zone. You mentioned that 19 have returned on those lease arrangements within the buffer zone. How many residences does Alcoa have available for lease in the buffer zone? Is that the total number in the buffer zone?*

⁹³³ Attachment 1, p6 of letter from Alcoa, June 26 2003.

⁹³⁴ Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, *Transcript of Evidence*, September 8 2003, pp3-4.

⁹³⁵ Letter from Mr Bill Knight, Wagerup Refinery Manager, October 6 2003, p9.

⁹³⁶ Ms Ann Whitty, Wagerup Refinery Manager, Alcoa World Alumina, *Transcript of Evidence*, February 18 2002, p14.

⁹³⁷ Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, *Transcript of Evidence*, September 8 2003, p12.

Mr Osborn: *No, it is not. I would have to come back to you with documentation on that. I do not know those numbers off the top of my head.*

Hon BRUCE DONALDSON: *Did the 19 who returned to those leases relinquish their rights when they signed up the contracts for the leases?*

Mr Osborn: *No. Nobody relinquishes any rights in terms of signing a contract. Any rights that a person may have as an individual or whatever still obviously remain after signing a contract.*

Hon BRUCE DONALDSON: *So they go back there, but not at their own risk obviously?*

Mr Osborn: *No, they do not.*

- 7.47 The Committee notes that in the Wagerup Land Management Revised Proposal, Alcoa states that it has been meeting with small business owners and is trying to address their concerns.⁹³⁸ It states that it will deal with business owners on a case-by-case basis and is committed to working with the business community to develop strategies for growth over the long term.⁹³⁹
- 7.48 The Committee also notes that the Wagerup Land Management Revised Proposal states that “Alcoa understands that people are concerned about the future of services in the area. We are examining opportunities where Alcoa may be able to provide assistance, for example with the Yarloop primary school and the hospital.”⁹⁴⁰
- 7.49 The Committee queried Alcoa as to why businesses were not included in the Wagerup Land Management Revised Proposal. In response, Alcoa advised that “The land management proposal was originally developed to enable any residents with concerns about the refinery to relocate.”⁹⁴¹ Alcoa also advised that “The businesses that operated in Area A were seen as land uses compatible with refinery operations. A policy of purchasing businesses outside Area A would not have contributed to maintaining the integral nature of the community.”⁹⁴²

⁹³⁸ Wagerup Land Management Revised Proposal, January 2002, p7.

⁹³⁹ Ibid.

⁹⁴⁰ Ibid.

⁹⁴¹ Letter from Mr Bill Knight, Wagerup Refinery Manager, October 6 2003, p4.

⁹⁴² Ibid.

- 7.50 Alcoa reiterated that it had been working with small businesses on a case-by-case basis and that it had “*incorporated consideration of business, relocation or closure issues into transactions involving Area A property.*”⁹⁴³
- 7.51 With respect to investing in the local community, the Committee notes that Alcoa states in its Wagerup Land Management Revised Proposal that it wants people to stay in the community and is “*committed to doing all it can to lower emissions and reduce impacts on the surrounding communities.*”⁹⁴⁴
- 7.52 It states that to encourage people to live locally and to enhance property values, it is committing \$2 million to be spent on projects in the local area. It proposes that a committee involving the community, the local Shires and Alcoa work together to identify appropriate projects to be funded by Alcoa.⁹⁴⁵
- 7.53 At the hearing on February 18 2002 Ms Whitty advised that Alcoa did not want to dictate to the local community, but wanted input from people living in the area as to the best way to make the local community more attractive. She advised that some of Alcoa’s ideas for the \$2 million included installing deep sewerage systems in Yarloop, the beautification of some of the main routes through the town, a new residential development south of Yarloop and support for the local hospitals and schools.⁹⁴⁶
- 7.54 For a discussion on Alcoa’s financial support to the local community and the \$2 million Community Development Fund, refer to paragraphs 8.51 to 8.72 of this report.

ALCOA’S STANDARD LEASE AGREEMENT - AREA A

- 7.55 During the course of its inquiry, the Committee obtained a copy of Alcoa’s standard lease agreement for the lease of a property situated within Area A.
- 7.56 Although basically a typical lease agreement, the Committee notes that there are some provisions that impose conditions beyond those normally found in standard residential lease agreements, particularly with respect to environmental obligations imposed on the tenant and the landlord’s (that is, Alcoa’s) reduced liability for nuisance.
- 7.57 Despite a provision in Alcoa’s standard lease agreement expressly acknowledging the tenant’s right to quiet enjoyment of the premises there is an exception to this right whereby tenants acknowledge and accept that they are aware that they are occupying land adjacent to an industrial facility. They also agree not to make any claim against

⁹⁴³ Ibid.

⁹⁴⁴ Wagerup Land Management Revised Proposal, January 2002, p7.

⁹⁴⁵ Ibid.

⁹⁴⁶ Ms Ann Whitty, Wagerup Refinery Manager, Alcoa World Alumina, *Transcript of Evidence*, February 18 2002, p13.

Alcoa arising in connection with its business activities that would affect quiet enjoyment of premises.⁹⁴⁷ Quiet enjoyment has been defined as “*A right to undisturbed occupation and possession of an estate in land*”.⁹⁴⁸

- 7.58 In particular, Alcoa’s standard lease agreement provides that any noise, odour, dust, particulates or any disturbance of any nature resulting from Alcoa’s business activities will not constitute a breach of a tenant’s right to quiet enjoyment. Alcoa’s standard lease agreement also provides that a tenant acknowledge that he or she has been made fully aware of disturbances being experienced in the local community at the present time.⁹⁴⁹
- 7.59 Nothing in Alcoa’s standard lease agreement, however, precludes a tenant from making a common law claim for personal injury against Alcoa. The Committee notes in particular clause 15 of Alcoa’s standard lease agreement whereby Alcoa remains liable for loss, damage or injury to any person caused by the sole negligence of Alcoa or its employees. This provision reflects the law.
- 7.60 The Committee is interested to note that Alcoa’s standard lease agreement provides that:
- the tenant shall not do anything offensive or illegal or anything which causes nuisance, damage to any other person, or causes or is likely to cause any damage to the environment;⁹⁵⁰
 - the tenant and his or her representatives shall comply with all applicable laws including laws regarding protection of human health and the environment and the prevention or control of pollution or toxic or hazardous substances;⁹⁵¹
 - without Alcoa’s prior written consent, the tenant is not to transport toxic or hazardous substances to or from the leased property or treat, store or dispose of such substances on the leased property. These substances include, among other things, asbestos, ceramic fibre, fibre glass or polychlorinated biphenyls or chlorinated fluorocarbons;⁹⁵² and

⁹⁴⁷ Alcoa’s standard Lease Agreement for the lease of a property situated within Area A - clause 2.

⁹⁴⁸ The Honourable Dr Peter E Nygh and Peter Butt, *Butterworths Australian Legal Dictionary*, Butterworths, 1997, p972. For example, in *Jenkins v Jackson* (1888) 40 Ch D 71 at 74 Kekewich J pointed out that the word ‘quietly’ in the covenant “*does not mean undisturbed by noise. When a man is quietly in possession it has nothing whatever to do with noise... ‘Peaceably and quietly’ means without interference - without interruption of the possession.*”

⁹⁴⁹ Alcoa’s standard Lease Agreement for the lease of a property situated within Area A - clause 2.

⁹⁵⁰ Ibid clause 9.

⁹⁵¹ Ibid, clause 10.

⁹⁵² Ibid.

- in the event of discharge or release of a toxic or hazardous substance on the leased property, the tenant shall formerly notify the relevant authorities and take action to control and clean-up the release so that any hazard or potential hazard to human health, life or the environment will be expeditiously controlled and eliminated.⁹⁵³

EXAMPLES OF EVIDENCE RECEIVED IN RELATION TO LOSS OF AMENITY

Mr Eric Walmsley, Alcoa employee and local resident

- 7.61 At its hearing in Waroona on November 21 2001 the Committee heard evidence from Mr Walmsley, who advised that he had been born in Yarloop and had lived and worked in the area all his life. Mr Walmsley advised the Committee that he is the fifth generation of his family to live in the Shire of Waroona and the surrounding districts. His forefathers settled in the area in the 1840s.
- 7.62 Mr Walmsley also advised that he had worked for Alcoa for 21 years. He commenced work in the farmlands at Alcoa's refinery site in 1979. Mr Walmsley submitted that he has had first-hand experience with the refinery operations from the building of the refinery through to the commencement of operations. He transferred to the mine site in 1994 and is currently employed there.
- 7.63 Mr Walmsley advised that his wife was born and raised in the Harvey and Waroona Shires and is the third generation of her family to live in the area. She is also employed by Alcoa, and has worked in the Environmental Mining Group since 1989.
- 7.64 As part of his submission to the Committee, Mr Walmsley commented on Alcoa's buffer zone strategy and expressed his view that it did not fix the problem at its source. He submitted that the buffer zone proposal prevents "*landowners from starting or improving a small cottage industry on their land, with no compensation or concessions of any kind.*"⁹⁵⁴
- 7.65 Mr Walmsley told the Committee that it was always his family's intention to develop their property into chalet-style accommodation. He submitted that Alcoa's buffer strategy "*will do nothing but devalue our land.*"⁹⁵⁵ He also submitted that "*We have built our dream on our property, with the intention of staying there forever because of location, family and lifestyle. Alcoa needs to fix its noise and odour issues. We do not*

⁹⁵³ Ibid.

⁹⁵⁴ Mr Eric Walmsley, Alcoa employee and local resident, *Transcript of Evidence*, November 21 2001, p3.

⁹⁵⁵ Ibid.

believe we should have to move in order to fix up Alcoa's problem, nor should we have to live with Alcoa's problem."⁹⁵⁶

Mr John Szkraba, Secretary, Wagerup Community Health Awareness Group

- 7.66 At its hearing in Waroona on November 21 2001 the Committee also heard evidence from Mr Szkraba who told the Committee that as a result of Alcoa's proposal to purchase properties in the local area, and particularly in Yarloop, people in the community were concerned that house and land values would decrease.
- 7.67 Mr Szkraba submitted that people in the local community were also concerned that the town of Yarloop "*will diminish, even with Alcoa's best intentions to keep the community together, but who wants to live in an industrial buffer zone?*"⁹⁵⁷
- 7.68 Mr Szkraba told the Committee that the people of Yarloop did not want to sell their homes. They want one outcome; that is, "*They want Alcoa to stop emitting the chemicals that are causing the health problems. Alcoa is a multinational corporation with worldwide resources at its feet. Surely it ought to be able to fix the problem.*"⁹⁵⁸

Mr Anthony Hall, Chairperson, Yarloop and Districts Concerned Residents Committee

- 7.69 At its hearing in Perth on February 18 2002 Mr Hall commented on Alcoa's land management strategy and submitted that the residents represented by the YDCRC considered the proposal to be unsatisfactory. Mr Hall noted that Alcoa had revised the land management strategy, and expressed his opinion that the revision was done "*with little or no input from the community...*"⁹⁵⁹ He also expressed his opinion that "*Revisions to that land management proposal are negligible. It does not address the concerns of the majority of people in town.*"⁹⁶⁰
- 7.70 Mr Hall expressed an opinion that the company's offer to purchase properties from people who no longer wished to live in the area was not fair. He submitted that the calculation of unaffected market value did not take into account the fact that many

⁹⁵⁶ Ibid.

⁹⁵⁷ Mr John Szkraba, Secretary of the Wagerup Community Health Awareness Group, *Transcript of Evidence*, November 21 2001, p2.

⁹⁵⁸ Ibid.

⁹⁵⁹ Mr Anthony Hall, Chairperson, YDCRC, *Transcript of Evidence*, February 18 2002, p12.

⁹⁶⁰ Ibid. Note that in a letter to the Committee dated March 31 2003 Ms Ann Whitty, Wagerup Refinery Manager, Alcoa, responded to a number of allegations made by various witnesses before the Committee, including these statements made by Mr Hall. Ms Whitty wrote at pages 10-11 that the statements made by Mr Hall were incorrect and advised that "*Alcoa undertook and (sic) intensive round of community consultation before publishing the Draft Land Management Proposal and calling for feedback. Some 439 forms were distributed with the Draft Proposal, with over half (255) being returned, some as a result of phone interviews by Patterson Market Research.*" See also paragraphs 7.5 and 7.113 of this report.

- houses in the area had been classified as heritage by the Harvey Shire Council.⁹⁶¹ Mr Hall also submitted that it ignored the fact that prior to the announcement of the buffer zone strategy some people had sold their property at a reduced price to obtain a quick sale to protect their deteriorating health.
- 7.71 Mr Hall also submitted that *“There are a lot of discrepancies in the initial valuations because they do not match up with bank valuations, for example, which people have had done for finance for improving their properties. In some cases there is a \$20 000 or \$30 000 difference between the banks’ valuation and that of Alcoa.”*⁹⁶²
- 7.72 Mr Hall submitted that *“The banks’ valuations are usually lower because they value the property on the basis of a fire sale scenario. They know what they expect to get for a property if they have to sell it because someone cannot keep the payments up.”*⁹⁶³
- 7.73 Mr Hall claimed that *“No consideration has been given to the fact that due to reasonable prices of real estate in this area and because they had no intention of moving, many people have spent money on improvements that they may not have been able to afford if they had purchased a property elsewhere.”*⁹⁶⁴
- 7.74 Mr Hall told the Committee that the issues surrounding Alcoa’s refinery at Wagerup have the greatest impact on the older members in the local community. He submitted that many of these people had lived in the area all their lives and had spent years prior to their retirement building a comfortable place in which to spend the rest of their lives. He noted that these elderly people had been surrounded by lifelong friends and family, but that they were now faced with the fact that if they moved, they would no longer have that support as it would be very unlikely that family and friends would be living as close to them as they do currently.⁹⁶⁵
- 7.75 Mr Hall submitted that *“Almost all the members of our communities would prefer that Alcoa’s processing return to the level of impact sustained prior to liquor burner associated problems when Alcoa ignored us and we ignored Alcoa.”*⁹⁶⁶ He submitted that the residents *“do not want to feel any impact from Alcoa’s processing. They want*

⁹⁶¹ A search of the Heritage Council of Western Australia website at www.heritage.wa.gov.au confirms that many properties in the Shire of Harvey and the Shire of Waroona have been heritage listed (accessed August 26 2003).

⁹⁶² Mr Anthony Hall, Chairperson, YDCRC, *Transcript of Evidence*, February 18 2002, pp15-16.

⁹⁶³ Ibid, p16.

⁹⁶⁴ Ibid, p10.

⁹⁶⁵ Ibid.

⁹⁶⁶ Ibid.

it to confine emissions to its property and to be left alone, as it has been for 20 years until now."⁹⁶⁷

- 7.76 In a subsequent written submission dated October 10 2002 made on behalf of the YDCRC, Mr Hall advised the Committee that at the time of making the submission Alcoa had purchased over 80 properties.⁹⁶⁸ Mr Hall submitted that Alcoa is *"supposed to replace the families that have moved with families of similar numbers. Alcoa have not yet done this in any meaningful manner, as quite a few of these properties have been leased to people from town who resided in the "B" zone. This has had a threefold effect within our community, which Alcoa recognise but have done nothing about.*"⁹⁶⁹
- 7.77 Mr Hall also submitted that Alcoa's buffer zone proposal impacts on owners of investment properties in the area affected by the Alcoa refinery at Wagerup. Mr Hall submitted that prior to the problems associated with the Alcoa refinery at Wagerup, rental properties in Yarloop were scarce as the town had a stable population and therefore rent for those properties was at a premium. He submitted that owning a rental property in Yarloop was a very attractive investment.
- 7.78 Mr Hall stated that owners of these investment properties are now competing with Alcoa for tenants. With the higher number of rental properties currently on the market than was previously the case, Mr Hall submitted that it is unlikely that owners *"will still achieve anywhere near those prices..."*⁹⁷⁰ He submitted that as a result, some owners are considering selling their properties to Alcoa.
- 7.79 Mr Hall described the buffer zone proposal as *"totally inadequate..."*⁹⁷¹ and claimed that if the impacts from the refinery were not dealt with soon, *"there will be another mass exodus from town..."*⁹⁷² He claimed the emissions have been affecting people over ten kilometres away from the refinery, with odour intrusions happening on a regular basis.
- 7.80 Mr Hall submitted that most people in the local community have maintained since Alcoa released its land management proposal that all of Yarloop and Hamel should be in the buffer zone. He expressed the view that if Alcoa had made the same offer to

⁹⁶⁷ Ibid, p12.

⁹⁶⁸ The Committee was advised by Alcoa by letter dated February 19 2003 that as at January 31 2003 it had acquired 83 properties in Area A. Refer to paragraphs 7.38 to 7.45 of this report.

⁹⁶⁹ Submission No. 44 from YDCRC, October 10 2002, p2.

⁹⁷⁰ Ibid, p3.

⁹⁷¹ Ibid.

⁹⁷² Ibid.

people in both areas, there would have been far less fear and anxiety in the local community.

7.81 Mr Hall also submitted that Alcoa should have every property revalued by totally independent professional valuers to properly establish market value.

7.82 In a submission to the Committee in January 2004 the YDCRC said, in relation to the buffer zone, that *“It is obvious to us, if no one else, the current buffer is inadequate in addressing impacts from the refinery in its current state, and it is even more obvious that it will not deal with the impacts from a refinery twice the current size, yet Alcoa maintain that this buffer is for the life of the refinery.”*⁹⁷³

Mr John Harris, local resident

7.83 In a submission to the Committee dated January 13 2004 Mr Harris, who lives approximately six kilometres south of Wagerup, advised the Committee that he often has serious and debilitating impacts on his health. He also submitted that there is constant uncertainty about the future of Yarloop and the services currently available. He said *“This has made Yarloop an unhappy town in which to live.”*⁹⁷⁴

7.84 Mr Harris submitted that his property had declined in value. However because his property was outside Area A and Area B he would not be able to replace what he has now. Mr Harris said that if he did sell his property he would find himself in a worse position.

7.85 Mr Harris stated that he would like a change to Alcoa’s land purchasing practice. He expressed his belief that *“Any one who is affected by the chemicals in the emissions and needs to move away to take in cleaner air should receive full replacement land size, soil type, zoning, improvements, compensation for revegetation work and full moving expenses. This needs to be in force for the life of Alcoa operations in the area”*⁹⁷⁵

7.86 Mr Harris expressed the view that Alcoa’s Wagerup refinery would expand and *“What we want before any increase in production is for Alcoa to put in place the latest technologies and practices to reduce the potency of what is coming out of the chimney.”*⁹⁷⁶

⁹⁷³ Submission No. 69 from YDCRC, January 27 2004, p1.

⁹⁷⁴ Submission No. 70 from Mr John Harris, January 13 2004, p1.

⁹⁷⁵ Ibid, p2.

⁹⁷⁶ Ibid, pp3-4.

Graeme, Gail and Andrew Wickham, farmers

- 7.87 In a submission to the Committee dated January 14 2004 Graeme, Gail and Andrew Wickham advised that their farm is approximately five kilometres south west of Wagerup. The Wickhams informed the Committee that they had regularly raised concerns with Alcoa regarding the past and current operation of the Wagerup refinery and how it had and is detrimentally impacting on their health.
- 7.88 They advised that Graeme and Andrew's health had and is being impacted through sinus problems, throat, nose and eye irritations, migraine headaches and nausea. They submitted that these symptoms had occurred since 1997. The Wickhams expressed concern for their long-term health.⁹⁷⁷
- 7.89 The Wickhams also expressed their personal and amenity concerns with the current operation and any proposed expanded operation of Alcoa's Wagerup refinery. They advised that their farm had been in the family for 110 years *"yet we would gladly trade our historical links with the farm for peace of mind, a healthy environment and a chance to plan our future rather than being dictated to by the Wagerup operation."*⁹⁷⁸
- 7.90 They submitted that *"We now lack the confidence and have lost our heart to plan and develop the property due to the real and perceived impacts of the Wagerup Refinery."*⁹⁷⁹ They expressed their desire to relocate to a property well away from industrial impacts and rebuild their lives. However, attempts to sell their property had failed which had caused incredible stress to their family unit.
- 7.91 The Wickhams submitted *"It has caused us distress that Alcoa has not recognised that it has impacted us in various ways and yet, to date, is not prepared to enter into negotiations to purchase our property. We feel we have been treated unfairly as Alcoa has purchased properties to the north, south, east and west of us. Most of these properties are outside of Alcoa's A and B Zone."*⁹⁸⁰
- 7.92 In relation to loss of services, the Wickhams submitted that *"There has been a gradual decline in services to Yarloop over the past year."*⁹⁸¹ They further noted that *"The general morale of the town is at a low ebb."*⁹⁸²

⁹⁷⁷ Submission No. 67 from Graeme, Gail and Andrew Wickham, January 14 2004, p1.

⁹⁷⁸ Ibid.

⁹⁷⁹ Ibid.

⁹⁸⁰ Ibid.

⁹⁸¹ Ibid, p2.

⁹⁸² Ibid.

- 7.93 The Wickhams concluded by expressing their concerns about the prospect of an expanded Wagerup refinery.
- 7.94 In a subsequent submission dated June 28 2004 the Wickhams advised the Committee that they had planned to grow an organic ginkgo crop on their property and purchased a considerable number of trees for the venture.⁹⁸³ They advised the Committee that Alcoa had offered them a ‘letter of comfort’ to provide to certification agencies however expressed their belief that *“the actual and perceived impacts of the Wagerup Refinery are not compatible with a ‘clean green’ image.”*⁹⁸⁴
- 7.95 The Wickhams submitted that due to their proximity to the Wagerup refinery they had red mud/dust from the refinery impact on their property three times in the past 19 months.⁹⁸⁵ They submitted that developing the organic ginkgo crop so close to the Wagerup refinery was an enormous financial risk and they had been advised it was not worth progressing.
- 7.96 The Wickhams expressed their belief that *“Alcoa’s Wagerup operations have limited our ability to trade and develop the business on this site.”*⁹⁸⁶

Mr Duncan Liddard, farmer at Wagerup

- 7.97 In a submission received by the Committee on February 18 2004 Mr Liddard described the situation he was experiencing and outlined the adverse impacts having on the physical, mental, emotional and financial wellbeing of him and his family.
- 7.98 Mr Liddard advised the Committee that his cattle stud of approximately 722 acres was purchased by his family in 1989 and is located close to the western edge of Alcoa’s land management area. He advised that the quality of the cattle bred since he took over the farm has improved to such an extent that the cattle *“are now assessed as being of some of the highest genetic standard in Australia and indeed rate extremely highly against recognized international standards.”*⁹⁸⁷
- 7.99 However Mr Liddard submitted that he is being forced into a position whereby he is *“unlikely to be able to continue his life’s work due to his ill health...”*⁹⁸⁸ and said that this situation *“has arisen due to unremitting pollution from Alcoa’s Wagerup refinery and has been perpetuated beyond all reasonable expectation due to the failure of*

⁹⁸³ Letter from Graeme, Gail and Andrew Wickham, June 28 2004.

⁹⁸⁴ Ibid.

⁹⁸⁵ Ibid.

⁹⁸⁶ Ibid.

⁹⁸⁷ Submission No. 71 from Mr Duncan Liddard received February 18 2004, p1.

⁹⁸⁸ Ibid.

*Alcoa and the government to rectify the situation and ensure the safety of citizens living in the area.*⁹⁸⁹

7.100 Mr Liddard informed the Committee that:⁹⁹⁰

- when he moved to his farm in 1989 he was physically very fit and readily capable of hard physical labour. This continued until the mid-1990s when he began to experience the symptoms of chemical sensitivity. He has suffered continuously since 1996;
- his ill health leads to problems with undertaking physical work and he often needs assistance running the farm. This has led to feelings of frustration, anger, resentment and depression;
- his records show “*an alarming trend of animal ill-health since 1996.*”⁹⁹¹ He advised that 2000 was his worst year on record, during which he lost six cows due to inexplicable illness. He noted that there had been a small improvement in animal health since 2000;
- the cost of herd replacement would be financially unviable. He submitted that even with the finances available, it would be impossible to ever replace the genetics due to the advent of mad cow disease. He is uncertain whether or not to continue investment in the breeding program; and
- the greatest financial impact had been on the value of his land. Mr Liddard submitted that despite the value of property generally increasing significantly, land values in the area near Alcoa’s Wagerup refinery were plummeting. He said he had been unable to sell his farm.

7.101 Mr Liddard submitted that “*People shouldn’t have to get sick in order for Alcoa to operate. If Alcoa won’t do the right thing voluntarily, the government MUST enforce a real solution.*”⁹⁹² Mr Liddard suggested two options:⁹⁹³

- Alcoa stop operating at Wagerup thus eliminating all emissions; or
- Alcoa accept that the current land management zone inadequately addresses the reality of the area subject to pollution and buys out those people in the area who are demonstrably being affected by the problem.

⁹⁸⁹ Ibid.

⁹⁹⁰ Ibid, pp2-10.

⁹⁹¹ Ibid, p4.

⁹⁹² Ibid, p8.

⁹⁹³ Ibid.

- 7.102 In conclusion, Mr Liddard submitted that *“If nothing is done but a perpetuation of rhetoric, argument and inaction then I will have to walk away from the farm to stay alive.”*⁹⁹⁴ He submitted that *“Everything we wished for in the future is now in serious jeopardy.”*⁹⁹⁵
- 7.103 The Committee draws readers’ attention to the contrasting evidence at paragraphs 6.19 to 6.27 of this report in relation to the good health of cattle from Alcoa’s farmlands.

Mr John Bradshaw MLA

- 7.104 In a letter to the Committee dated March 12 2002 Mr Bradshaw advised that he had been the State Member of Parliament for the area taking in Alcoa Wagerup since 1983. He advised that from 1984 until 1996 he could not remember receiving any complaints regarding the refinery.
- 7.105 Mr Bradshaw advised that after the liquor burner was built in 1996, he started to receive complaints related to the smell and adverse physical effects experienced by nearby residents. He advised that these effects included red and runny eyes, sore throats, headaches and respiratory problems. Complaints of this nature had continued since 1996.
- 7.106 Mr Bradshaw advised that the complaints initially arose from residents in Yarloop but had since spread to the surrounding areas.
- 7.107 Mr Bradshaw noted Alcoa’s proposal to purchase local properties surrounding the refinery and expressed his concern that this would have a negative impact on the towns of Yarloop, Harvey and Waroona. He also expressed concern for *“those people being adversely affected by Alcoa who were reluctant property sellers, or who are still holding onto their surrounding land despite the health and odour problems.”*⁹⁹⁶
- 7.108 The Committee notes Mr Bradshaw’s concern that *“Landowners in the area are convinced that the problems with emissions cannot be fixed and feel they have little option but to negotiate with Alcoa to sell their land.”*⁹⁹⁷ He submitted that many residents did not wish to move from the area, but felt that the risk posed to their families’ health as a result of the refinery was forcing them to move. Mr Bradshaw noted that business owners in Yarloop had told him that they were *“already severely affected by these issues.”*⁹⁹⁸

⁹⁹⁴ Ibid, p9.

⁹⁹⁵ Ibid.

⁹⁹⁶ Letter from Mr John Bradshaw MLA, March 12 2002.

⁹⁹⁷ Ibid.

⁹⁹⁸ Ibid.

- 7.109 The Committee notes Mr Bradshaw's advice that landowners outside Area A have also been affected by the refinery *"either by the odours or through bad publicity which has driven down land prices or made it virtually impossible to sell."*⁹⁹⁹
- 7.110 Mr Bradshaw noted that a major concern for the people considering selling their property is their desire to replace their home and lifestyle. He submitted that this is not always reflected in the purchasing arrangements Alcoa has put in place. Mr Bradshaw submitted that the landowners were not attempting to improve their position, but felt they could not replace what they had for the amounts being offered.
- 7.111 Mr Bradshaw expressed his view that, among other things, medical and other assistance should be provided to those residents and workers who have been adversely affected by emissions from the refinery. He also submitted that *"The Government puts into action a plan to provide a positive image for Yarloop and Hamel to stop the exodus of residents and the consequent detrimental effects to services and businesses in the towns."*¹⁰⁰⁰ Mr Bradshaw also submitted that Government assistance should be provided to assist landowners in negotiating with Alcoa to sell their properties.
- 7.112 The Committee notes that Mr Bradshaw conducted a survey of residents of Yarloop and Wagerup asking whether they supported Alcoa's draft land management proposal. Of the 90 people who returned the survey, 67 people indicated that they did not support the proposal and 15 people did support the proposal. Three people indicated that they supported some aspects of the Draft Land Management Proposal, four people gave a comment only without indicating whether they did or did not support the proposal, and one person indicated that they were not interested in the proposal.
- 7.113 The Committee notes that this survey was conducted on the original land management proposal released by Alcoa in October 2001. Alcoa took the results of this survey into account when it revised the land management proposal that was subsequently released in January 2002.¹⁰⁰¹

Professor D'Arcy Holman

- 7.114 As previously noted, on August 18 2003, the Committee heard evidence from Professor D'Arcy Holman, Chair in Public Health, School of Population Health, University of Western Australia.

⁹⁹⁹ Ibid.

¹⁰⁰⁰ Ibid.

¹⁰⁰¹ Wagerup Land Management Revised Proposal, January 2002, p4.

- 7.115 Professor Holman commented on Alcoa's land management strategy and expressed his belief that *"The implementation of the land area policy was not optimal."*¹⁰⁰² He submitted *"That has become one of the major causes of angst in the township of Yarloop."*¹⁰⁰³
- 7.116 Professor Holman noted that one of the boundary lines for the area in which Alcoa has agreed to purchase people's properties for the life of the refinery (called 'Area A' and which is discussed, together with Alcoa's Wagerup land management strategy, in paragraphs 7.5 to 7.53 of this report) runs through the township of Yarloop. He told the Committee *"That is not what I would have recommended"*¹⁰⁰⁴ and submitted that this *"caused further social difficulties and added to the social overlay that always exists in a community that is affected by this type of environmental controversy."*¹⁰⁰⁵
- 7.117 Professor Holman said he would have preferred the whole township of Yarloop to have been incorporated in Alcoa's land management strategy. He submitted that if that had been the case *"we would probably not have seen some of the difficulties that have subsequently been seen."*¹⁰⁰⁶
- 7.118 Professor Holman expressed the view that *"From a strict health point of view, the fewer people in the buffer zone, the better, but there is more to this problem than merely a consideration of the health concerns narrowly defined as physical health concerns."*¹⁰⁰⁷ He advised the Committee that *"We are also talking about the social and community health of a group of people."*¹⁰⁰⁸
- 7.119 Explaining his point of view, Professor Holman said *"the trade-off of removing people entirely from the buffer zone is the problem of depopulating the town further and thereby reducing the profit margins for local businesses, sending them potentially to the wall and further depopulating the town, then gradually leading to the withdrawal of essential community services because the town no longer has the scale to warrant the same level of schooling and health facilities and so forth."*¹⁰⁰⁹
- 7.120 Professor Holman expressed his opinion that *"There is indeed a mixed reaction [in the local community] to the whole question of buffer zones and I believe it is because of*

¹⁰⁰² Professor D'Arcy Holman, Chair in Public Health, School of Population Health, University of Western Australia, *Transcript of Evidence*, August 18 2003, p2.

¹⁰⁰³ Ibid.

¹⁰⁰⁴ Ibid, p4.

¹⁰⁰⁵ Ibid, p2.

¹⁰⁰⁶ Ibid, p5.

¹⁰⁰⁷ Ibid, p2.

¹⁰⁰⁸ Ibid.

¹⁰⁰⁹ Ibid.

the trade-off between these two tensions of the fewer physical health concerns versus the broader social community health concerns and depopulation of the area.”¹⁰¹⁰

- 7.121 Professor Holman said “*So we have that whole complex community side of things that I believe has to be rightly considered in the final setting of policy about all of these matters.*”¹⁰¹¹
- 7.122 Professor Holman told the Committee “*I feel that the community view of the buffer zone has actually changed from, in my opinion, being mainly in favour of it, to being much more mixed.*”¹⁰¹²
- 7.123 Professor Holman advised the Committee that, when the Wagerup Medical Practitioners’ Forum first considered the issue of the buffer zone in early 2002, in his opinion “*there seemed to be a predominant concern from the community about loss of land values and that seemed to be actually adding to the distress and the mental health problems that were arising from the whole scenario.*”¹⁰¹³
- 7.124 Professor Holman said “*at the time [early 2002] I have to be honest and say that we [the Wagerup Medical Practitioners’ Forum] felt that by encouraging Alcoa to go ahead with its land policy, at least we would be assisting in the removal of a source of stress, mainly economic stress, to the local community.*”¹⁰¹⁴ Professor Holman said the Wagerup Medical Practitioners’ Forum did not foresee the extent to which people would accept the offer and leave. He said those people who remain, particularly those not in the buffer, “*are feeling the economic impact of depopulation or potentially perceiving that to be a threat to their livelihood.*”¹⁰¹⁵

Shire of Harvey

- 7.125 In a letter to the Committee dated January 24 2002 Mr Keith Leece, Chief Executive Officer of the Shire of Harvey advised that the township of Yarloop is well provided with recreational, health, educational and shopping facilities. He advised that the Shire Council’s position was that “*Any loss of population will impact on the provision of State and Local government services currently being enjoyed by Yarloop residents.*”¹⁰¹⁶

¹⁰¹⁰ Ibid, p3.

¹⁰¹¹ Ibid, pp2-3.

¹⁰¹² Ibid, p4.

¹⁰¹³ Ibid, p3.

¹⁰¹⁴ Ibid.

¹⁰¹⁵ Ibid, p4.

¹⁰¹⁶ Letter from Mr Keith Leece, Chief Executive Officer, Shire of Harvey, January 24 2002.

- 7.126 Mr Leece submitted that Yarloop faced the prospect of losing its primary school, police services and hospital.
- 7.127 The Committee notes Mr Leece's comments that *"The recent negative media coverage on the Wagerup refinery has had a significant detrimental effect on residents in Yarloop."*¹⁰¹⁷ He submitted that *"Property values are likely to fall because of the negative publicity and little prospect is seen for attracting 'replacement' population to Yarloop."*¹⁰¹⁸
- 7.128 Mr Leece also noted that those people who do choose to move from the area *"are confronted with all the emotional stresses that have become prevalent throughout the community."*¹⁰¹⁹
- 7.129 The Committee notes Mr Leece's view that local business people who have invested significantly in their trading outlets are concerned about serious setbacks in trading, which place their investment at high risk.
- 7.130 The Committee also notes Mr Leece's point that *"A number of initiatives have been proposed by both Council and Alcoa to counter the loss of amenity experienced to date and likely to occur in the future. It would behove the State Government to give every support for the initiatives currently under consideration."*¹⁰²⁰
- 7.131 Following up on some of the matters raised by Mr Leece and as part of its inquiry, the Committee wrote to the Shire of Harvey requesting further information concerning a number of issues relating to the Alcoa refinery at Wagerup. Due to the importance of this information, the Committee requested that the issues raised in its letter be considered by the Harvey Shire Council.
- 7.132 Mr Leece provided the response on behalf of the Harvey Shire Council on July 25 2003.
- 7.133 In response to the Committee's query whether the Harvey Shire Council supported Alcoa's buffer zone concept, Mr Leece advised that it opposed the proposed buffer. Mr Leece said that at the Harvey Shire Council's meeting in June 2002 it formalised a submission to the DEP in relation to the operation of the Alcoa refinery at Wagerup. Mr Leece provided a copy of that submission to the Committee.
- 7.134 The main point of the Harvey Shire Council's submission was that all negative impacts should be contained within current boundaries, failing which, production

¹⁰¹⁷ Ibid.

¹⁰¹⁸ Ibid.

¹⁰¹⁹ Ibid.

¹⁰²⁰ Ibid.

- should be restricted rather than the boundaries expanded by a buffer. The Harvey Shire Council submitted to the DEP that if negative impacts cannot be contained within the current boundaries, then production should be reduced rather than the boundaries increased.
- 7.135 The Harvey Shire Council also submitted to the DEP that noise above the set limits should be regarded as a negative impact and should also be contained within current boundaries.
- 7.136 Mr Leece advised the Committee that the Harvey Shire Council's approach to opposing the proposed buffer remains the same as it was at the time it made the submission to the DEP in June 2002. Further, Mr Leece advised that the Harvey Shire Council was concerned about the financial and social impact on landowners in Area A and the community of Yarloop generally.
- 7.137 In relation to the anticipated costs associated with the buffer concept, Mr Leece advised that the Harvey Shire Council will incur substantial costs should the buffer concept proceed. He advised that additional staff would be required as well as a number of unknown costs being incurred. Mr Leece advised that the Harvey Shire Council would expect those costs to be met by Alcoa or the Government.
- 7.138 Mr Leece also advised that the Harvey Shire Council "*has concerns over possible claims by landowners for "injurious affection"*"¹⁰²¹ *should rezoning of land be proceeded with for the buffer.*"¹⁰²² Mr Leece submitted that the Harvey Shire Council would expect Alcoa or the Government to indemnify it against such claims.
- 7.139 The Committee was interested to know what the Harvey Shire Council anticipated to be the long term effects (both the advantages and the disadvantages) on the Shire if a buffer was created. In response, Mr Leece advised that the Shire anticipated the disadvantages to be a decline in property values, a loss of land use rights, the possible impact on produce grown in an 'industrial buffer' such as milk and vegetables, population depletion and economic and social decline such as loss of businesses, the school and hospital. The Harvey Shire Council submitted its belief that a buffer would exacerbate current social and economic issues.

¹⁰²¹ This term means "*Depreciation in the value of land caused by the adverse effects of public works through such things as noise, vibration, overshadowing, loss of support, and restriction or loss of access. It is usually associated with carrying out substantial public undertakings such as the construction of freeways or airports. An owner of land may be entitled to compensation if his or her land has been affected injuriously by part of the land being taken by the state exercising its compulsory purchasing or acquisition of land powers. Injurious affection includes consequent restrictions in user enjoyment or the development of land by an owner*": The Honourable Dr Peter E Nygh and Peter Butt, *Butterworths Australian Legal Dictionary*, Butterworths, 1997, p601.

¹⁰²² Letter from Mr Keith Leece, Chief Executive Officer, Shire of Harvey, July 25 2003.

- 7.140 The Harvey Shire Council anticipated the advantages of a buffer to be that Alcoa could expand its operations, possible additional local employment opportunities and an increase in State tax collections. It also submitted that a buffer would provide a legal solution to the noise complaints emanating from the refinery.

Shire of Waroona

- 7.141 As part of its inquiry, the Committee wrote to the Shire of Waroona requesting information concerning a number of issues relating to the Alcoa refinery at Wagerup. Due to the importance of the information to the Committee's inquiry, the Committee requested that the issues raised in its letter be considered by the Waroona Shire Council.
- 7.142 Of particular interest to the Committee was the Waroona Shire Council's position regarding a possible industrial buffer zone around the Alcoa refinery at Wagerup. The Committee requested information from the Waroona Shire Council regarding the procedure for identifying an industrial buffer, the costs that would be incurred in creating a buffer zone and the long term advantages and disadvantages to the Shire of Waroona in having a buffer zone in place, including the effects on industry and local businesses and the likely economic and social impacts on people living near but not in the buffer zone.
- 7.143 The Committee also requested information from the Waroona Shire Council regarding initiatives it has undertaken to support the local community and counter any loss of amenity that may have been experienced to date in the Shire and that may occur in the future.
- 7.144 In response to its request, the Committee received a letter from Mr Kevin O'Connor, Chief Executive Officer of the Shire of Waroona dated July 30 2003. Mr O'Connor's letter provided a response to the Committee on behalf of the Waroona Shire Council.
- 7.145 Mr O'Connor advised that at its meeting in November 2002, the Waroona Shire Council considered a proposal from Alcoa associated with the establishment of a buffer around the Wagerup refinery. The same proposal was also presented to the Shire of Harvey.
- 7.146 Mr O'Connor advised the Committee that "*At no point has Council given formal approval for identification of a buffer zone.*"¹⁰²³
- 7.147 At its meeting in November 2002 the Waroona Shire Council passed a number of resolutions with respect to Alcoa's buffer proposal. These are set out in Mr O'Connor's letter to the Committee. The general effect of the resolutions was to

¹⁰²³ Letter from Mr Kevin O'Connor, Chief Executive Officer, Shire of Waroona, July 30 2003.

support the commencement and timely progression of consultation processes for Alcoa's buffer proposal, strategic land use planning and statutory planning controls.¹⁰²⁴

- 7.148 The Waroona Shire Council also resolved at its meeting in November 2002 that the making of the resolutions referred to above did not constitute agreement to the initiation of a town planning scheme amendment.¹⁰²⁵
- 7.149 Mr O'Connor advised that at a Shire Council meeting twelve months earlier, in November 2001, the Waroona Shire Council had considered its response to the draft Wagerup Land Management Proposal that was released by Alcoa in October 2001 (and which is discussed in paragraphs 7.6 to 7.15 of this report). At that time, the Waroona Shire Council resolved that *"It is supportive of the principle of identifying and formalising a buffer, but that continued support is contingent upon the satisfactory addressing of a range of concerns."*¹⁰²⁶
- 7.150 Mr O'Connor advised that in November 2001 the Waroona Shire Council also identified a number of objectives for the buffer identification and formalisation process. The objectives support the area affected by the buffer being minimised while also adequately containing the environmental impacts of Alcoa's operations and not reducing the effort being put into managing pollution at source.
- 7.151 The objectives provide that owners of properties directly affected by the buffer should be adequately compensated and owners of property in the area adjoining the buffer should be adequately protected from any adverse effects on the value of their properties or their livelihoods as a result of the creation of the buffer or Alcoa's activities in general.
- 7.152 The Committee notes that the Waroona Shire Council's objectives in relation to the buffer identification and formalisation process also provide that ratepayers be compensated for any costs borne by the Waroona Shire Council associated with the buffer identification process and that buffer land is managed in a manner that maximises community benefits and minimises community costs.
- 7.153 The Waroona Shire Council's final objective provides that Alcoa increase its commitment to projects and initiatives designed to strengthen local communities and economies.
- 7.154 The Committee notes that these objectives identified by the Waroona Shire Council in November 2001 were made before Alcoa revised its land management proposal in

¹⁰²⁴ Ibid.

¹⁰²⁵ Ibid.

¹⁰²⁶ Ibid.

January 2002. However Mr O'Connor advised that at its meeting in November 2002 the Waroona Shire Council resolved that it continue to be guided by these objectives.¹⁰²⁷

7.155 In relation to costs associated with the buffer process, Mr O'Connor advised that there are two main costs to the Waroona Shire Council:

- a) The identification of a formal buffer in the Waroona Shire Council's town planning scheme may create the basis for compensation claims by affected landowners. He wrote that *"Whilst such claims are unlikely to be successful, Council would not initiate a town planning scheme amendment until such time as it has a legally binding agreement with either Alcoa or another party accepting all responsibility for meeting costs associated with defending such claims and agreeing to meet any costs associated with successful claims."*¹⁰²⁸
- b) Over the last 18 months to two years Waroona Shire Council staff have spent considerable time addressing issues associated with the buffer proposal. Mr O'Connor anticipated that this is likely to continue to be the case for at least another 18 months to two years. Mr O'Connor said an estimate in late 2001 that approximately \$30 000 worth of staff time would be allocated to the issue over two years had proven to be reasonably accurate. Mr O'Connor advised that recent funding of \$35 000 agreed to by the DoIR had helped to address the issue. Mr O'Connor also advised that *"If and when Alcoa requests that Council formally initiate an amendment to its town planning scheme, Council can require payment of a fee at that time. If a formal request is made, Council would look to recover some or all of the costs it will incur through imposition of such a fee."*¹⁰²⁹

7.156 Mr O'Connor advised the Committee that by indicating 'in-principle' support for the identification of a buffer, the Waroona Shire Council was taking the view that a formal buffer identified in a town planning scheme *"could be preferable to the historical approach, where Alcoa has implemented a de facto buffer through land purchase on a somewhat ad hoc basis."*¹⁰³⁰

7.157 Mr O'Connor submitted that if a formal buffer is identified there will be greater certainty over the long term that Alcoa emissions will be contained within a specific area. He also submitted that planning controls would provide an opportunity for land within the buffer that is currently owned by Alcoa and used in a manner *"that is of*

¹⁰²⁷ Ibid.

¹⁰²⁸ Ibid. Any issues relating to an indemnity are outside the inquiry's terms of reference.

¹⁰²⁹ Ibid.

¹⁰³⁰ Ibid.

little economic and social benefit to the community to be made available for compatible uses, such as light industry or intensive horticulture.”¹⁰³¹

- 7.158 The Committee notes Mr O’Connor’s submission that *“Most significantly, a formal buffer provides an opportunity for the community to have input into what land uses are around the refinery and the way they are managed. This has proven very difficult with the current, informal approach.”*¹⁰³²
- 7.159 The Committee raised the issues in the above paragraphs with Alcoa and in particular, whether Alcoa intended to amend the TPS. Alcoa responded that its original intention was to work with the relevant local authorities to establish the best method to secure land use compatibility around the Wagerup refinery. It noted that this would likely involve changes to existing Town and Regional Planning Schemes.¹⁰³³
- 7.160 Alcoa advised that this process had progressed to the point where, in conjunction with the Shires of Harvey and Waroona, land use options were identified and processes established to progress Planning Scheme amendments. Alcoa advised, however, that it did not prove possible to secure the necessary consensus with the local authorities.¹⁰³⁴
- 7.161 In response to the Committee’s query regarding whether the Shire of Waroona had investigated the likely economic and social impacts on those people living near but not in the buffer area, Mr O’Connor advised that the Shire of Waroona had investigated the matter, mostly in terms of the impact of *“Alcoa’s decision to offer to purchase properties within an area adjoining the proposed buffer area...and their failure to provide a legally binding commitment to back up that offer.”*¹⁰³⁵ Mr O’Connor submitted that *“This has created considerable uncertainty and there is anecdotal evidence to suggest that a number of people have sold their properties to Alcoa because of that uncertainty.”*¹⁰³⁶
- 7.162 The Committee notes that the Shire of Waroona provided the Committee with a summary of the economic benefits to the Shire as a result of the Alcoa refinery at Wagerup. The information provided by the Shire is the same as that provided by Alcoa which is discussed in paragraphs 8.51 to 8.72 of this report.

¹⁰³¹ Ibid.

¹⁰³² Ibid.

¹⁰³³ Letter from Mr Bill Knight, Wagerup Refinery Manager, October 6 2003, p4.

¹⁰³⁴ Ibid.

¹⁰³⁵ Letter from Mr Kevin O’Connor, Chief Executive Officer, Shire of Waroona, July 30 2003.

¹⁰³⁶ Ibid.

EVIDENCE FROM THE MINISTER FOR THE ENVIRONMENT AND THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

- 7.163 In response to a request for information, the Committee received a letter from the Minister for the Environment dated April 9 2002. The Minister provided some advice to the Committee and also provided an extensive submission prepared by the DEP.
- 7.164 The Minister expressed her belief that significant progress has been, and continues to be, made to address the Wagerup issue.¹⁰³⁷ The DEP also submitted that *“Significant reductions in noise and odour emissions have been achieved and additional projects are in progress to further reduce odour emissions from the refinery by mid winter this year. These additional projects are expected to result in a major reduction in odour emissions and a significant reduction in ground level odour concentrations.”*¹⁰³⁸
- 7.165 However, the DEP also submitted that by the end of winter 2002 all of the significant emissions sources from the refinery will have been addressed and any further reductions achieved after that time, short of plant closure, will be marginal in terms of their significance.¹⁰³⁹
- 7.166 The Committee notes the DEP’s submission that it is unlikely that engineering solutions alone will resolve all identified community concerns.¹⁰⁴⁰
- 7.167 Similarly, the Minister submitted that whilst further emission reduction projects are possible and will be pursued, they are expected to give significantly smaller reductions than those either already achieved or in progress.¹⁰⁴¹
- 7.168 The Minister submitted that *“In view of this, the buffer concept being progressed by Alcoa will be critical in resolving any outstanding matters where individual residents believe they are still being adversely affected by Alcoa’s operations. Accordingly, the security and integrity of the buffer area will need to be protected through relevant town planning zoning schemes.”*¹⁰⁴²
- 7.169 The Minister submitted that *“Buffer zones become critical when all reasonable and practical measures to reduce emissions from industrial activities have been taken.”*¹⁰⁴³

¹⁰³⁷ Submission No. 53 from the DEP, April 9 2002, attached letter from the Minister.

¹⁰³⁸ Submission No. 53 from the DEP, April 9 2002, p5.

¹⁰³⁹ Ibid.

¹⁰⁴⁰ Ibid.

¹⁰⁴¹ Submission No. 53 from the DEP, April 9 2002, attached letter from the Minister.

¹⁰⁴² Ibid.

¹⁰⁴³ Ibid.

- 7.170 The DEP submitted that it supported the buffer concept, however noted that the strategy had raised a number of community concerns relating to social impacts, including the consequence of moving house, being away from established social networks, implications on the provision of services within the community and impact on land values.¹⁰⁴⁴
- 7.171 The Committee notes the DEP submission that *“The buffer issue is significant as historically there was an inadequate buffer for both noise and odour, especially to the south of the refinery. This became a critical factor when odour and noise emissions from the refinery increased beyond those levels experienced prior to 1996.”*¹⁰⁴⁵
- 7.172 The DEP also submitted that there should be provisions in the relevant local government Town Planning Schemes and the draft region schemes for the Peel and Bunbury Regions for a buffer area to address this issue. It submitted that if such provisions were made, the buffer area would be clearly documented on statutory land zoning plans for the public to see, the relevant planning authorities would be able to control potentially conflicting land uses from being developed within the buffer, and land within the buffer could be acquired if necessary, via the provision of a formal mechanism and not solely on the goodwill of the company involved.¹⁰⁴⁶
- 7.173 The Committee notes that in her letter the Minister expressed her belief that the *“Wagerup case is similar to numerous other cases where adequate buffer zones were not initially in place or properly protected via the town planning process.”*¹⁰⁴⁷ She noted that the implications of this apply to both existing and proposed facilities and submitted that *“This issue will need to be resolved in any strategy developed to ensure that conflicts between industrial activities and other landuses, are minimised or prevented.”*¹⁰⁴⁸
- 7.174 The DEP submission also noted that the issue of inadequate buffer areas and increasing conflicts between industrial activities and residents is not unique to the Wagerup situation. The Committee notes with interest the DEP’s advice that numerous examples of similar land use planning conflicts are being experienced with respect to other industrial activities such as hazardous waste treatment, waste disposal, abattoirs, rendering plants, food processing, cement works and brick works, and sewerage treatment plants.¹⁰⁴⁹

¹⁰⁴⁴ Submission No. 53 from the DEP, April 9 2002, p24.

¹⁰⁴⁵ Ibid, p25.

¹⁰⁴⁶ Ibid pp42-43.

¹⁰⁴⁷ Submission No. 53 from the DEP, April 9 2002, attached letter from the Minister.

¹⁰⁴⁸ Ibid.

¹⁰⁴⁹ Submission No. 53 from the DEP, April 9 2002, p25.

- 7.175 The DEP submitted that the broader issue of buffer zones and the protection of these areas through appropriate town planning processes needs to be addressed both generally and in specific cases. It submitted that the need for this action relates to both existing and proposed industrial activities.¹⁰⁵⁰
- 7.176 The Committee notes the DEP's submission that "*there does not appear to be a State agency responsible for managing or resolving social issues resulting from this type of issue. The community feels that it is subject to Alcoa's objectives in this regard. This perception has added to the community's concern regarding this issue.*"¹⁰⁵¹
- 7.177 In a subsequent written submission to the Committee dated January 24 2003 the DEP advised that at a meeting of the Wagerup Community Working Group on August 30 2002 "*some key community members indicated that health and odour impacts are no longer the most significant issues for the community.*"¹⁰⁵²
- 7.178 The DEP advised that the community members indicated the major issue faced by the community at present "*is the social impacts that this issue has caused, especially via the purchase of properties by Alcoa both inside and outside 'Area A'.*"¹⁰⁵³
- 7.179 The DEP also noted that at an open day and public information session held in Yarloop on October 8 2002 it was clear that "*economic and social issues associated with Alcoa's land purchases were currently more significant than community concerns over air quality.*"¹⁰⁵⁴

REPORT BY DR MARK CULLEN, CHIEF MEDICAL OFFICER, ALCOA

- 7.180 The Committee refers to Dr Cullen's report titled *Wagerup Alumina Refinery. Health Issues. Visit to Alcoa World Alumina Australia, West Australian Operations. February 2002* which is also discussed in paragraphs 4.63 to 4.81 of this report.
- 7.181 In his discussion about Alcoa's land management strategy, Dr Cullen notes that it is "*having some teething problems. Some community members believe anomalies in the scheme are inequitable.*"¹⁰⁵⁵
- 7.182 Dr Cullen notes that as this strategy is part of Alcoa's response to community concerns about health issues, "*it is appropriate to address teething problems within*

¹⁰⁵⁰ Ibid.

¹⁰⁵¹ Ibid.

¹⁰⁵² Submission No. 52 from the DEP, January 24 2003, p14.

¹⁰⁵³ Ibid.

¹⁰⁵⁴ Ibid, p18.

¹⁰⁵⁵ Dr Mark Cullen: *Wagerup Alumina Refinery. Health Issues. Visit to Alcoa World Alumina Australia, West Australian Operations. February 2002*, p7.

that context and to reflect on community concerns about broader economic impacts of health issues on the community.”¹⁰⁵⁶

7.183 Dr Cullen stated that *“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.”¹⁰⁵⁷*

7.184 In relation to Alcoa’s land management strategy, the Committee notes that Dr Cullen recommended that *“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.”¹⁰⁵⁸*

ALCOA’S RESPONSE TO DR CULLEN’S REPORT

7.185 The Committee received a letter from Mr Geoff Hayward, Executive Director, WA Operations, Alcoa World Alumina Australia, dated April 23 2002 containing a summary of actions taken by Alcoa in response to Dr Cullen’s report.

7.186 Mr Hayward advised that Alcoa was implementing the Wagerup Land Management Revised Proposal. He advised that a number of properties in the region had been purchased, with those close to the refinery being retained by Alcoa and leased to tenants. Properties further from the refinery were being resold. Refer to paragraphs 7.38 to 7.45 of this report for information regarding the numbers of properties acquired by Alcoa.

7.187 However, Mr Hayward advised that Alcoa was encountering concerns within the community about reduced population and government services, and consequent concerns from local business owners over these issues.¹⁰⁵⁹ Mr Hayward advised that Alcoa was working with a representative group from the community on agreed ways for Alcoa to support enhanced infrastructure, and was looking to Government for assistance in preventing the decline in government services in the area. Refer to paragraphs 7.47 to 7.52 of this report for further information. Refer also to paragraphs 8.51 to 8.72 of this report for a discussion on Alcoa’s financial assistance to the local community and Alcoa’s Community Development Fund.

¹⁰⁵⁶ Ibid.

¹⁰⁵⁷ Ibid.

¹⁰⁵⁸ Ibid, p10.

¹⁰⁵⁹ Letter from Mr Geoff Hayward, Executive Director WA Operations, Alcoa World Alumina Australia, April 23 2002.

- 7.188 Mr Hayward also advised that the concerns of local businesses are being worked through on an individual basis.¹⁰⁶⁰
- 7.189 The Committee notes Mr Hayward's comment that a meeting was held with a group of real estate agents who cover the entire region, including Waroona, Yarloop, Harvey, Pinjarra and Bunbury.¹⁰⁶¹ Mr Hayward advised that these real estate agents will be involved in re-selling properties bought by Alcoa, and "*provided a lot of advice on how to quickly get purchased property back into the hands of new residents.*"¹⁰⁶²

MINISTERIAL COUNCIL RESPONSE TO RECOMMENDATION 4 OF THE WAGERUP MEDICAL PRACTITIONERS' FORUM

- 7.190 For a discussion on the Wagerup Medical Practitioners' Forum and Ministerial Council please refer to paragraphs 4.240 to 4.250 of this report. Recommendation 4 of the Wagerup Medical Practitioners' Forum states that "*The Forum supported exposure reduction via a planned buffer zone.*"
- 7.191 In its response to recommendation 4, the Ministerial Council stated that it supported Alcoa's buffer expansion concept as it "*provides an opportunity for community members to remove themselves from continued exposure where they believe that refinery emissions are affecting their health or amenity.*"¹⁰⁶³
- 7.192 The Ministerial Council expressed its belief that:

*it is important to remember that the "buffer strategy" was conceived as a mechanism to allow community members near the refinery to relocate should they wish to do so. The delineation of area A and area B was originally chosen based, in the main, on the 35dBa noise contour. Consequently, area A does not represent a boundary for chemical or odour exposure risk.*¹⁰⁶⁴

- 7.193 However the Ministerial Council noted that there are social issues related to the implementation of this concept which require understanding and sympathetic attention. The Ministerial Council noted that it was aware that:

members of the community and the local government authorities are concerned that this land purchase strategy may unintentionally lead

¹⁰⁶⁰ Ibid.

¹⁰⁶¹ Ibid.

¹⁰⁶² Ibid.

¹⁰⁶³ Ministerial Council Response to Wagerup Medical Practitioners' Forum Recommendation 4.

¹⁰⁶⁴ Ibid.

*to social impacts as some families leave the area, such as a reduction in vibrancy in the local area or a reduction in commercial or government services.*¹⁰⁶⁵

- 7.194 The Ministerial Council expressed its belief that *“it is important that Alcoa’s land purchases are sensitive to a possible reduction in local government or other services. Furthermore, it is expected that Alcoa will implement measures to minimise unwanted social impacts by working in partnership with the local community and local government.”*¹⁰⁶⁶

YARLOOP, EDITH COWAN UNIVERSITY, ALCOA PROJECT

- 7.195 In response to a request for information regarding the Yarloop, Edith Cowan University, Alcoa Project (**YEAP Project**), Alcoa advised by way of letter dated August 28 2003 that it is funding the YEAP Project to *“build stronger networks in the local community.”*¹⁰⁶⁷

- 7.196 Alcoa advised that *“The project aims to build capacity so the community can shape its own future. It also aims to address community concerns regarding Alcoa’s land management strategy.”*¹⁰⁶⁸

- 7.197 The Committee was advised that as part of the YEAP project, a full-time expert facilitator for on-ground support, other staff resources and a community drop-in centre are provided to the community.

- 7.198 Alcoa advised that:

*The facilitator has played an important roll (sic) in guiding negotiations between Alcoa and the community with regards to Alcoa’s Land Management Proposal. This process is drawing to a conclusion and is expected to result in positive outcomes for both the community and Alcoa.*¹⁰⁶⁹

- 7.199 Alcoa also advised that, while still to be formalised:

it is anticipated that the next stage of the YEAP project will have a greater focus on resolving social issues, bridging gaps in the community and integrating new community members. The facilitator

¹⁰⁶⁵ Ibid.

¹⁰⁶⁶ Ibid.

¹⁰⁶⁷ Letter from Alcoa, August 28 2003, p10.

¹⁰⁶⁸ Ibid.

¹⁰⁶⁹ Ibid.

*will have a role to play in helping the community identify community development priorities for the future.*¹⁰⁷⁰

- 7.200 In a submission dated January 27 2004 the Yarloop and Districts Concerned Residents Committee (**YDCRC**) provided the Committee with a copy of a report prepared by Dr Dyann Ross, Edith Cowan University (**ECU**), dated September 2003.¹⁰⁷¹
- 7.201 Dr Ross noted in her report that ECU began working with Alcoa in June 2002 with a broad brief to enable constructive relationships with local leaders and Alcoa, with a view to finding workable strategies to the shared issues.¹⁰⁷²
- 7.202 Dr Ross noted that the focus of the collaborative work was on addressing the issues perceived to arise from Alcoa's Revised Land Management Proposal. She also noted that as with all complex conflicts, this focus intersected with all the other perception issues, namely health concerns, social impacts, the effects of media exposure, refinery operational issues such as air pollution, noise, community relations difficulties due to the fear of the impact of the proposed 'buffer' and also of a possible refinery expansion on the neighbouring properties and townsites.¹⁰⁷³
- 7.203 The purpose of Dr Ross's report was to present the process, outcomes and ways forward arising from a collaboration between Alcoa and some property owners in Yarloop and Hamel. Dr Ross wrote that it was expected that Alcoa would refer to the report to assist its decision-making and that a separate document would be prepared by Alcoa noting what recommendations they were prepared to uphold and possibly how they would be enacted.¹⁰⁷⁴
- 7.204 Dr Ross provided her summary of the common ground agreed between the parties, which included:¹⁰⁷⁵
- that caution needed to be exercised in making changes to the land management strategy to avoid making the situation worse;
 - the method of valuation was acknowledged as problematic for many property owners, resulting in a loss of confidence in the instructions, specific valuations and method used to determine 'unaffected' market value.

¹⁰⁷⁰ Ibid.

¹⁰⁷¹ Dr Dyann Ross, Edith Cowan University, *Reviewing the Land Management Issues: Some Common Ground at a Point in the Process - A Report on the Collaboration between Alcoa, Wagerup and Yarloop/Hamel*, September 2003.

¹⁰⁷² Ibid, p7.

¹⁰⁷³ Ibid, p1.

¹⁰⁷⁴ Ibid, p3.

¹⁰⁷⁵ Ibid, pp15-16.

Additionally, this method of valuation did not address some property related losses and the perception of an increased gap between valuation obtained and replacement property;

- the immediate threat to the impacted communities was acknowledged and the parties shared interest in regaining the towns' viability was evident in many discussions; and
- the importance of small businesses to the towns was recognised and a shared concern.

7.205 Dr Ross listed a significant number of unresolved issues which encompassed what the community participants regarded as crucially important to the viability of their towns and the fair treatment of people affected by Alcoa's operations at Wagerup. These included that:¹⁰⁷⁶

- the need for a 'buffer' remained a big question from the outset of the meetings;
- there had been an expression of the continuing urgency about the need to address the impact on the small businesses and other income earners who lost work with the cessation of development in the towns;
- the boundaries of designated Area A had been consistently contested;
- it was often argued that there should be no difference in how people are treated; thus all purchases by Alcoa should be in accordance with the Area A offer and should additionally include a separate compensation amount for losses relating to social amenity and personal harm; and
- the state and local governments' roles and responsibilities in the issues were consistently questioned and dissatisfaction was the predominant sentiment.

7.206 It was noted in the report that the key recommendations negotiated during collaborative meetings between the parties and being considered by Alcoa as at September 2003 included issues such as:¹⁰⁷⁷

- communities as key stakeholders in local planning issues;
- valuation methods;

¹⁰⁷⁶ Ibid, pp23-24.

¹⁰⁷⁷ Ibid, pp4-5.

- more transparent property management;
- underwriting to protect property values in towns and assistance to property owners outside towns;
- businesses were recognised as important; and
- improved processes for complex cases.

7.207 The underwriting option, as explained in Dr Ross's report, recommended that Alcoa would enact a strategy to provide protection of property values for the remaining owners in Hamel and Yarloop townships as follows:¹⁰⁷⁸

- Alcoa would underwrite the value of Hamel and Yarloop township properties sold on the open market by paying any shortfall between sale price and agreed value;
- the underwriting option was to be available from January 1 2007. The current situation of Alcoa purchasing in Area B until December 2006 was to remain in place, however the extension for an additional five years was to be replaced by the underwriting option;
- the option was to be provided by Alcoa for the life of the eligible property owner or the life of the Wagerup refinery, whichever came first;
- the owner was to genuinely attempt to sell the property for a six month period; and
- if the property was not sold within this period, and provided there were no unforeseen impacts external to Alcoa, then Alcoa would look to various incentive arrangements to secure a sale.

7.208 Dr Ross provided an update in an epilogue to her report, written in November 2003. Dr Ross noted that at a specially convened meeting in September 2003, Alcoa informed the community members that although it agreed to all the other recommendations, it was unwilling to uphold the underwriting option for people in Area B.¹⁰⁷⁹

¹⁰⁷⁸ *Revision/Review Paper of Alcoa's Wagerup Land Management Revised Proposal, Jan., 2002: Draft 2 for Community Feedback*; p106, Appendix 9 of Submission No. 69 from YDCRC, January 27 2004.

¹⁰⁷⁹ Dr Dyann Ross, Edith Cowan University, *Reviewing the Land Management Issues: Some Common Ground at a Point in the Process - A Report on the Collaboration between Alcoa, Wagerup and Yarloop/Hamel*, September 2003, p38.

7.209 Alcoa explained its decision as follows:¹⁰⁸⁰

- the underwriting option was not consistent with Alcoa exiting the property market which many residents of Yarloop had indicated they wanted;
- there was concern that in the future it could create issues for residents, in particular those who were new to the area; and
- the amendment had broader planning implications that needed to be considered in the context of the current Government initiatives.

7.210 Dr Ross stated in her epilogue that the underwriting initiative was considered crucial by many residents and the meeting was closed without any clear next step. Dr Ross noted in her report that three weeks after the announcement that Alcoa was unwilling to uphold the underwriting option for people in Area B, community members wrote to Alcoa requesting a re-convened meeting to debrief and assess what had been achieved. Dr Ross noted in her epilogue that a response from Alcoa was still pending.¹⁰⁸¹

7.211 In its submission to the Committee the YDCRC referred to the underwriting option and advised the Committee that it was:

considered necessary by some of the community to address current uncertainties and a means of addressing the uncertainties of Alcoa's proposed expansion, in that if impacts increased the risk of negative impacts on property values would not once more be inflicted on the communities."¹⁰⁸²

7.212 The YDCRC submitted that:

By continuing to refuse to address security for residents further heightens concerns that Alcoa are merely ensuring that they cannot be held accountable for any increase in impacts as a result of any production increase, effectively by making sure no precedent is set as a result of the current controversy and conflict and therefore no commitments are made that Alcoa will be bound to and is the only plausible explanation as to why they have not acknowledged, let alone followed, the recommendations of the consultants engaged by the ECU as part of the Land Management Meetings. The purpose of all

¹⁰⁸⁰ Ibid, p39.

¹⁰⁸¹ Ibid.

¹⁰⁸² Submission No. 69 from YDCRC, January 27 2004, p8.

*that work was to ensure “fairness and equity” and “win/win” outcomes for all.*¹⁰⁸³

COMMITTEE FINDINGS

- 7.213 The Committee finds that emissions from Alcoa’s Wagerup refinery have had an adverse impact on the amenity of the local communities.
- 7.214 In hindsight the Committee is of the view that the creation of a formal buffer zone around Alcoa’s refinery at Wagerup at the time it was built may have prevented some of the issues raised in this report.
- 7.215 The issues raised in this report in relation to Alcoa’s Wagerup refinery highlight the importance of the need for the implementation of adequate buffer zones during:
- the initial planning and assessment phase of industrial proposals; and
 - consideration of any proposed expansion to the capacity of such industries and/or changes in technology affecting such industries.
- 7.216 Many people in the local community believe that Alcoa’s Land Management Revised Proposal is inequitable and has not gone far enough towards addressing their very real concerns about underlying social and economic issues. In particular, the Committee believes that the fact that the boundary of Area A runs through the township of Yarloop has been a significant factor in the division and social unrest currently being experienced by the local community.
- 7.217 Furthermore, some aggrieved households fall within neither Area A nor Area B. The Committee notes that some people living outside Area A and Area B have asserted in evidence to the Committee that they have been adversely impacted by Alcoa’s Wagerup refinery.¹⁰⁸⁴ The Committee is concerned that those people are not included in Alcoa’s Wagerup Land Management Revised Proposal at the time of tabling this report.
- 7.218 The Committee finds that Alcoa’s Land Management Revised Proposal has created a perception of a lack of equity and has been the cause of financial stress to some people living near the refinery.
- 7.219 The Committee concludes that to achieve the stated commitments in Alcoa’s Land Management Revised Proposal, it should be re-drafted to achieve fairness and equity for those members of the local community, both current residents and current business

¹⁰⁸³ Ibid, p9.

¹⁰⁸⁴ For example, refer to paragraphs 7.84 and 7.91 of this report.

owners/operators, who are considering leaving the area due to the impact of the refinery on their lives.

7.220 In coming to this view, the Committee has been mindful of the concerns relating to the viability and vitality of Yarloop and Hamel that may arise as a result of, or be exacerbated by, the expansion of the informal buffer zone.¹⁰⁸⁵

7.221 The Committee notes Alcoa's advice that as at April 21 2003 it had:

- purchased 86 properties in Area A (from a total of 233 properties), of which 64 were residences and 22 were vacant blocks;¹⁰⁸⁶
- leased 52 properties acquired in Area A to tenants, 19 of which had been leased back to their previous owners (including residents who previously registered complaints about refinery emissions); and
- purchased 99 properties outside Area A in Yarloop and Hamel (from a total of 301 properties), of which 76 were residences and 23 were vacant lots. Thirty two of these properties had been re-sold by Alcoa to new owners and 25 properties were under offer.

7.222 The Committee finds it inappropriate that the complex competing land uses at Wagerup, Yarloop and Hamel and the strategies used to resolve them have been left to Alcoa to settle. The Committee considers that this is more properly the role of the Government.

7.223 The Committee finds that Alcoa's current land management strategy is inequitable. The Committee therefore encourages Alcoa to consider the following options in relation to its land management strategy:

First option: amend the Wagerup Land Management Revised Proposal by extending Area A to include all of the townships of Yarloop and Hamel.

In the Committee's view the advantages of the first option include that:

- it resolves the problems created by the current division of those townships into two different areas under the existing land management strategy; and
- it is relatively simple to achieve.

In the Committee's view the disadvantages of the first option include that:

¹⁰⁸⁵ For example, refer to Alcoa's view at paragraph 7.27 and the view of the Shire of Harvey at paragraph 7.139.

¹⁰⁸⁶ The Committee notes Alcoa's advice that as at September 4 2003 it had purchased 97 properties in Area A.

- it may exacerbate issues relating to the vitality and viability of the townships; and
- it may create a perception of inequity by those persons not in Area A or Area B who are excluded entirely.

Second option: *re-consider implementing the underwriting option proposed in the YEAP project (refer to paragraph 7.207 of this report).*

In the Committee's view the advantages of the second option include that:

- it would stabilise the populations of Yarloop and Hamel; and
- it would provide financial security to people who wish to remain in those townships.

In the Committee's view the disadvantages of the second option include that:

- benchmarking may distort valuations due to other factors; and
- the area of application is uncertain.

7.224 ***Third option:*** The Committee notes that an option available to the State Government is to implement a statutory buffer zone. However the Committee unanimously agreed that this is not an acceptable solution due to its compulsory nature and its retrospectivity which would be extremely disruptive to the local communities.

CHAPTER 8

SOCIAL IMPACTS

OVERVIEW OF CHAPTER

8.1 In this chapter the Committee discusses:

- the communities in the vicinity of the Alcoa refinery at Wagerup, particularly the Shires of Harvey and Waroona;
- examples of evidence received in relation to social impacts of the Alcoa refinery at Wagerup on members of the local community;
- the Alcoa Research Centre for Stronger Communities;
- Alcoa's financial assistance to the local community and its Community Development Fund; and
- Noise emissions from the Alcoa refinery at Wagerup and evidence in relation to those emissions.

8.2 The Committee has summarised many of the submissions it has received in relation to social impacts to give the reader an understanding of the wide range of issues raised in relation to this matter during the course of the Committee's inquiry.

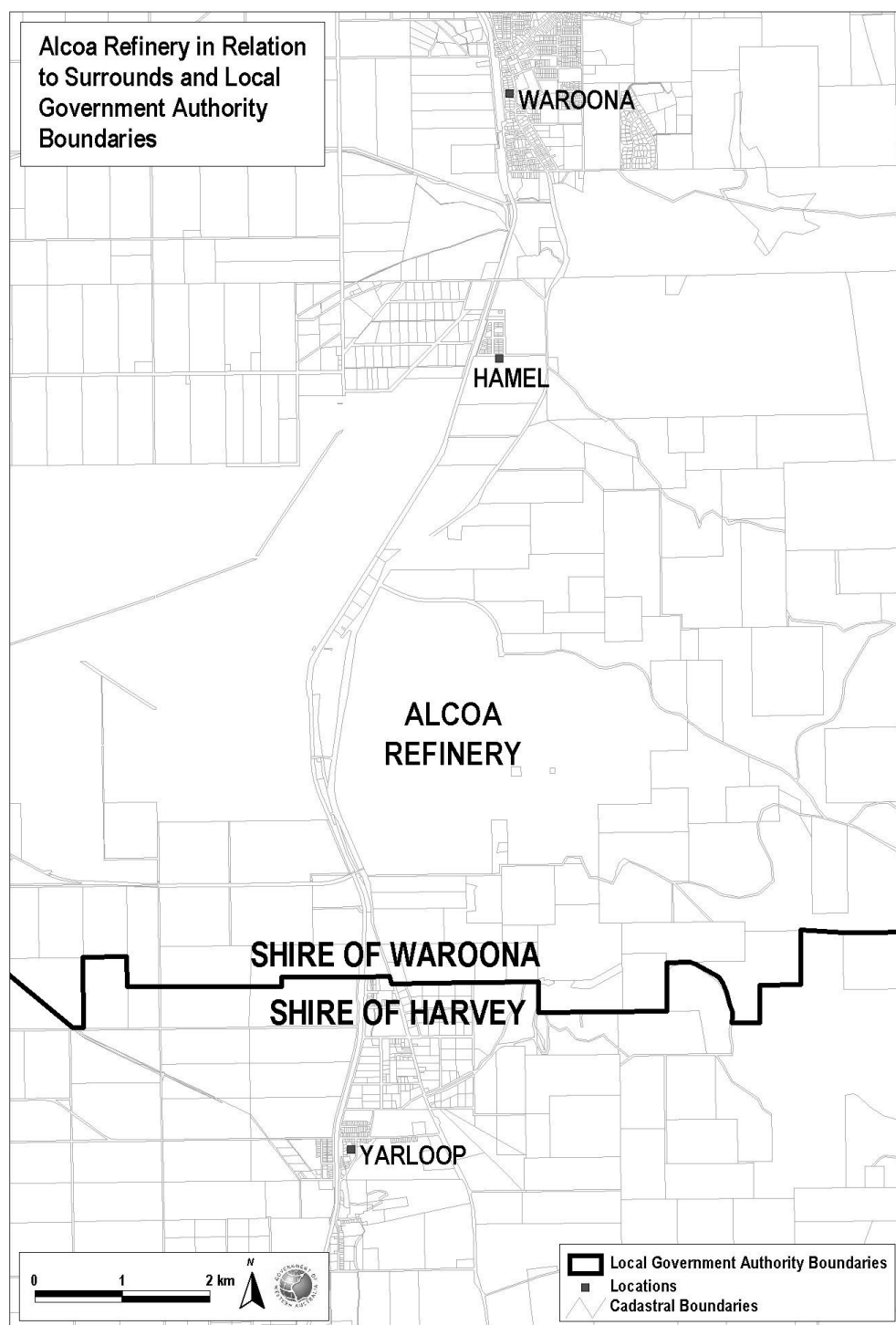
8.3 The final part of the chapter contains Committee findings, analysis and conclusions as well as recommendations for the future.

COMMUNITIES IN THE VICINITY OF THE ALCOA REFINERY AT WAGERUP

8.4 The areas most affected by the Alcoa refinery at Wagerup fall within the jurisdiction of the Shire of Harvey and the Shire of Waroona. A map showing the boundaries of the Shires of Harvey and Waroona is set out in Figure 8.1.

Figure 8.1

Boundaries of Shires of Harvey and Waroona



Shire of Harvey

- 8.5 The Shire of Harvey is located approximately 120 kilometres south of Perth and encompasses an area of approximately 1766 square kilometres.
- 8.6 It is bordered to the north by the Shire of Waroona, to the north-east along the Murray River with the Shire of Boddington, to the south-east by the Shire of Collie, to the south along the Collie River with the Shire of Dardanup, to the south-west by the City of Bunbury and to the west by the Indian Ocean.
- 8.7 The land types and uses within the Shire of Harvey vary, however the dairy and beef industries are significant rural industries. The bauxite rich Darling Range forms the basis of Western Australia's alumina refining industry.
- 8.8 Figures from the 2001 Australian Bureau of Statistics census recorded that on the night of August 7 2001 when the census was held, were 17 272 people in the Shire of Harvey and that the median age was 33 years.¹⁰⁸⁷
- 8.9 The Shire of Harvey has a total of 13 pre-primary and primary schools, two secondary schools and one agricultural college, two Technical and Further Education campus's, three police stations and two public hospitals.
- 8.10 Towns within the Shire of Harvey include Australind, Cookernup, Harvey and Yarloop.

Shire of Waroona

- 8.11 The Shire of Waroona consists of an area of 835 square kilometres of land running from the Indian Ocean in the west, across the Darling Range and down to the Murray River in the east, including Nanga and Lane-Pool Reserve. Approximately one third of the land within the Shire of Waroona is rateable land.
- 8.12 Like the Shire of Harvey, the land types and uses within the Shire of Waroona vary leading to a range of diverse industries. These include beef, sheep and dairy farming, tree farming, earthmoving, market growers, engineering and mining, although the Shire does rely heavily on the mining industry. The Shire of Waroona was commissioned in 1898 and recently celebrated 100 years of local government.¹⁰⁸⁸

¹⁰⁸⁷ Australian Bureau of Statistics website: www.abs.gov.au (accessed August 26 2003).

¹⁰⁸⁸ Shire of Waroona website: www.waroona.wa.gov.au (accessed August 26 2003).

- 8.13 Figures from the 2001 Australian Bureau of Statistics census recorded that on the night of August 7 2001 when the census was held, there were 3276 people in the Shire of Waroona and that the median age was 36 years.¹⁰⁸⁹
- 8.14 The Shire of Waroona has two primary schools, one secondary school (up to year ten) and one police station. There are no public hospitals.
- 8.15 The townsite of Waroona has a population of approximately 2500 and is located on the South Western Highway, a major transport route, about 110 kilometres south of Perth. It is the commercial, social and administrative centre for most of the Shire's population. Other townsites within the Shire include Preston Beach, Hamel and Lake Clifton.

EXAMPLES OF EVIDENCE RECEIVED IN RELATION TO SOCIAL IMPACTS EXPERIENCED BY MEMBERS OF THE LOCAL COMMUNITY

Mr and Mrs Martelli, local residents

- 8.16 At the Committee's hearing at Waroona on November 21 2001 Mr Giglio Martelli, Vice President, WCHAG tabled a letter, written by his wife Mrs Leanne Martelli, titled *"Life on the Alcoa Merry-Go Round"*. Refer to paragraphs 4.337 to 4.358 of this report for an outline of the WCHAG.
- 8.17 Mrs Martelli wrote that her husband's family had lived in the Yarloop area for fifty years. His parents had subdivided their land for their children *"so they too could live in what we think is a beautiful area with, what was, a first class quality of life."*¹⁰⁹⁰
- 8.18 Mrs Martelli submitted that the area in which she lives, that is, the area of Yarloop which has been affected by the Alcoa refinery at Wagerup, might not appear to be a significant area when shown on a map. However she expressed her opinion that *"to us and to many neighbours, friends and relatives around us, it is the place we once loved and would have never considered leaving. Ever!"*¹⁰⁹¹
- 8.19 She expressed her view that for all the years her husband and his family had lived in Yarloop, the lifestyle had been wonderful. This included the people, the quiet life and the rural lifestyle with all the amenities close by.
- 8.20 However, Mrs Martelli expressed her opinion that this is no longer the case. She wrote that *"Now we are on the Alcoa merry-go round, not by choice but because of*

¹⁰⁸⁹ Australian Bureau of Statistics website: www.abs.gov.au (accessed August 26 2003).

¹⁰⁹⁰ Letter written by Mrs Leanne Martelli, undated, tabled by Mr Giglio Martelli at the Committee's hearing at Waroona on November 21 2001.

¹⁰⁹¹ Ibid.

decisions made by people without regard as to the effects these decisions will have on the community's population."¹⁰⁹²

- 8.21 Mrs Martelli informed the Committee that for approximately three years her family's lives had been put on hold because of the odour emanating from the Alcoa refinery at Wagerup. She submitted that the odour problem is a major irritation "*not only on our noses but also on the many other aspects of their lives*". Mrs Martelli wrote that "*The rural lifestyle we once regarded so highly is now ruined. As like many others living in Yarloop, for six months of the year we are locked inside our house trying to escape the disgusting odours coming from Alcoa.*"¹⁰⁹³
- 8.22 Mrs Martelli advised that the odours cause cancellations of activities that other people take for granted such as weeding the garden, putting the washing on the line, letting children play outside, entertaining friends and eating produce from the garden.
- 8.23 Mrs Martelli also advised that her family's social life outside Yarloop had been affected. She submitted that the issues surrounding the Alcoa refinery at Wagerup are a constant part of their lives, and that it is impossible to avoid the constant talk in the community of what is happening in Yarloop. She advised that the phone does not stop ringing and the meetings continue to encroach on their spare time.
- 8.24 Mrs Martelli said that at the time of writing the letter she was eight months pregnant and had considered leaving Yarloop during her pregnancy as she was unsure what effect, if any, the emissions from the Alcoa refinery at Wagerup might have on her unborn baby. She submitted that these are the sorts of major decisions people in the local community face every day.
- 8.25 Mrs Martelli expressed her opinion that it is difficult for people to make the decision to sell their house and leave the area of Yarloop. She said many people have elderly relatives living close by who rely on them, and that it is very difficult to move people towards the end of their lives without causing a major upset. She wrote that "*These types of problems are only increased when you add to the facts, that the money it costs to shift and trying to find somewhere suitable to live, close by without the odour problems and all the amenities such as scheme water, rubbish collections, power and sealed roads makes it hard.*"¹⁰⁹⁴
- 8.26 Mrs Martelli concluded by expressing her hope that her letter had given an insight into some of the:

¹⁰⁹² Ibid.

¹⁰⁹³ Ibid.

¹⁰⁹⁴ Ibid.

*human problems being caused by the emissions coming from Alcoa. So that when they say they are below emission limits and below the world health standards that you now realise that this does not mean that they are not having a major impact on the people in Yarloop's lives.*¹⁰⁹⁵

Mr Anthony Hall, Chairperson of the Yarloop and Districts Concerned Residents Committee

- 8.27 At its hearing in Perth on February 18 2002 the Committee heard evidence from Mr Hall, Chairperson of the YDCRC. Refer to paragraph 4.119 of this report for an outline of the YDCRC.
- 8.28 Mr Hall submitted that *“As the current system operates, it is we, the members of the community, who must pay the price for Alcoa’s expansions with the loss of our health, amenity and lifestyle and more than possibly the loss of our communities.”*¹⁰⁹⁶
- 8.29 Mr Hall said that when the emissions from the refinery are particularly obvious, people living in the area try as much as possible to stay indoors. However, people are still affected despite remaining inside, as it is impossible to keep all emissions and odours out of the house. Mr Hall submitted that people upon whom the emissions have a more severe impact leave the area.
- 8.30 In answer to a question put by the Chairman as to whether Yarloop faced losing its services such as the primary school, hospital and other public services, Mr Hall submitted that it was *“very likely that that will happen if the student numbers drop at the school.”*¹⁰⁹⁷ Mr Hall said enrolled student numbers at the school had dropped 30 percent in 2002 and that there was a chance that the school might lose another teacher.¹⁰⁹⁸
- 8.31 Following up on this matter, the Committee sought from the Department of Education and Training, the numbers of school based full time teaching staff and the numbers of full time students for Yarloop Primary School over a period of time.¹⁰⁹⁹ The tables set out in Figure 8.2 show trends in staff and student numbers at Yarloop Primary School from 1996, which the Committee notes was when the LBF was installed, to Semester Two 2003.

¹⁰⁹⁵ Ibid.

¹⁰⁹⁶ Mr Anthony Hall, Chairperson, YDCRC, *Transcript of Evidence*, February 18 2002, p10.

¹⁰⁹⁷ Ibid, p12.

¹⁰⁹⁸ Ibid.

¹⁰⁹⁹ Facsimile from the Department of Education and Training dated September 24 2003.

Figure 8.2**Trends in student and staff numbers at Yarloop Primary School****Full Time Students - Yarloop Primary School**

Individual Semesters	Education Levels		
	Pre-Compulsory	Primary	Totals
2003 Semester 2	13	66	79
2003 Semester 1	18	60	78
2002 Semester 2	17	64	81
2002 Semester 1	18	72	90
2001 Semester 2	21	80	101
2001 Semester 1	19	86	105
2000 Semester 2	23	93	116
2000 Semester 1	25	98	123
1999 Semester 2	22	108	130
1999 Semester 1	23	113	136
1998 Semester 2	25	112	137
1998 Semester 1	24	107	131
1997 Semester 2	15	109	124
1997 Semester 1	14	107	121
1996 Semester 2	18	116	134
1996 Semester 1	16	114	130

Full Time School Based Teaching Staff - Yarloop Primary School

Individual Semesters	Teaching Staff (School Based)
2003 Semester 1	5.94
2002 Semester 2	5.73
2002 Semester 1	6.33
2001 Semester 2	6.93
2001 Semester 1	6.93
2000 Semester 2	7.48
2000 Semester 1	7.48
1999 Semester 2	8.19
1999 Semester 1	7.95
1998 Semester 2	7.49
1998 Semester 1	7.34
1997 Semester 2	7.20
1997 Semester 1	7.20
1996 Semester 2	7.60
1996 Semester 1	7.00

8.32 Mr Hall submitted that the reduction in numbers of students enrolled at the local school will impact on other public services in the area. He expressed the view that
“As the school gets smaller and the level of education drops, whoever is left in town

*will take their children out because the standard of education will drop. The school will possibly close eventually.*¹¹⁰⁰

- 8.33 Mr Hall expressed his concern that if the school closed it would have a significant long-term impact on the town of Yarloop. His view was that anyone with children considering moving into the town would not do so due to the distances required to travel to and from school, the nearest school being a 20 kilometre bus trip away.
- 8.34 When asked by the Chairman about possible solutions acceptable to the communities represented by the YDCRC, Mr Hall said *“The only acceptable solution for almost all the residents is that Alcoa fix its problems. In the light of that, I cannot honestly see a solution that would please the majority of people.”*¹¹⁰¹
- 8.35 Mr Hall also said *“Probably the most acceptable solution would be to move the town. In that way the community would still be together. I do not think that forcing people away and not addressing the problems is the only solution.”*¹¹⁰²
- 8.36 Mr Hall explained that if the town as a whole was moved to a safer location, the community could remain together rather than families and residents moving and scattering to disparate locations.
- 8.37 In a subsequent written submission to the Committee dated October 10 2002, on behalf of the YDCRC, Mr Hall advised that the large number of people leaving Yarloop was having a significant impact on local businesses. He submitted that some businesses are losing up to 25 percent of their turnover and that if people continue to leave the town, some businesses will be forced to close.
- 8.38 Mr Hall expressed concern that if businesses close it will result in more people leaving Yarloop, and the eventual loss of all services to the town.
- 8.39 Mr Hall advised that, at the request of local business owners, the YDCRC had approached Alcoa to attempt to address the business owners’ concerns regarding their livelihoods, investments and future in Yarloop. Mr Hall submitted that *“Alcoa’s only response is that they will deal with the businesses on a case by case basis and they will not discuss individual cases with anyone.”*¹¹⁰³ For further discussion on this issue, refer to paragraphs 7.47 to 7.50 of this report.

¹¹⁰⁰ Mr Anthony Hall, Chairperson, YDCRC, *Transcript of Evidence*, February 18 2002, p12.

¹¹⁰¹ Ibid, p13.

¹¹⁰² Ibid.

¹¹⁰³ Submission No. 44 from YDCRC, October 10 2002, p3.

Mr Steve Bunce, local resident

- 8.40 Mr Bunce, a resident of Yarloop for 20 years, provided a written submission to the Committee dated September 4 2002 which expressed his views and opinions on the social impacts the Alcoa refinery at Wagerup has had, and is having, on the Yarloop community.
- 8.41 Mr Bunce submitted that when Alcoa commenced operations in the area people in the local community thought that *“the refinery and minesite would be a godsend, providing employment and security for the town.”*¹¹⁰⁴ However, he expressed his opinion that this has not been the case.
- 8.42 Mr Bunce submitted that although there had been problems over the years, it was the installation of the liquor burner in 1996 and the subsequent expansion of the refinery that significantly aroused community concerns.
- 8.43 Mr Bunce advised that *“Stress is a huge issue in Yarloop. The townspeople live with it twenty four hours a day. It is not possible to escape the subject of Alcoa.”*¹¹⁰⁵
- 8.44 Mr Bunce expressed concern that in his view elderly people have been *“particularly poorly treated through this process...”*¹¹⁰⁶ and *“are losing support systems that were previously provided by neighbours.”*¹¹⁰⁷
- 8.45 He also submitted that *“The rebuilding of the town morale and sense of community has fallen on the shoulders of those who stay whether they want that responsibility or not.”*¹¹⁰⁸
- 8.46 Mr Bunce expressed an opinion that Alcoa has attempted to address the social issues affecting the people in the local community *“but is only offering bandaid solutions...”*¹¹⁰⁹ He said *“Alcoa is convinced that most people are happy with their proposal, they are not.”*¹¹¹⁰

¹¹⁰⁴ Letter from Mr Steve Bunce, September 4 2002.

¹¹⁰⁵ Ibid.

¹¹⁰⁶ Ibid.

¹¹⁰⁷ Ibid.

¹¹⁰⁸ Ibid.

¹¹⁰⁹ Ibid.

¹¹¹⁰ Ibid.

Other adverse social impacts

8.47 During the course of its inquiry the Committee was informed of a number of adverse impacts on quality of life experienced by some people living in the communities close to the Alcoa refinery at Wagerup. These included the following:

- development of MCS resulting in having to resign from the workforce, in turn resulting in a loss of income and self-esteem;
- depression due to continual pain and inability to live a normal life;
- extreme difficulty performing household tasks;
- having to severely curtail all hobbies;
- having to severely restrict social life including holidays and family events away from home;
- no longer being able to drive a motor vehicle long distances due to sore joints and fatigue, resulting in, among other things, isolation;
- having to sell the family home and move to new areas with less chemical exposure; and
- finding it difficult to meet new people after relocating due to medical conditions.

THE ALCOA RESEARCH CENTRE FOR STRONGER COMMUNITIES

8.48 During the course of its inquiry the Committee obtained information regarding the Alcoa Research Centre for Stronger Communities at Curtin University.

8.49 The Alcoa Research Centre for Stronger Communities is sponsored by Alcoa. It undertakes research aimed at having a practical and applied impact on community life. Its focus is to *“provide a multi-disciplinary research environment that encourages coordinated collaborative research to resolve the complexities of the development of stronger communities, particularly at a State and national level. It aims to do this by first providing real solutions at a community level.”*¹¹¹¹

8.50 In a letter to the Committee dated October 6 2003, Alcoa submitted that *“The [Alcoa Research Centre for Stronger Communities] project supports Alcoa’s drive to build*

¹¹¹¹ Curtin University of Technology, Division of Humanities, *The Alcoa Research Centre for Stronger Communities*, p12.

*community capacity and to undertake joint research projects relevant to both our local communities and the company.*¹¹¹²

ALCOA'S FINANCIAL ASSISTANCE TO THE LOCAL COMMUNITY

8.51 During its inquiry the Committee requested a number of updates from Alcoa outlining the financial assistance it has provided to the local community. Alcoa provided this information in letters dated February 19 2003, June 26 2003 and August 28 2003.

8.52 In relation to its support for local businesses, Alcoa advised that:

- its local supplier strategy invests approximately \$16 million annually to support local businesses in the Shire of Waroona and \$1.4 million in the Shire of Harvey;¹¹¹³ and
- it helps local suppliers in Waroona, Yarloop and Hamel to do business with Alcoa by inviting capable local business to bid on every locally supplied or manufactured good or service, giving preference to local business, working with local business groups to identify and utilise local suppliers and where possible, structuring bids to enable local supplier participation.¹¹¹⁴

8.53 Alcoa also advised that:

- its refinery at Wagerup contributes approximately \$45 000 per annum to the Shire of Waroona in rates and that in 2003 it contributed approximately \$40 000 to the Shire of Harvey in rates;¹¹¹⁵
- of its workforce of approximately 650 employees, it employs about 230 Waroona Shire residents and over 100 Harvey Shire residents.¹¹¹⁶ Thirty seven Alcoa employees and families live in Yarloop;¹¹¹⁷ and
- total payroll contributions over the past four years averaged approximately \$12.6 million to Waroona Shire residents and approximately \$6 million to Harvey Shire residents.¹¹¹⁸

¹¹¹² Letter from Alcoa, October 6 2003, p9.

¹¹¹³ Attachment 1, p1 of letter from Alcoa, August 28 2003.

¹¹¹⁴ Ibid.

¹¹¹⁵ Ibid, p2.

¹¹¹⁶ Ibid, p3.

¹¹¹⁷ Ibid.

8.54 Alcoa also advised that it was supporting training for youth and provided details of programs in which it is involved and which were aimed at preparing young people for the workforce.

Shire of Harvey

8.55 Alcoa advised that it is “committed to the long-term sustainability and development of Yarloop and is working hard to support the local community.”¹¹¹⁹

8.56 Alcoa advised that in 2002 it provided:

- approximately \$100 000 to Yarloop Primary School for a new transportable classroom, computers, video equipment, play equipment and other resources;¹¹²⁰ and
- \$1 960 to the Yarloop Hospital, \$6 700 to the Yarloop Fire Brigade and \$4 000 to the Yarloop Bowling Club.¹¹²¹

8.57 Alcoa advised that:

- it also supports numerous other local and community groups in the Shire of Harvey through its community sponsorship program. Examples include the Cookernup Community Association, Harvey Basketball Association, the Harvey Senior High School and the Harvey Agricultural Society,¹¹²² and
- as at August 28 2003 it had contributed a total of \$70 405 to projects and initiatives in the Shire of Harvey including the Yarloop Playgroup and the Harvey Senior High School.¹¹²³

8.58 Alcoa also advised that, through the Alcoa Foundation, it provided a US\$3000 grant to support Alcoa volunteers to restore and upgrade facilities at the Yarloop Workshops. A further grant of US\$3000 had been approved to allow Alcoa

¹¹¹⁸ Ibid. Note that these figures only include residents employed directly by Alcoa and do not include employment generated by Alcoa for local residents through Alcoa contracted personnel recruited by agencies, local businesses contracted to Alcoa and flow-on employment generated as a result of Alcoa spending and local contracts.

¹¹¹⁹ Ibid, p8.

¹¹²⁰ Ibid.

¹¹²¹ Ibid, p11.

¹¹²² Ibid, p9.

¹¹²³ Ibid.

volunteers to assist in upgrading hospital day-room facilities at the Yarloop Hospital and installing barbeque and shade facilities.¹¹²⁴

8.59 The Committee was advised of other community projects supported by Alcoa in the Shire of Harvey:¹¹²⁵

- the Alcoa/Fremantle Arts Centre ‘In the Community’ projects (which support local artists, community groups and schools and individuals in Yarloop and Waroona);
- since 1994 Alcoa has contributed over \$1 million to Landcare projects in the Peel Harvey catchment of which a significant proportion has been directed to projects in the Harvey Shire; and
- Alcoa is funding the Edith Cowan-Alcoa Community Project in Yarloop which aims to “*build capacity so the community can shape its own future. It also aims to address community concerns regarding Alcoa’s land management strategy.*” Alcoa advised that as part of the project, a full-time expert facilitator for on-ground support, other staff resources and a community drop-in centre are provided to the community.

Shire of Waroona

8.60 The Committee was advised that in 1988 the Shire of Waroona entered into a Community Projects Agreement with the Alcoa Wagerup Refinery and that through the agreement, Alcoa has contributed approximately \$325 000 to Waroona Shire projects, including Centennial Park, a learning centre, the Health and Community Resource Centre, pathways/trails and indoor basketball courts.¹¹²⁶

8.61 In addition, Alcoa has contributed a further \$480 000 to the Shire of Waroona for the swimming pool, library, the Waroona Show, Waroona celebrity cricket match and Waroona Football Club rooms.¹¹²⁷

8.62 Alcoa advised that:¹¹²⁸

- as at August 28 2003 it had contributed a total of \$178 288 to projects and initiatives in the Shire of Waroona including to the swimming club, the Waroona Community Centre and the Waroona scouts; and

¹¹²⁴ Ibid.

¹¹²⁵ Ibid, p10.

¹¹²⁶ Ibid, p6.

¹¹²⁷ Ibid.

¹¹²⁸ Ibid, pp6-7.

- through the Alcoa Foundation, it provided \$51 250 to Waroona Shire community organisations in 2002. It submitted that *“similar support is expected in 2003/04.”*¹¹²⁹
- 8.63 The Committee was advised of other community projects supported by Alcoa in the Shire of Waroona:¹¹³⁰
- the Alcoa/Fremantle Arts Centre ‘In the Community’ projects, referred to in paragraph 8.59 above;
 - Alcoa is co-funding the Waroona Family and Youth Support Service with the Department for Community Development. Alcoa advised that it will provide \$120 000 over three years (2002 to 2004); and
 - the establishment of the Wagerup Community Consultative Network which meets monthly.

COMMUNITY DEVELOPMENT FUND

- 8.64 The Committee was advised that Alcoa established the Community Development Fund in 2001 to *“help ensure that Yarloop and Hamel remain strong and viable communities.”*¹¹³¹ The Community Development Fund is in addition to the financial support provided by Alcoa to the Shires of Harvey and Waroona discussed above.
- 8.65 Alcoa advised that the \$2 million Community Development Fund has been allocated to the townships of Yarloop (within the Shire of Harvey - \$1.5 million) and Hamel (within the Shire of Waroona - \$500 000) on the basis of number of residences and residents in these localities.¹¹³²
- 8.66 Alcoa advised that projects to be supported by the fund will be selected in consultation with local government and the community and in general should have the support of the wider community, provide an economic or social benefit to the community, build capital assets in the community, attract funds from other sources, have approval from the relevant authorities to proceed and be technically sound.¹¹³³
- 8.67 Alcoa also advised that the funds should not be used to replace funds available from other sources or replace the role of government or other agencies, provide direct

¹¹²⁹ Ibid, p7.

¹¹³⁰ Ibid.

¹¹³¹ Letter from Alcoa, February 19 2003, p4.

¹¹³² Ibid.

¹¹³³ Ibid, p5.

financial benefit to private individuals or private businesses or provide direct financial support to religious or political organisations.¹¹³⁴

- 8.68 The proposed expenditure of the Community Development Fund in the Shires of Harvey and Waroona is discussed below.

Shire of Harvey

- 8.69 Alcoa advised that it was working with the Shire of Harvey to identify suitable community projects in Yarloop that can be supported using the \$1.5 million allocated to the township. The Yarloop Progress Association was formed to identify possible projects for Yarloop.¹¹³⁵
- 8.70 Alcoa advised that it has “*identified allocation of the \$1.5 million Community Development funds for Yarloop as a priority for 2003-04.*”¹¹³⁶ It advised that as a result of discussions between Alcoa, the Chief Executive Officer of the Shire of Harvey and the Shire President, an “*appropriate process will be implemented for the identification of projects and allocation of funds.*”¹¹³⁷

Shire of Waroona

- 8.71 In relation to the \$500 000 of the Community Development Fund that has been allocated to the Shire of Waroona, Alcoa advised that the Shire, in consultation with Alcoa and the community, have nominated that the funding will be applied to the following projects:
- Waroona Health and Community Resource Centre - additional health facilities - \$250 000;
 - Waroona Town Square Development - \$150 000; and
 - Engagement of consultants for project development and management of the Hamel Eco-Historic precinct - \$100 000.¹¹³⁸
- 8.72 Alcoa advised that these funds are planned to be expended during the last quarter of 2003 and early 2004. All funds will be paid to the Shire of Waroona.¹¹³⁹

¹¹³⁴ Ibid.

¹¹³⁵ Attachment 1, p8 of letter from Alcoa, August 28 2003.

¹¹³⁶ Ibid.

¹¹³⁷ Ibid.

¹¹³⁸ Ibid, p5.

¹¹³⁹ Letter from Alcoa, February 19 2003, p5.

NOISE EMISSIONS***Environmental Protection Act 1986 and Environmental Protection (Noise) Regulations 1997***

- 8.73 The *Environmental Protection (Noise) Regulations 1997* (**Noise Regulations**) came into effect on January 31 1998 and replaced the *Noise Abatement (Neighbourhood Annoyance) Regulations 1979*. The Noise Regulations were drafted to operate under the *Environmental Protection Act 1986* (**EP Act**).
- 8.74 “Noise” is defined in section 3 of the EP Act to include “*vibration of any frequency, whether transmitted through air or any other physical medium.*”
- 8.75 The Noise Regulations are a “prescribed standard” under sections 51, 62(3), 65, and Item 22 of Schedule 4 of the EP Act. Causing or allowing noise emissions which exceed the prescribed standard is an offence.¹¹⁴⁰ It can also be regarded as “pollution”¹¹⁴¹ and “unreasonable noise”¹¹⁴² under section 3 of the EP Act.
- 8.76 The Noise Regulations deal with all noise passing from one premise to another, noise from public places as it affects adjacent premises and providing a basis for determining acceptable noise levels in relation to land use.
- 8.77 Assigned noise levels are the highest levels of noise allowed to be received at a premise at a particular time of the day or night.¹¹⁴³
- 8.78 Assigned noise levels are set differently under the Noise Regulations for noise-sensitive premises such as residences, commercial premises such as shops and offices and industrial premises such as factories and mines. Alcoa’s refinery at Wagerup is an industrial premise. The Noise Regulations also set assigned noise levels differently for noises of different durations: for example a short duration noise such as a car in a driveway can be at a higher level.

¹¹⁴⁰ See for example section 51 of the *Environmental Protection Act 1986*.

¹¹⁴¹ “Pollution” means “*direct or indirect alteration of the environment (a) to its detriment or degradation; (b) to the detriment of an environmental value; or (c) of a prescribed kind, that involves an emission.*”, Section 3A, *Environmental Protection Act 1986*.

¹¹⁴² Noise is taken to be unreasonable if it is emitted, or the equipment emitting it is used, in contravention of the Act or any subsidiary legislation or requirement or permission made or given by or under the Act, or having regard to the nature and duration of the noise emissions, the frequency of similar noise emissions from the same source (or a source under the control of the same person or persons) and the time of day at which the noise is emitted, the noise unreasonably interferes with the health, welfare, convenience, comfort or amenity of any person or is prescribed to be unreasonable under the Act: Section 3 *Environmental Protection Act 1986*.

¹¹⁴³ See Regulation 8 *Environmental Protection (Noise) Regulations 1997*.

- 8.79 The time period over which the noise levels can be assessed must be between 15 minutes and four hours and must allow for a representative assessment of the noise emission.¹¹⁴⁴
- 8.80 Regulation 8(2) of the Noise Regulations contains a table setting out the assigned noise levels for different types of receiving premises and different times of the day. A copy of that table is set out in Figure 8.3. These are the assigned noise levels with which Alcoa must currently comply.

Figure 8.3**Noise Regulations, Regulation 8(2), Assigned Noise Levels**

Type of premises receiving noise	Time of day	Assigned level (dB)		
		L _A 10	L _A 1	L _A max
Noise sensitive premises at locations within 15 metres of a building directly associated with a noise sensitive use	0700 to 1900 hours Monday to Saturday	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises at locations further than 15 metres from a building directly associated with a noise sensitive use	All hours	60	75	80
Commercial premises	All hours	60	75	80
Industrial and utility premises	All hours	65	80	90

Regulation 8(1) of the Noise Regulations defines three types of assigned noise levels. L_{Amax} assigned level means a noise level which is not to be exceeded at any time. L_{A1}

¹¹⁴⁴ See the definition of “representative assessment period” in Regulation 2(1) *Environmental Protection (Noise) Regulations 1997*.

- assigned level means a noise level which is not to be exceeded for more than one percent of the time (for example, for more than one minute in 100 minutes). L_{A10} assigned level means a noise level which is not to be exceeded for more than ten percent of the time (for example, for more than ten minutes in 100 minutes).
- 8.81 The assigned levels at individual noise sensitive premises varies depending on the influencing factor determined under Schedule 3 of the Noise Regulations.
- 8.82 Noise emitted from any premises, when received at other premises, must not cause, or significantly contribute to a level of noise which exceeds the assigned level in respect of noise received at premises of that kind.¹¹⁴⁵
- 8.83 The noise must also be free of tonality (for example, whining and droning), impulsiveness (for example, banging and thumping) and modulation (for example, like a siren).¹¹⁴⁶
- 8.84 A noise emission is taken to “significantly contribute to” a level of noise if the noise emission is greater than a level which is five decibels below the assigned level at the point of reception.¹¹⁴⁷ For example, if the assigned level was 40 decibels and the measured level, including the noise source and other noise, was 44 decibels, then the noise source would not be “significantly contributing” if its level was 35 decibels or less.
- 8.85 Part 3 of the Noise Regulations deals with noise measurement and sets out the places where noise must be measured¹¹⁴⁸ (for example, outside or inside buildings depending on the type of premises and its use) and the requirements for positioning microphones.¹¹⁴⁹
- 8.86 The Noise Regulations provide for situations where the assigned noise levels cannot reasonably be met.¹¹⁵⁰
- 8.87 Regulation 17(1) provides that where a person believes that he or she cannot reasonably or practicably comply with the assigned level, they may apply to the Minister for the Environment for approval to allow the noise emission to exceed or vary from the assigned level. These applications are referred to in this report as ‘noise Regulation 17 applications’.

¹¹⁴⁵ Regulation 7(1)(a) *Environmental Protection (Noise) Regulations 1997*.

¹¹⁴⁶ Regulation 7(1)(b) *Environmental Protection (Noise) Regulations 1997*.

¹¹⁴⁷ Regulation 7(2) *Environmental Protection (Noise) Regulations 1997*.

¹¹⁴⁸ Regulation 19 *Environmental Protection (Noise) Regulations 1997*.

¹¹⁴⁹ Regulation 20(2)-(4) *Environmental Protection (Noise) Regulations 1997*.

¹¹⁵⁰ Regulation 17 *Environmental Protection (Noise) Regulations 1997*.

8.88 The noise Regulation 17 application then goes through the following process:¹¹⁵¹

- The Minister for the Environment refers the application to the EPA for assessment;
- The EPA assesses the application with the assistance of the DEP and reports back to the Minister for the Environment;¹¹⁵²
- The Minister for the Environment may grant or refuse to grant the application for approval. The approval may be for a set period of time and may include any conditions or restrictions;
- The Minister for the Environment may amend or revoke an approval, however must first request the EPA to inquire into and report on the matter;
- Notice of an approval, variation or revocation of an approval is to be published in the Western Australian *Government Gazette*;
- If a condition of an approval is breached, the approval ceases and the assigned levels apply;
- Any person, either the applicant or another person, who disagrees with the Minister's decision may lodge a written appeal with the Minister within 14 days of the publication of the decision in the *Gazette*; and
- The *Environmental Protection Act 1986* requires the Minister in such cases to refer the appeal to an appeals committee and then determine the appeal in accordance with the recommendations of the committee.

Map of noise boundary

8.89 A map showing Alcoa's 35 decibel noise contour (2000) and Area A boundary is attached as Appendix 11 to this report.

¹¹⁵¹ Regulation 17 *Environmental Protection (Noise) Regulations 1997* and Part VII *Environmental Protection Act 1996*.

¹¹⁵² In its Submission No. 53 dated April 9 2002 the DEP advised that "It is the EPA's policy that all applications made in relation to Regulation 17 variations be subject to a public consultation process.", p24.

Evidence from Mr Eric Walmsley, Alcoa employee and local resident, in relation to noise emissions

- 8.90 At its hearing in Waroona on November 21 2001 the Committee heard evidence from Mr Eric Walmsley. Refer to paragraphs 7.61 to 7.63 of this report for a brief outline of the Walmsley family history in the local area.
- 8.91 Mr Walmsley advised the Committee that before they moved into their current house, he and his wife rented a property from Alcoa for approximately six years. The rented property was approximately one kilometre due south of the refinery and during the time they lived there they did not have an issue with noise or odour from the refinery.
- 8.92 Mr Walmsley advised that the boundary of their current property is approximately 1.3 kilometres from the refinery, and that their house is approximately 1.8 kilometres from the refinery.
- 8.93 Mr Walmsley advised that prior to 2001 he and his family felt that the refinery did not intrude significantly on their home and lifestyle. In the first three months of 2001 they began experiencing what Mr Walmsley described as “*a marked increase in loud noise and odour from the refinery.*”¹¹⁵³ He said these problems had arisen at the same time as production had increased from 2.2 million tonnes per annum to 2.35 million tonnes per annum.
- 8.94 Mr Walmsley said that in April 2001 the family contacted Alcoa to register a noise complaint. Mr Walmsley expressed his opinion that “*Alcoa refinery’s response was inadequate and we had difficulty communicating with it.*”¹¹⁵⁴
- 8.95 Mr Walmsley advised that Alcoa commenced monitoring their property in May 2001. He told the Committee that “*we were given the common response that Alcoa’s operations were not exceeding noise regulations at our residence.*”¹¹⁵⁵
- 8.96 Mr Walmsley said that in June 2001 they commenced their own monitoring of the noise levels at their property to attempt to confirm their belief that the noise was excessive. Mr Walmsley said their records confirm that over a 90-day period, on average for 79 percent of the time, they were experiencing well above the night-time noise level of 35 decibels. He said they were experiencing an average greater than 45 decibels. Mr Walmsley expressed the view that “*This is excessive and unacceptable.*”¹¹⁵⁶

¹¹⁵³ Mr Eric Walmsley, Alcoa employee and local resident, *Transcript of Evidence*, November 21 2001, p1.

¹¹⁵⁴ Ibid.

¹¹⁵⁵ Ibid, p2.

¹¹⁵⁶ Ibid.

- 8.97 Mr Walmsley said that for 37 percent of the time, they were experiencing intrusive and unacceptable odours from the refinery.¹¹⁵⁷
- 8.98 Mr Walmsley said that due to what he considered to be the lack of effective response from Alcoa to both their personal communications and to community complaints sheets, he lodged a number of formal complaints with the DEP.
- 8.99 At the Committee's hearing in Waroona on November 21 2001 Mr Walmsley tabled a letter he received from Mr Tim McAuliffe, Acting Director, Pollution Prevention Division, DEP, dated September 17 2001. In his letter, Mr McAuliffe advised the Walmsley's that in July 2001 Alcoa had applied to the Minister for the Environment to increase the assigned noise level with the most impacted zone close to the refinery, called Zone A, from 35 decibels plus influencing factor to 48 decibels plus influencing factor. Mr McAuliffe expressed the belief that the Walmsley's property may be within Zone A.
- 8.100 Mr Walmsley expressed his belief that *"instead of being forced to meet Regulation 17 as it stands, the DEP is moving the goalposts."*¹¹⁵⁸
- 8.101 Mr Walmsley concluded that Alcoa and the DEP had briefly discussed options for noise control at his home. However he considered that none of the options were appropriate given that the family live on a large property and want to enjoy their outdoor style of living.

Submissions from the Department of Environmental Protection in relation to noise

- 8.102 In a written submission to the Committee dated April 9 2002, prepared by the DEP at the request of the Minister for the Environment, the DEP referred to, among other things, the issue of noise levels generated by Alcoa's refinery at Wagerup.
- 8.103 The Committee was advised that monitoring of noise levels at fixed locations in the community south of the Alcoa refinery at Wagerup has taken place since 1995. In more recent times permanent noise monitors have been installed.¹¹⁵⁹ Alcoa's noise monitoring program is also discussed in paragraph 8.164 of this report.
- 8.104 The DEP advised that *"Studies show that compliance with the requirements of the Regulations is still not technically being achieved at all times."*¹¹⁶⁰ Additional reports

¹¹⁵⁷ Ibid.

¹¹⁵⁸ Ibid.

¹¹⁵⁹ Appendix 18 of Submission No. 53 from the DEP, April 9 2002.

¹¹⁶⁰ Ibid. Note that "Regulations" refer to the *Environmental Protection (Noise) Regulations 1997*. Refer to paragraph 8.73 of this report and following for a discussion on the *Environmental Protection (Noise) Regulations 1997*.

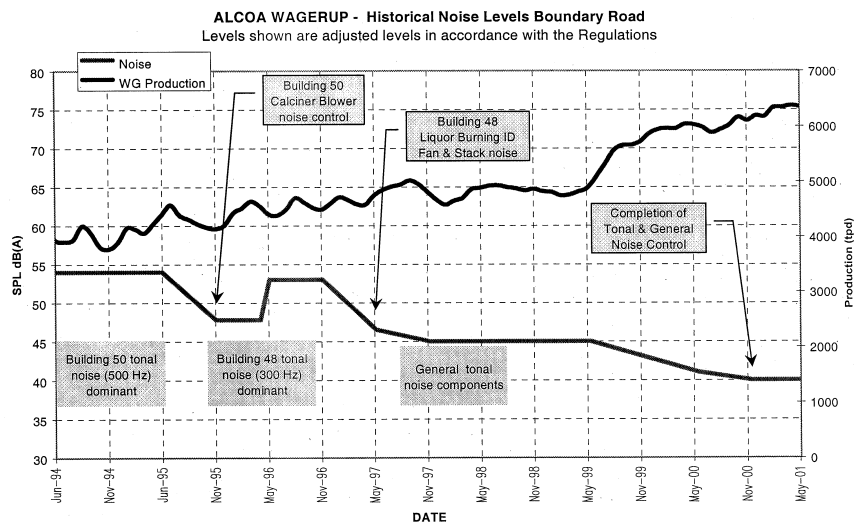
were commissioned by Alcoa to identify opportunities to further reduce noise emissions from the refinery.

8.105 As a result of those reports, a new noise reduction program involving two main projects was developed and implemented in 2000. One project targeted the elimination of tonal noise sources from within the refinery and the other project targeted the reduction of noise from several major broadband noise sources within the refinery. The work addressed 12 key noise sources and involved the expenditure of approximately \$1 million.¹¹⁶¹

8.106 The DEP advised that the tonal noise reduction program resulted in a five decibel reduction in the overall refinery noise emission.¹¹⁶² Set out in Figure 8.4 is a graph provided by Alcoa to the DEP (and included in the DEP's submission to the Committee) which shows the reduction in noise that was achieved at the Alcoa refinery at Wagerup for the period June 1994 to May 2001.

Figure 8.4

Historical Noise Levels



8.107 The DEP said that Alcoa's advice to the DEP was that since the refinery at Wagerup had been commissioned, Alcoa had incurred and committed a total expenditure of \$6.18 million for noise control reduction measures.¹¹⁶³ A table showing Noise Management Costings, which was provided by Alcoa to the DEP and which formed

¹¹⁶¹ Appendix 18 of Submission No. 53 from the DEP, April 9 2002.

¹¹⁶² Ibid.

¹¹⁶³ Ibid. Note these figures were current to the time the DEP provided this submission to the Committee in April 2002.

part of the DEP's submission to the Committee, is attached as Appendix 12 to this report.

- 8.108 However the DEP also advised the Committee that noise monitoring data indicates that levels exceed the allowable night-time limit of the *Environmental Protection (Noise) Regulations 1997* of 35 decibels during adverse weather conditions.¹¹⁶⁴
- 8.109 The DEP said Alcoa had advised it that it was “*unable to meet the relevant noise Regulations under all conditions despite significant reductions in noise generated from its Wagerup refinery*”.¹¹⁶⁵ As a result, Alcoa had submitted a noise Regulation 17 application with the Minister for the Environment for approval to vary the assigned noise levels. Refer to paragraphs 8.86 to 8.88 of this report for a discussion on the procedure to vary assigned noise levels.
- 8.110 The DEP advised that “*In the face of undertaking such works [noise reduction] and seeking a variation, enforcement action has not been taken as it is unlikely to result in an improved environmental outcome or facilitate continuous improvement.*”¹¹⁶⁶ This matter is discussed in more detail in paragraphs 8.123 to 8.130 of this report.
- 8.111 Alcoa made a noise Regulation 17 application to vary assigned noise levels in July 2001. Following an initial assessment of the application by the DEP and on the DEP's recommendation, Alcoa revised the application and re-submitted it in February 2002.
- 8.112 As noted above, the Committee received a subsequent submission from the DEP dated January 24 2003. In that submission the DEP informed the Committee that as at January 24 2003 only two noise Regulation 17 applications had been granted, with a third about to be granted. The DEP advised that the shortest time frame for an approval had been 17 months. The Committee was advised that, as at January 24 2003, ten applications were currently being processed, apart from some group applications from Western Power Corporation in respect of a number of their sites.¹¹⁶⁷
- 8.113 The DEP advised that due to the community concerns in relation to the noise emissions from the Alcoa refinery at Wagerup, together with the amount of information supplied by Alcoa and the technical complexity of the noise generation, acoustic modelling, engineering noise reduction and noise emission monitoring aspects of the application, it elected to conduct an independent review of Alcoa's noise management.¹¹⁶⁸

¹¹⁶⁴ Submission No. 53 from the DEP, April 9 2002, p24.

¹¹⁶⁵ Ibid.

¹¹⁶⁶ Ibid.

¹¹⁶⁷ Submission No. 52 from the DEP, January 24 2003, pp6-7.

¹¹⁶⁸ Ibid, p7.

- 8.114 The DEP advised that community consultation on the formulation of the scope of works for and the selection of suitable independent tenderers was undertaken. The Committee was advised that the independent review was being conducted by SVT Engineering Consultants (**SVT**), under supervision of the DEP, with funding being provided by Alcoa.¹¹⁶⁹
- 8.115 The DEP advised that the review focuses on the noise monitoring programs and the noise reduction and management programs undertaken by Alcoa, and includes a preliminary assessment of Alcoa's noise Regulation 17 application. The review will consider whether Alcoa has undertaken all reasonable and practicable measures to reduce the noise emissions.¹¹⁷⁰
- 8.116 The DEP advised that the independent review commenced in May 2002 and was expected to be completed by August 2002. However due to delays caused by the need for the reviewer to examine additional information provided by Alcoa and the resignation of the relevant officer within the DEP, the DEP advised that as at January 24 2003 the independent report was still being finalised.¹¹⁷¹
- 8.117 For a discussion on the review undertaken by SVT refer to paragraphs 8.159 to 8.183 this report.
- 8.118 In its submissions to the Committee, the DEP advised that in conjunction with the community consultation in relation to the scope of works for, and selection of, the consultant to conduct the independent review, the DEP had been participating in community consultation activities in relation to Alcoa's noise Regulation 17 application. This included:¹¹⁷²
- June 2002: A letter was sent to residents advising of the successful consultant and inviting them to meet the consultant. A community meeting was then conducted with the DEP and the consultant.
 - September 2002: An open day was arranged by Alcoa with the DEP in attendance.
 - May 2003: Copies of the independent review report were released to residents by letter, with an invitation to a community meeting to discuss the report. The consultants then presented the independent review report to residents at a community meeting.

¹¹⁶⁹ Ibid.

¹¹⁷⁰ Ibid.

¹¹⁷¹ Ibid.

¹¹⁷² Letter from the DEP dated December 1 2003.

- October 2003: A letter was sent to residents inviting them to a community meeting to consider a possible response to Alcoa's noise Regulation 17 application. That community meeting was then conducted.
- 8.119 The DEP also informed the Committee that discussions had been held with individual residents and officers from the Shire of Waroona, a DEP noise monitor had been set up at a residence in Yarloop and that there had been various informal contacts with community members.¹¹⁷³
- 8.120 The DEP advised that public submissions would be sought on the noise Regulation 17 application and that it anticipated public submissions would be accepted during the first quarter of 2003.¹¹⁷⁴
- 8.121 The DEP advised in its submission of January 24 2003 that it will draw together the results of the technical review and community submissions in order to provide a strategy briefing for the EPA, and would then prepare the EPA's report on the assessment. The DEP advised that this report would probably be sent out for public comment prior to forwarding to the Minister for the Environment.¹¹⁷⁵
- 8.122 The DEP provided the Committee with its best estimate of a realistic timeframe for the major steps in the noise Regulation 17 application as follows:¹¹⁷⁶
- March 2004: Complete community consultation phase.
 - April 2004: Conduct strategy briefing with EPA.
 - June 2004: Release EPA Bulletin for four weeks public comment.
 - August 2004: EPA letter to Minister with summary of public comment and draft noise Regulation 17 approval (if recommended).
 - October 2004: Noise Regulation 17 approval signed by Minister and gazetted (if granted), or application refused.
- 8.123 The Committee was interested to note in the DEP submission of January 24 2003 the DEP raised several issues relating to enforcement considerations. The DEP noted that there has been concern from some members of the community about the DEP election

¹¹⁷³ Ibid and Submission No. 52 from the DEP, January 24 2003, p7.

¹¹⁷⁴ Submission No. 52 from the DEP, January 24 2003, p7.

¹¹⁷⁵ Ibid, p8.

¹¹⁷⁶ Letter from the DEP dated December 1 2003.

- to follow the noise Regulation 17 process in preference to invoking enforcement measures to achieve noise reductions.¹¹⁷⁷
- 8.124 The DEP advised that these are separate matters: the noise Regulation 17 process is conducted by the DEP at the request of the EPA to fulfil its statutory requirement to assess and advise on the application, while enforcement measures are taken at the discretion of the Chief Executive Officer of the DEP.
- 8.125 The DEP advised that the enforcement measure most likely to be invoked in a case such as Alcoa's would be to issue a pollution abatement notice (**PAN**) under section 65 of the *Environmental Protection Act 1986*. It advised that the DEP has elected not to pursue this avenue at this time, for two main reasons.
- 8.126 The first reason was that when the DEP becomes aware of noise emissions that are in excess of the Noise Regulations, the normal procedure under the Enforcement Guidelines is to advise the noise emitter and seek a program for reduction of noise emissions to meet the Noise Regulations over an agreed timeframe. The DEP advised that a PAN is normally issued only when the noise emitter has failed to respond to this request in a constructive manner or has failed to keep the agreed timeframe.¹¹⁷⁸
- 8.127 The DEP informed the Committee that *"Alcoa has been cooperative in reducing noise emissions from the Wagerup Refinery in the past, having spent some \$6m on noise control since 1995 and is currently providing substantial information to assist in the noise Regulation 17 assessment process."*¹¹⁷⁹
- 8.128 The DEP submitted that this process provided the best opportunity to identify and implement further noise reduction measures from this site. It submitted that if it were to issue a PAN, *"this same level of cooperation could not be expected to continue, thus hampering the current process."*¹¹⁸⁰
- 8.129 The second reason given by the DEP not to issue a PAN to Alcoa was that the issuing requires the DEP to specify clear measures that are considered necessary to reduce the noise emissions. It submitted that *"Because of the complexity of the noise emissions from this plant, the DEP does not have this information at this stage, and is therefore not in a position to issue a PAN which meets the requirements for legal certainty. This is a compelling issue for the DEP to consider."*¹¹⁸¹

¹¹⁷⁷ Submission No. 52 from the DEP, January 24 2003, p8.

¹¹⁷⁸ Ibid, p9.

¹¹⁷⁹ Ibid.

¹¹⁸⁰ Ibid.

¹¹⁸¹ Ibid.

- 8.130 The DEP submitted that for the above reasons, the noise Regulation 17 assessment process provides a more effective avenue to achieve managed reductions in noise emissions in a case such as this, than does a PAN. The DEP submitted that it *“fully recognises the concern of some residents over noise. However, we believe the process described above has the greatest chance of seeing meaningful changes and reducing noise impacts on residents.”*¹¹⁸²
- 8.131 The Committee notes the DEP advised that should the independent review identify significant areas where further noise reductions may practicably be achieved, it would expect Alcoa to develop a program for the investigation and implementation of noise reduction measures within an acceptable timeframe.¹¹⁸³
- 8.132 The DEP also advised that should the independent review indicate that all major practicable noise controls have been implemented, and that substantial further noise reductions cannot practicably be achieved, the DEP would expect Alcoa to develop a new noise reduction program, focused on identifying and treating specific noise sources which are noticeable to the community.
- 8.133 As noted above, the DEP referred to the continuing increase in complaints received in relation to noise from the Wagerup refinery. It advised that the complaint response system had been evaluated as part of the independent review, and improvements to the system may ensue from that process.

WAGERUP REFINERY AND BAUXITE RESIDUE OPERATIONS TRIENNIAL ENVIRONMENTAL REVIEW 2000 TO 2002

- 8.134 Alcoa's *Wagerup Refinery and Bauxite Residue Operations Triennial Environmental Review 2000-2002* dated March 2003 (**Triennial Review**) provided a review of operations and relevant research at the Wagerup refinery, summarised performance for the 2002 calendar year and provided trend information where appropriate for the period 2000 to 2002.
- 8.135 The Department of Environment provided the Triennial Review which received it from Alcoa as part of the reporting requirements under Alcoa's Wagerup Licence. The Triennial Review was also submitted to the DoIR.
- 8.136 The following comments in relation to the Triennial Review relate only to the issue of noise emissions from Alcoa's refinery at Wagerup. The Triennial Review is discussed elsewhere in this report in relation to other specific issues arising from the Wagerup refinery.

¹¹⁸² Ibid.

¹¹⁸³ Ibid.

- 8.137 The Committee notes that Alcoa provided a dedicated noise officer to respond to noise complaints in 2002 in order to better understand the community noise issues and how they could be resolved.¹¹⁸⁴
- 8.138 The Committee sought further information from Alcoa in relation to the noise officer and was advised that in March 2002 an Alcoa employee was seconded from the Alcoa Mining Group to the Alcoa's refinery at Wagerup to respond to all noise complaints and to provide input into the refinery noise management process.¹¹⁸⁵ The person seconded is a qualified Noise Officer registered with the DMPR, and has had 15 years experience in blast, occupational and environmental noise management within the Alcoa Mining Group.¹¹⁸⁶
- 8.139 The scope of the noise officer's work was to:¹¹⁸⁷
- respond personally to any noise complaint received from the refinery's neighbours;
 - promote and coordinate noise amelioration to neighbours' residences;
 - support the noise Regulation 17 variation application process through collation and provision of information;
 - review the existing noise monitoring system and identify opportunities for improvement; and
 - review and update supporting documents and procedures and support improvements in refinery noise management.
- 8.140 The Committee was advised that the noise officer returned to the Mining Group in March 2003, but continues to have responsibility for responding to noise complaints received from Wagerup neighbours and for maintaining relationships with neighbours.¹¹⁸⁸
- 8.141 In its Triennial Review, Alcoa refers to the noise reduction programs that were undertaken in 2000 and 2001 and which are discussed in paragraphs 8.105 to 8.107 of this report.

¹¹⁸⁴ *Wagerup Refinery and Bauxite Residue Operations Triennial Environmental Review 2000-2002*, March 2003, p50.

¹¹⁸⁵ Letter from Alcoa, October 28 2003, p7.

¹¹⁸⁶ Ibid.

¹¹⁸⁷ Ibid.

¹¹⁸⁸ Ibid.

- 8.142 It stated that these noise reduction programs were considered to have resulted in the removal of tonal components from Alcoa's refinery at Wagerup and to have consolidated the reduction in overall noise levels at Boundary Road (approximately 1.5 kilometres to the south of the refinery) by five decibels.¹¹⁸⁹
- 8.143 The Committee is pleased to note Alcoa's statement in the Triennial Review that installation of the dehumidifier on the liquor burner in December 2001 (which was predominantly for odour reduction benefits) also resulted in a ten decibel reduction of noise at the source and eliminated the liquor burner stack as a contributing noise source at Boundary Road.¹¹⁹⁰
- 8.144 However the Committee also notes Alcoa's statement in the Triennial Review that studies in 2002 indicated the potential presence of additional tonal sources from the refinery and that further work is planned to confirm whether any tonality is still present. The Committee is concerned that noise emissions from the refinery are an ongoing problem.
- 8.145 The Committee is interested in Alcoa's intentions and plans for the future in relation to noise management at the refinery. In this regard the Committee is pleased to note Alcoa's statement in the Triennial Review that noise continued to be a key area of focus at Wagerup during 2002, with the main focus being on strengthening the noise management and monitoring practices at the refinery.¹¹⁹¹
- 8.146 The Committee is also pleased to note that planned capital engineering projects are required to be assessed for potential noise impacts or noise reduction opportunities using a risk assessment process. Additionally, all new and replacement equipment ordered must meet noise emissions below 83 decibels and undergo pre-commissioning load checks to ensure there is no additional contribution to overall refinery noise levels.¹¹⁹²
- 8.147 The Committee notes Alcoa's statement in the Triennial Review that further improvements have been made to the noise monitoring system installed in 2000. Alcoa stated that the Digital Audio Tape (**DAT**) tape recording facility at the noise logging stations commenced operation late in 2001 and was used extensively in 2002 to support the monitoring data collected during periods when neighbours complained

¹¹⁸⁹ *Wagerup Refinery and Bauxite Residue Operations Triennial Environmental Review 2000-2002*, March 2003, p49.

¹¹⁹⁰ Ibid.

¹¹⁹¹ Ibid, p5.

¹¹⁹² Ibid, p49.

about noise. Alcoa stated that some opportunities had been identified to improve the use of this system and that they would be addressed for use in 2003.¹¹⁹³

- 8.148 The Committee notes Alcoa's comments in the Triennial Review that it has attempted to address the concerns of the local community with respect to the noise emissions by using mobile noise monitors to increase the understanding of noise impact at specific residences in the community during 2002. Alcoa stated in the Triennial Review that neighbours at those residences have been able to request the activation of DAT tapes to record noise events that they consider unacceptable, and the tapes have been analysed to help identify potential contributing noise sources at the refinery. It stated that this process has led to additional noise control work being conducted on site during 2002.¹¹⁹⁴
- 8.149 Alcoa also referred to noise amelioration work that the company has offered to its neighbours to minimise the current noise impact. The Triennial Review states that during 2002, five local residences received noise amelioration on their houses, which it stated was successful in reducing noise emissions received in modified rooms by typically three to five decibels.¹¹⁹⁵
- 8.150 The Committee sought further information from Alcoa in relation to this noise amelioration work and was advised by letter dated October 28 2003 that residents of five properties in Yarloop had accepted Alcoa's offer to undertake noise amelioration to their residences. Three of the five properties were in Hoffman Road, one was in Boundary Road and the other in Freemason Road.
- 8.151 The noise amelioration works were conducted on the master bedrooms of all the properties. In addition, one residence had work conducted on its two other bedrooms, study, kitchen and dining room. Three of the properties also had noise amelioration work to close in the open eaves around the entire house including the front and rear verandahs.¹¹⁹⁶
- 8.152 The total of the noise amelioration work was \$39 100 excluding GST. The average noise reduction achieved was four decibels.¹¹⁹⁷
- 8.153 Alcoa advised that as at October 28 2003 residents in three of the five properties that received noise amelioration work had elected to continue living in the community while the residents in the two other properties decided to sell their houses to Alcoa.¹¹⁹⁸

¹¹⁹³ Ibid.

¹¹⁹⁴ Ibid.

¹¹⁹⁵ Ibid, p50.

¹¹⁹⁶ Letter from Alcoa, October 28 2003, p2.

¹¹⁹⁷ Ibid, pp2-3.

- 8.154 The Committee notes that in its Triennial Review, Alcoa stated its commitment to continue to work closely with its near neighbours to resolve any noise emission impacts that may occur.¹¹⁹⁹
- 8.155 However the Committee notes that Alcoa then stated that despite the noise reductions achieved to date, *“it is not technically feasible to bring the refinery into compliance with the noise levels assigned by Regulation 8, at all times, by reduction of sound power levels alone.”*¹²⁰⁰
- 8.156 Alcoa states that the technology required to achieve the required noise reduction at the closest noise sensitive premises is currently not available, and it states that *“the only way full compliance can be achieved at this time is through either a variation under Regulation 17 or acquisition of property.”*¹²⁰¹
- 8.157 As noted in paragraph 8.109 and following of this report, Alcoa initially sought a variation to the assigned noise level in 2001 but re-submitted the application in 2002. As also previously noted, an independent consultant was appointed by the DEP in 2002. Refer to paragraphs 8.159 to 8.183 of this report for a discussion on the independent review.
- 8.158 In the context of future noise management at the refinery, the Committee notes Alcoa’s land management strategy which provides for land acquisition within the 35 decibel contour and proposes changes under local Town Planning Schemes to prevent further residential development or other conflicting land use within this area. Refer to paragraphs 7.5 to 7.51 of this report for a discussion on Alcoa’s land management strategy.

REVIEW OF ENVIRONMENTAL NOISE EMISSIONS FROM ALCOA WAGERUP REFINERY FOR DEPARTMENT OF ENVIRONMENTAL PROTECTION, FEBRUARY 2003: SVT ENGINEERING CONSULTANTS

- 8.159 As previously discussed, in July 2001 Alcoa submitted an application to the Minister for the Environment for a variation to the assigned noise levels under Regulation 17 of the *Environmental Protection (Noise) Regulations 1997*. The application was re-submitted in February 2002. The Minister has referred the re-submitted application to the EPA for assessment.

¹¹⁹⁸ Ibid.

¹¹⁹⁹ *Wagerup Refinery and Bauxite Residue Operations Triennial Environmental Review 2000-2002*, March 2003, p74.

¹²⁰⁰ Ibid. Note that “Regulation 8” refers to Regulation 8 of the *Environmental Protection (Noise) Regulations 1997* which is discussed in paragraphs 8.77 to 8.80 of this report.

¹²⁰¹ Ibid. Note that “Regulation 17” refers to Regulation 17 of the *Environmental Protection (Noise) Regulations 1997* which is discussed in paragraphs 8.86 to 8.88 of this report.

8.160 SVT were appointed by the DEP to undertake an independent review of environmental noise emissions from Alcoa's refinery at Wagerup. The review commenced in May 2002.

8.161 SVT was required to provide to the DEP:¹²⁰²

- an independent review of Alcoa's assessment of noise emissions from the refinery;
- recommendations for any additional noise monitoring that may be required to assess noise emission from the refinery, if deemed necessary;
- a technical review of the noise reduction programs operated at the refinery;
- an assessment of whether all technically feasible noise control treatments that would contribute to a measurable reduction of refinery noise emissions have been implemented; and
- an assessment of whether the increased assigned noise levels requested by Alcoa are representative of the refinery's current noise emission levels.

8.162 During the course of its inquiry the Committee obtained a copy of SVT's review titled *Review of Environmental Noise Emissions from Alcoa Wagerup Refinery for Department of Environmental Protection, February 2003*.

8.163 For the purposes of its review, SVT studied the sound propagation from the Wagerup refinery. SVT noted that:¹²⁰³

- the audibility of the refinery varies with distance from the refinery and is also strongly meteorologically dependent;
- for most of the affected noise sensitive premises, the refinery is audible only under down-wind conditions; and
- within 500 metres of the refinery, the refinery dominates ambient noise. Within approximately three kilometres of the refinery, the refinery can be clearly audible, particularly under down wind conditions, but is often masked by noise from other sources such as traffic, wind and fauna. Beyond three kilometres from the refinery, it is still possible for the refinery to be audible under ideal meteorological conditions for sound propagation and when background noise is very low.

¹²⁰² *Review of Environmental Noise Emissions from Alcoa Wagerup Refinery for Department of Environmental Protection, February 2003, p7.*

8.164 SVT further noted that:

- Alcoa had monitored noise emissions from the Wagerup refinery since 1994¹²⁰⁴;
- Alcoa's noise monitoring network was a comprehensive system that employed up-to-date technology. It stated that it had been well conceived and implemented, and was capable of accurately monitoring sound levels¹²⁰⁵; and
- Alcoa had undertaken an extensive noise monitoring program in support of its noise variation application and concluded that the noise monitoring systems installed by Alcoa were "*appropriate for the task, and the data collected is reliable.*"¹²⁰⁶

8.165 SVT expressed its belief that, in its submission to the EPA in support of its noise variation application, Alcoa had provided a reasonable indication of the level of noise emissions from its Wagerup refinery.¹²⁰⁷

8.166 SVT noted that:¹²⁰⁸

- Alcoa had reported that noise limits may be exceeded for up to 14 percent of the time for the month in which worst case conditions for sound propagation occur. This figure only applied to sound propagation from the refinery in a south-westerly direction. If other directions were also considered, this figure would be higher;
- Alcoa had not accounted for tonality when assessing its compliance with noise levels. Tonal sounds are those sounds that have an identifiable pitch, and are considered to be more intrusive and annoying than non-tonal sounds; and
- noise emissions from the refinery can sometimes exhibit tonal characteristics at some receiving locations and that "*further investigation is warranted to*

¹²⁰³ Ibid, p11.

¹²⁰⁴ Ibid, p13. The Committee notes the discrepancy between this evidence with respect to the year in which Alcoa commenced monitoring noise emissions from the refinery at Wagerup (1994) and the evidence provided by the DEP (1995) in its Submission No. 53 dated April 9 2002 which is discussed in paragraph 8.103 of this report. The Committee believes that this discrepancy is not significant.

¹²⁰⁵ Ibid, p15.

¹²⁰⁶ Ibid, p4.

¹²⁰⁷ Ibid.

¹²⁰⁸ Ibid, p5.

identify noise sources and process conditions at the Refinery which have the potential to cause tonality.”¹²⁰⁹

8.167 The Committee notes SVT’s statement that *“In a recent update of its noise management strategy, Alcoa has committed to ensuring that no annoying noise characteristics (including tonality) are present in the Refinery noise emissions that impact noise sensitive premises.”*¹²¹⁰

8.168 As part of its review, SVT conducted a review of Alcoa’s noise complaint monitoring system. SVT stated that:¹²¹¹

- the complaints management system was rendered less effective than it could be because of the current volume of complaints;
- because of Alcoa’s commitment to respond to every complaint received, the system was essentially being used as a sophisticated complaints recording system; and
- the system had the potential for a more in-depth analysis of the nature of the complaints.

8.169 SVT noted that the complaints system is currently used to validate complaints. However, it noted that most of the complaints received are valid and that the assigned levels are being exceeded. SVT recommended that *“More focus should be given to establishing the source of the complaint - Can a particular source be identified? Was there a process upset? etc.”*¹²¹²

8.170 SVT also suggested that the complaints records could be analysed to identify any trends; for example to determine if specific events or process conditions give rise to complaints and if so, whether those events can be foreseen and therefore avoided. It suggested that noise levels could also be trended against weather conditions.¹²¹³

8.171 SVT noted that a shortfall of the complaints management system was that logged and recorded data were not generally taken at the complainant’s property. The Committee notes SVT’s suggestion that future noise monitoring should place greater emphasis on obtaining noise data at complainants’ properties.¹²¹⁴

¹²⁰⁹ Ibid.

¹²¹⁰ Ibid.

¹²¹¹ Ibid, p27.

¹²¹² Ibid.

¹²¹³ Ibid, p28.

¹²¹⁴ Ibid, p5.

8.172 In its review, SVT recommended, among other things, that:

- future noise reduction programs should place emphasis on source identification from measurements and observations recorded at complainants' properties, and noise control efforts should be focussed on eliminating the potential for tonality¹²¹⁵; and
- the tape recordings of noise emissions are too short for in-depth analysis and should run for at least six to twelve minutes so that a complete noise logging cycle is included.¹²¹⁶

8.173 In its review, SVT noted that Alcoa had developed an acoustic model of the refinery at Wagerup that allows the refinery's contribution to overall noise levels to be predicted.¹²¹⁷ SVT noted that the acoustic model had been used to assess the effectiveness of various noise control scenarios, and thereby estimate the costs involved in achieving specific noise level reduction targets.¹²¹⁸ SVT expressed its opinion that *"the current noise model is not suitable for accurately identifying the major contributors to noise received at noise sensitive locations."*¹²¹⁹ SVT recommended that *"The model needs to be updated to reflect the most recent assessment of sound power levels at the Refinery."*¹²²⁰

8.174 SVT noted that:

- Alcoa had spent over \$6 million on noise management projects at the refinery since 1995. SVT had inspected these noise control treatments and was satisfied that they had been effective;¹²²¹ and
- although there were some areas of the refinery where further noise reductions may be possible, SVT stated its agreement with Alcoa's assessment that achieving compliance with the current noise limits through noise control was not technically feasible.¹²²²

8.175 As part of its review, SVT considered Alcoa's noise Regulation 17 application. Alcoa's application advises the EPA that Alcoa has undertaken all practicable noise

¹²¹⁵ Ibid.

¹²¹⁶ Ibid, p28.

¹²¹⁷ Ibid, p4.

¹²¹⁸ Ibid, p6.

¹²¹⁹ Ibid.

¹²²⁰ Ibid, p34.

¹²²¹ Ibid, p5.

¹²²² Ibid.

controls that can result in reduction of the refinery's contribution to overall noise levels in the surrounding district.¹²²³ Alcoa has therefore requested that the assigned noise levels be increased to allow the refinery to operate in compliance with the *Environmental Protection (Noise) Regulations 1997* at its current noise emission level.

8.176 There are 90 noise sensitive premises in the area for which Alcoa has requested a variation of the assigned noise levels, seven of which are owned by Alcoa. The majority of these premises are located to the south of the refinery in the Yarloop area.¹²²⁴

8.177 The variation sought by Alcoa is to obtain three zones with increasing distance from the refinery where the assigned noise levels are increased. The zone boundaries have been determined by noise modelling for night-time, worst case noise emission.¹²²⁵

8.178 A summary of Alcoa's noise management plan is as follows:¹²²⁶

- seek to reduce noise levels in a reasonable and practicable manner, or at a minimum, to maintain the current levels;
- request an increase in the assigned noise levels to reflect current noise emission levels;
- seek to purchase properties within the 35 decibel contour when they become available;
- offer noise amelioration options for affected premises;
- undertake detailed engineering assessments of noise control scenarios required to achieve three decibel and seven decibel reductions in noise emissions from the refinery;
- ensure that any new projects do not result in an increase in overall noise emissions from the refinery; and
- maintain and regularly review the noise monitoring program.

8.179 SVT expressed its belief that this is a reasonable plan and can be effective in managing both existing and future noise emissions from the refinery.¹²²⁷

¹²²³ Ibid.

¹²²⁴ Ibid, p11.

¹²²⁵ Ibid, p29.

¹²²⁶ Ibid, pp29-30.

- 8.180 It also recommended that in light of recent evidence that indicates a possible increase in low frequency noise emissions, the noise management plan should include a commitment to identifying the source(s) responsible for this increase and investigation of noise control treatments.¹²²⁸
- 8.181 SVT noted that Alcoa's application for a variation of the assigned levels did not constitute a request to allow an increase in noise emissions from the refinery, but rather it was Alcoa's assessment that bringing the refinery into compliance with the existing assigned levels was technically impracticable.¹²²⁹
- 8.182 The Committee notes that in support of its application, Alcoa has given a commitment that the current noise emissions from the refinery will not increase with any future modification, upgrade or expansion of the refinery.¹²³⁰
- 8.183 In conclusion, SVT expressed its belief that the proposed variation to the assigned levels was sufficient to cover Alcoa's current noise emissions provided that noise emissions were free from tonality.¹²³¹

ALCOA'S RESPONSE TO SVT ENGINEERING CONSULTANT'S REPORT

- 8.184 In response to its request for an update on the work Alcoa has and is undertaking to address the recommendations made by SVT, the Committee was advised by letter dated October 28 2003 that *"Alcoa is currently developing a scope of work to address all the recommendations raised in the SVT report."*¹²³²
- 8.185 In relation to SVT's recommendations concerning Alcoa's complaints management system, Alcoa advised by way of letter dated October 28 2003 that some of those recommendations had already been adopted, including:¹²³³
- increasing the DAT run time to 12 minutes per sample to capture a complete noise logging cycle;
 - complaint analysis reports now display actual logger level, predicted (modelled) logger level and predicted (modelled) level at neighbours' residences; and

¹²²⁷ Ibid, p30.

¹²²⁸ Ibid.

¹²²⁹ Ibid.

¹²³⁰ Ibid, p8.

¹²³¹ Ibid.

¹²³² Letter from Alcoa, October 28 2003, p8.

¹²³³ Ibid.

- a proposal to obtain DAT samples under low ambient conditions in addition to times of complaint is being considered to determine if it can be implemented.

8.186 The Committee sought further information from Alcoa in November 2003, namely:

- the work it was undertaking to address the recommendations made in the SVT report;
- requesting several documents referred to in the SVT report; and
- the basis for Alcoa's commitment (see paragraph 8.182 above) that the current noise levels being emitted from the refinery would not increase with any future modification, upgrade or expansion of the facility.

8.187 The Committee followed up these requests with Alcoa in February and April 2004.

8.188 In April 2004 Alcoa responded to the Committee's numerous letters as follows:

- in relation to the work it had undertaken to address the recommendations made in the SVT report, Alcoa provided no new information but referred the Committee to its previous responses;
- it did not provide the documents requested but advised that it would do so as soon as possible; and
- in relation to the Committee's query as to Alcoa's assurance that noise emissions would not increase with any expansion, Alcoa responded by seeking "*further advice from the Committee on the specific clarification sought of Alcoa by the Committee.*"¹²³⁴

8.189 As at October 2004 the documents had not been provided to the Committee.

8.190 The Committee did not have time to further pursue these matters with Alcoa prior to tabling its report, however expresses its disappointment that it was not provided with the information requested. The Committee considers the management of noise and the compliance with noise limits to be pivotal in the consideration or approval of any proposal to expand Alcoa's Wagerup refinery and expresses its disappointment that despite numerous requests Alcoa did not clarify this issue with the Committee.

COMMITTEE FINDINGS

8.191 The Committee finds that there is a significant adverse social impact on the lives of individuals in the communities surrounding the refinery. This impact includes:

¹²³⁴ Letter from Alcoa, April 16 2004, p1.

- financial stress;
- loss of community membership;
- noise and odour intrusion;
- disempowerment;
- emotional stress; and
- insecurity about the future.

8.192 The Committee notes that Alcoa:

- makes payments of approximately \$16 million and \$1.4 million annually in favour of local businesses in the Shires of Waroona and Harvey respectively through its local supplier strategy;
- made total annual payroll contributions for 1999 to 2003 averaging approximately \$12.6 million to Shire of Waroona residents and approximately \$6 million to Shire of Harvey residents; and
- makes payments of approximately \$40 000 per annum in rates to both the Shire of Waroona and the Shire of Harvey.

8.193 The Committee believes this funding will have and has had some significant benefits for the local communities.

8.194 The Committee notes that Alcoa has committed the following funds to the local communities adjacent to the Wagerup refinery including, but not limited to:

- \$2 million on the Community Development Fund;
- since 1994, more than \$1 million to Landcare in the Peel Harvey catchment of which a considerable amount has been directed to projects in the Shires of Waroona and Harvey;
- since 1997, approximately \$985 000 to projects in the Shire of Waroona; and
- since 2002, approximately \$200 000 to projects in the Shire of Harvey.

8.195 The Committee notes that Alcoa is not required by law to provide any financial assistance to local communities but encourages Alcoa to continue this practice.

8.196 The Committee notes Alcoa's recognition of the complexity of the issues faced by it and the communities surrounding the refinery at Wagerup, its unreserved apology for

its part in those issues and its stated commitment to restoring the trust and good relations of the community.

- 8.197 The Committee is of the view that noise emissions from the refinery are having an adverse impact on the lives of some people living in close proximity.
- 8.198 The Committee notes the comments by SVT Engineering Consultants in its report on noise emissions from Alcoa's Wagerup refinery that although there are some areas where further noise reductions may be possible, achieving compliance with the current noise limits through noise control is not technically feasible.
- 8.199 The Committee notes that since the refinery was commissioned, Alcoa has committed a total expenditure of \$6.18 million for noise reduction measures. The Committee notes that although these measures have resulted in a decrease in noise emissions, noise levels continue to exceed the allowable limit set pursuant to the *Environmental Protection (Noise) Regulations 1997* during specific weather conditions.
- 8.200 The Committee notes that Alcoa has applied to the Minister for the Environment for a variation of its assigned noise levels and that this application is still pending. The Committee notes that applications to vary assigned noise levels are reasonably common for industries in Western Australia.
- 8.201 Alcoa failed to provide certain specific important information sought by the Committee regarding its noise emissions. Refer to paragraphs 8.186 to 8.190.

RECOMMENDATION

Recommendation 18: The Committee recommends that the State Government take critical note of current breaches of the existing noise limits for Alcoa's Wagerup refinery in its consideration of the proposal to increase production from the refinery.

CHAPTER 9

ADEQUACY OF REGULATORY MECHANISMS

OVERVIEW OF CHAPTER

9.1 In this chapter the Committee discusses the following:

- The regulatory regimes covering the environment, occupational health and safety, and public health in Western Australia.
- Complaints alleging inadequate actions by Government departments and the responses from those departments.
- Government reform of environmental protection.
- Submissions received in relation to perceived deficiencies in emissions exposure guidelines.
- Submissions received in relation to perceived deficiencies in accessing compensation for multiple chemical sensitivity (**MCS**).
- The roles of various Government departments, their interaction, and the whole of government strategy to address environmental, health and safety issues.
- The State Government's reform of the occupational health and safety regime.

9.2 The Committee has provided its findings and recommendations on these matters at the end of the chapter.

INTRODUCTION

9.3 Three government departments are responsible for administering environmental, occupational health and safety and public health issues raised in regard to Alcoa's refinery at Wagerup:

- The DEP is responsible for the administration of the *Environmental Protection Act 1986* (**EP Act**), which is the principal environmental legislation governing the environment in Western Australia. (Refer to paragraphs 9.6 to 9.21 of this report for a discussion of the DEP's regulatory role).
- The DMPR is responsible for the administration of the *Mines Safety and Inspection Act 1994* (**MSI Act**) and associated regulations, which include

prevention of environmental hazards that could impact adversely on the health and safety of employees of a mine. (Refer to paragraphs 9.113 to 9.124 of this report for a discussion of the DMPR's regulatory role).

- The DoH is responsible for administering health legislation, which includes addressing public health concerns.¹²³⁵ (Refer to paragraphs 9.146 to 9.148 of this report for a discussion of the DoH's regulatory role).

9.4 For a discussion on regulatory mechanisms regarding noise emissions, refer to paragraphs 8.73 to 8.88 of this report.

THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

9.5 The Committee has set out below a summary of the DEP's regulatory role and how this relates to Alcoa's refinery at Wagerup.

The role of the Department of Environmental Protection in environmental regulation generally

9.6 The DEP has responsibility for the prevention, control and reduction of pollution (including air pollution matters), and the protection and management of the environment, where the general community is involved. The DEP has statutory authority to require pollution matters to be investigated and addressed.

9.7 The DEP regulates industry through the licensing system established under the EP Act and the associated Regulations. Through the licensing system and the issuing of works approvals, the DEP controls the operations of refineries, such as Alcoa's refinery at Wagerup:¹²³⁶

The DEP is responsible for managing refinery emissions into the environment through the issue, administration and enforcement of an operating Licence.

9.8 The EP Act makes provision for the development of policies and the issuing of works approvals and licences, and ensuring compliance with them. A works approval is required to conduct works that relate to the handling or the emission of waste on premises. Works Approvals contain conditions that:¹²³⁷

are designed to prevent or minimise any potential pollution impacts arising during the construction stage of a project and to ensure that

¹²³⁵ This includes the *Health Act 1911* and numerous other Acts. (Refer to the DoH Annual Report 2002 for a list of the Acts).

¹²³⁶ Submission No. 53 from the DEP, April 9 2002, p27.

¹²³⁷ Ibid.

the premises will be able to operate in compliance with any subsequent or current licence conditions following commissioning of the works.

- 9.9 In general, licences set requirements or standards on industry, require certain action by industry, measure the performance of industry through monitoring of any waste discharged and/or environmental impact and promote the objectives of minimising environmental discharges and preventing or abating pollution of the environment.¹²³⁸
- 9.10 The DEP advised that *“Licences are issued with specific operating conditions designed to ensure that a facility is operated in an environmentally acceptable manner.”*¹²³⁹
- 9.11 The DEP sets conditions for licence and works approvals only in relation to pollution. Section 62 of the EP Act outlines the conditions to which works approvals and licences may be subjected. Conditions include the installation of pollution control equipment and the carrying out of monitoring programs.
- 9.12 The EP Act provides that a licence may be revoked or suspended or licence conditions may be amended. Revocation or suspension of a licence may occur if there has been a breach of any condition of a works approval held by the licensee or a breach of any condition of a licence. An amendment may occur to remove, add or change any condition of licence, or to correct any mistakes or errors in the licence (s 59 of the EP Act).
- 9.13 The DEP has the power to set standards relating to the emissions of waste or ambient air quality levels associated with these emissions.
- 9.14 It is an offence to contravene a licence condition (s 58 of the EP Act). The offence carries a penalty of up to \$125 000 for a body corporate, with a daily penalty of up to \$25 000.
- 9.15 The Committee notes that from approximately 1992 to the time amendments were made to the EP Act in 2003, the DEP’s prosecution process relating to on-site and off-site pollution was inadequate.¹²⁴⁰ Amendments to the EP Act in October 2003,

¹²³⁸ Licensing Branch, Pollution Prevention Division, DEP, *Regulating Industries under the Environmental Protection Act 1986*, January 2000, p3: DoE website: www.environ.wa.gov.au/downloads/Works_Approval/Regulating_Industries.pdf (accessed February 26 2004).

¹²³⁹ Submission No. 53 from the DEP, April 9 2002, p27.

¹²⁴⁰ Western Australia, Legislative Assembly, Standing Committee on Economics and Industry, *Bellevue Hazardous Waste Fire Inquiry*, Volume 2, Report No.2, June 27 2002, pp 45-49.

particularly to section 3(2aa), have clarified the definition of pollution, which now includes a reference to on-site emissions impacts.¹²⁴¹

9.16 The Committee notes the June 2002 report by the Western Australian Legislative Assembly Standing Committee on Economics and Industry on the *Bellevue Hazardous Waste Fire Inquiry*¹²⁴² (**Bellevue Fire Report**). The Bellevue Fire Report discusses the limitations that were applied to the definition of pollution in the EP Act (section 3(1)) by a decision of the Full Court of the Supreme Court of Western Australia in 1991.¹²⁴³ The Court's decision in limiting the definition of pollution also interacted with the definition of the environment under the EP Act. The Bellevue Fire Report states that "*As it relates to pollution and prescribed premises, the environment is something surrounding the premises, other than the premises itself*".¹²⁴⁴

9.17 The Bellevue Fire Report notes that pollution as defined in the EP Act "*is confined to impacts beyond the boundary of the prescribed premises.*"¹²⁴⁵ The Western Australian Legislative Assembly Standing Committee on Economics and Industry was advised by Dr Bryan Jenkins that "*It is not enough for a contaminant to be present offsite; it must also have caused direct or indirect alteration of the environment either to its detriment or degradation...*".¹²⁴⁶ The Bellevue Fire Report states that Crown Law advice was that the DEP did not have the legal authority to deal with on-site pollution issues.¹²⁴⁷

9.18 The Western Australian Legislative Assembly Standing Committee on Economics and Industry made the following finding in the Bellevue Fire Report:¹²⁴⁸

Provisions within the Environmental Protection Act 1986 that deal with pollution within the boundaries of prescribed premises are ineffective and do not allow the regulators to take effective action where on-site pollution is reasonably suspected.

9.19 On the licensing process, Mr Peter Skitmore, Manager, Special Projects, DEP informed the former Standing Committee on Public Administration in February 1999 that:¹²⁴⁹

¹²⁴¹ Section 3(2aa) and section 3A of the EP Act and email from Manager, Legal Services, DoE, February 5 2004.

¹²⁴² Western Australia, Legislative Assembly, Standing Committee on Economics and Industry, *Bellevue Hazardous Waste Fire Inquiry*, Volume 2, Report No.2, June 27 2002.

¹²⁴³ Ibid, pp45-49.

¹²⁴⁴ Ibid, p47.

¹²⁴⁵ Ibid.

¹²⁴⁶ Ibid, p48.

¹²⁴⁷ Ibid, p47.

the licensing process is designed to ensure that when the approvals to operate industrial facilities are issued, we are comfortable that those operations should not cause a problem in terms of environmental impact. That is quite often based on the technology being used and the standards which are applied to that industry. That is a proactive process to ensure the environment is protected.

- 9.20 To ensure compliance with conditions imposed on licences issued by the DEP in Western Australia, industry is required to conduct its own monitoring of emissions and report them to the DEP.¹²⁵⁰
- 9.21 The Committee notes advice given by the DEP to the previous Standing Committee on Public Administration in February 1999 that if there was a demonstrated link between the health of the individuals in the community and the emissions from Alcoa's refinery at Wagerup, then the DEP would be able to take the appropriate action.¹²⁵¹

The role of the Department of Environmental Protection at Alcoa's refinery at Wagerup

Breaches of licence conditions

- 9.22 The provisions of the EP Act cover emissions from Alcoa's refinery at Wagerup. Specifically:
- environmental impact assessment is covered by Part IV of the EP Act; and
 - control of pollution is covered by Part V of the EP Act.
- 9.23 The operations at Alcoa's refinery at Wagerup are prescribed under Category 46 (Bauxite Refining) of the *Environmental Protection Regulations 1987 (EP Regulations)*.
- 9.24 As previously noted, Alcoa's refinery at Wagerup has been licensed by the DEP since 1987. The licence is reviewed annually.¹²⁵²

¹²⁴⁸ Ibid, p48.

¹²⁴⁹ Mr Peter Skitmore, Manager Special Projects, DEP, *Transcript of Evidence*, June 16 1999, pp26-27.

¹²⁵⁰ For example, refer to Alcoa's licence for the 2003/2004 period: Licence Number 6217/7.

¹²⁵¹ Western Australia, Legislative Council, Standing Committee on Public Administration, *Report in relation to the Administration of Environmental Complaints Relating to Public Health: A Case Study*, Report No. 12, September 1999, Appendix 2 - letter from Dr Michael Bond, Acting Chief Executive Officer, DEP, to Hon Kim Chance MLC, Chairman, former Standing Committee on Public Administration, February 23 1999, p2.

¹²⁵² Submission No. 53 from the DEP, April 9 2002, p28. Section 63 of the EP Act provides that a works approval or licence shall continue in force for such period as is specified in the works approval or licence.

- 9.25 The DEP places conditions on the licence for Alcoa's refinery at Wagerup in relation to reporting requirements, air monitoring and emission control, water monitoring and emission control, and solid waste management.¹²⁵³
- 9.26 The DEP advised the Committee that "*In terms of compliance with Part V [of the EP Act] licence conditions, generally Alcoa has been operating in compliance with its licence conditions, with the exception of minor technical non-compliances.*"¹²⁵⁴
- 9.27 Despite the statement above, the Committee notes that the DEP is prosecuting Alcoa for allegedly causing pollution and breaching its licence conditions. Alcoa faces two charges:
- that on November 15 2002, Alcoa caused pollution by the contamination of the air at Wagerup and Yarloop with dust from the residual disposal areas (**RDAs**) contrary to sections 49(3) and 99Q(2)(a) of the EP Act; and
 - that on November 15 2002, Alcoa contravened a condition of its licence in that it failed to ensure that no visible dust generated from the bauxite milling, storage transfer or refining process crossed the boundary of the premises contrary to sections 58(1) and 99Q(2)(b) of the EP Act.
- 9.28 Alcoa appeared at a preliminary hearing on June 15 2004.
- 9.29 It has been reported that other incidents have occurred at Alcoa's refinery at Wagerup, both occurring in March 2002:
- An accident resulting in a big spill of caustic liquid, in which it was reported that "*Thousands of litres of a highly alkaline solution containing caustic soda and aluminium was spilt within the refinery.*"¹²⁵⁵ An Alcoa spokesman was reported as saying that the incident did not breach environmental licence conditions because it was contained within the refinery.¹²⁵⁶ A spokesman from the DEP was reported as saying that the department was investigating the incident and that no decision had been made on whether to prosecute Alcoa.¹²⁵⁷
 - An incident when it was reported that emissions control equipment on a calciner failed and released big quantities of aluminium oxide and other

¹²⁵³ Ibid, p28.

¹²⁵⁴ Ibid, p36.

¹²⁵⁵ "*Big caustic spill at Wagerup*", *The West Australian* newspaper, March 27 2002, p16.

¹²⁵⁶ Ibid.

¹²⁵⁷ Ibid.

pollutants into the atmosphere for several hours.¹²⁵⁸ It was reported that after a three-month investigation, the DEP was of the view there had been a breach of Alcoa's licence but that it would take no action.¹²⁵⁹ The director of regulation of the DEP was reported as saying that the investigation had established that the leak from the refinery's calciner plant had exceeded the licence limit for particulates by up to eight times and the leak had continued for more than eight hours.¹²⁶⁰ However, this was described as a technical breach.¹²⁶¹ The director of regulation of the DEP was reported as saying that *"We do not regard this incident as pollution. The licence limits can be exceeded without any significant harm or pollution occurring. (The leak) dropped dust on Alcoa's land and forest, so we don't believe it did any harm to the environment or had any impact on people."*¹²⁶²

Licence conditions and renewals

- 9.30 Alcoa's licence for the period expiring on September 30 2001 allowed for the production of up to 2.2 million tonnes per annum (**mtpa**) of alumina. The Committee notes that the refinery had been operating at a daily production rate equivalent to 2.35 mtpa of alumina since approximately October 2000.¹²⁶³
- 9.31 In June 2001, the DEP received a request from Alcoa for an increase in annual production of 2.2 mtpa to 2.35 mtpa of alumina. On July 25 2001, the DEP issued the amendment to the licence for the remainder of the licence period which expired on September 30 2001.¹²⁶⁴ The rationale behind the DEP's decision to allow the increase in throughput was based, in part, on the understanding that data indicated that noise and odour emission levels had been gradually decreasing.¹²⁶⁵
- 9.32 A further licence was issued by the DEP on September 28 2001 which also allowed production up to 2.35 mtpa.¹²⁶⁶
- 9.33 The Committee considers that the licensing process was poorly managed by the DEP when production at Alcoa's refinery at Wagerup was forecast to exceed the licence

¹²⁵⁸ Michael Southwell, "No decision yet over Alcoa chemical cloud", *The West Australian* newspaper, June 8 2002, p53.

¹²⁵⁹ Michael Southwell, "Watchdog defiant on Alcoa", *The West Australian* newspaper, June 12 2002, p7.

¹²⁶⁰ Ibid.

¹²⁶¹ Ibid.

¹²⁶² Ibid.

¹²⁶³ Appeals Convenor for the EP Act, *Appeals Report*, Conditions of Licence Number 6217/4, p1.

¹²⁶⁴ Ibid.

¹²⁶⁵ Appendix 2, p2 of Submission No. 53 from the DoE, April 9 2002.

¹²⁶⁶ Appeals Convenor for the EP Act, *Appeals Report*, Conditions of Licence Number 6217/5, p1.

limits. The Committee considers that there should have been a formal review process of Alcoa's licence when the increase in production was forecast rather than after an approach by Alcoa in June 2001. As noted by the Appeals Convenor in the Appeals Report on the licence amendment, *"the delay in amending the licence has disadvantaged appellants, as they did not have the opportunity to challenge the increase in production at the time that it was forecast."*¹²⁶⁷

- 9.34 It should be noted that during these critical months of inaction, many pollution events were being experienced around Wagerup. Furthermore, this took place after the performance of the DEP on this issue had been scrutinised by a parliamentary inquiry.¹²⁶⁸
- 9.35 As a result of significant community concerns expressed through the community appeals process, the Minister for the Environment intervened to reduce the production of alumina levels to 2.2 mtpa unless three main emissions reductions programs were achieved by Alcoa by June 30 2002.

Monitoring of emissions

- 9.36 The DEP advised, in April 2002, that it reviews and re-evaluates monitoring requirements and requires an independent audit to be undertaken to review all monitoring programs, sampling locations and techniques, analytical techniques, and quality assurance in these areas. Should any deficiencies be identified, the DEP initiates appropriate action to address them.¹²⁶⁹
- 9.37 As a condition of the 2003/2004 licence for Alcoa's refinery at Wagerup, Alcoa is required to monitor and report on all major emissions sources from the refinery. Where Alcoa is required to provide an annual monitoring report and/or emission reduction evaluation report as part of the licence, these report(s) should be independently/peer reviewed.¹²⁷⁰
- 9.38 The Committee notes that the October 2004 DoE Material provides some information in relation to the peer review and independent review of the continuous monitoring program conducted by Alcoa.¹²⁷¹

¹²⁶⁷ Appeals Convenor for the EP Act, *Appeals Report*, Conditions of Licence Number 6217/4, pp2 and 10.

¹²⁶⁸ Western Australia, Legislative Council, former Standing Committee on Public Administration, *Report in relation to the Administration of Environmental Complaints relating to Public Health: A Case Study*, Report No. 12, September 1999.

¹²⁶⁹ Submission No. 53 from the DEP, April 9 2002, p30.

¹²⁷⁰ Letter from Acting Director, Environmental Regulation Division, DEP, November 7 2003 attaching Alcoa refinery at Wagerup licence No 6217/7 for the period 2003/2004, p3.

¹²⁷¹ Submission from the DoE, p11-12 attached to letter the Minister for the Environment, October 5 2004.

9.39 Alcoa's 2003/2004 operating licence does not contain comprehensive emissions limits on a wide range of parameters. In lieu of this, the DEP uses production limits as a mechanism to control the potential for pollution.¹²⁷²

9.40 In April 2002 the DEP advised the Committee that it is:¹²⁷³

moving towards a comprehensive emissions based licence and will determine appropriate specific licence limits as soon as practicable. ...These emissions criteria will replace the existing throughput condition, as it is emissions which should be directly controlled rather than production as a surrogate.

9.41 The DEP also advised the Committee that:¹²⁷⁴

In line with this, DEP has required Alcoa to undertake a comprehensive and detailed emissions inventory of all significant emission points and for an independent auditor to review and assess quality assurance of that monitoring. ...Regardless of existing licence controls, ambient air quality in the community has been and is currently well within all relevant guidelines.

9.42 The Committee notes that the October 2004 DoE Material discusses the 2004/2005 licence (issued on August 12 2004 for one year) and the new production limits. The DoE states:¹²⁷⁵

The licence also initially constrains annual production to 2.35 million tonnes. However, it makes a provision for an increase in annual alumina production of up to 2.5 million tonnes, but only if there is a clearly demonstrated emissions benefit in real terms from the calcination process. Retaining the annual production limit during the licence period ensures the community has a 'safety net' in relation to refinery impacts, whilst providing the opportunity to further develop emissions limits.

The licence also specifies an absolute daily production limit of 7400 tonnes, thereby reducing emissions peaks associated with production peaks. Previously, daily throughput had fluctuated as high as 8400

¹²⁷² Letter from Acting Director, Environmental Regulation Division, DEP, November 7 2003 attaching Alcoa refinery at Wagerup licence No 6217/7 for the period 2003/2004, pp1 and 10.

¹²⁷³ Submission No. 53 from the DEP, April 9 2002, p29.

¹²⁷⁴ Ibid, p43.

¹²⁷⁵ Submission from the DoE, pp19-20, attached to letter from the Minister for the Environment, October 5 2004.

tonnes, generating daily emissions up to 12 percent above those at the new permissible level.

A new condition has been imposed to limit the level of key volatile organic compounds (VOCs) emissions from calcination over the period of the licence, with additional limits specified for each quarter. This ensures a community benefit before any increase in annual production is allowed.

This is a transition arrangement between the purely production based approach and an emissions base approach. It also includes a frequent monitoring and reporting provision through the Tripartite Group.

STATE GOVERNMENT REFORM OF ENVIRONMENTAL PROTECTION

9.43 The Committee notes that a number of reviews have been undertaken since the beginning of 2003 on various aspects of environmental regulation in Western Australia in relation to the DoE. The Committee notes specifically:

- a review to identify systemic problems with licence conditions, and recommend improvements to the current industry licensing system: Welker Environmental Consultancy, *Western Australian Licence Conditions Independent Strategic Review - Final Draft*, February 2003 (**Welker Review**);
- a review of DEP enforcement and prosecution guidelines: Dr Brian Robinson, *Review of the Enforcement and Prosecution Guidelines of the Department of Environmental Protection of Western Australia*, February 2003; (**Robinson Review**) and
- a review of the management structure of the DEP and the Water and Rivers Commission: D Carew-Hopkins, *Department of Environmental Protection, Water and Rivers Commission Management and Structure Review 2003*, March 2003 (**Carew-Hopkins Review**).

9.44 The Minister for the Environment informed the Committee in October 2003 that a total of 145 recommendations had been made from these three separate reviews.¹²⁷⁶ The Minister stated that the reviews combined with new environment and contaminated sites legislation, had provided the new DoE with a stronger focus on environmental regulation and protection.¹²⁷⁷

¹²⁷⁶ Letter from the Minister for the Environment, October 1 2003.

¹²⁷⁷ Ibid.

9.45 The Committee was advised that stakeholder working groups were established in June 2003 to assist the DoE to progress reforms in the following areas:¹²⁷⁸

- Licence condition review.
- Environmental improvement plans.
- Community involvement and public reporting.
- Integration of environmental impact assessment with the works approval and licensing process.

Welker Review

9.46 The Minister informed the Committee that the Welker Review identified a number of key reforms amongst 61 recommendations. The Minister stated that the new DoE “has continued, but refined, its own industry licensing reforms to address recommendations in the Welker Review.”¹²⁷⁹

9.47 The Minister advised that the review of licence conditions being progressed (as at October 2003) would result in the development of a new framework for the structure and content of licence conditions. The structure would clearly detail the objective, limit and/or target for each condition, as well as relevant monitoring and reporting requirements. The content of conditions would be primarily focused on managing discharges of waste.¹²⁸⁰

9.48 The Minister advised that, in October 2003, the new DoE would commence a program of licence reviews to progressively apply the new framework, together with other reform initiatives to licences across Western Australia.¹²⁸¹

Robinson Review

9.49 To assist in performing its enforcement functions the DEP, after extensive consultation, adopted the *Enforcement and Prosecution Guidelines* in January 2001. Subsequent public criticism of the DEP’s enforcement performance raised questions about the adequacy of the guidelines in a changing environment and in August 2002, the Minister for the Environment commissioned the Robinson Review.¹²⁸²

¹²⁷⁸ Ibid.

¹²⁷⁹ Ibid.

¹²⁸⁰ Ibid.

¹²⁸¹ Ibid.

¹²⁸² Dr Brian Robinson AM FTSE, *Review of the Enforcement and Prosecution Guidelines of the Department of Environmental Protection of Western Australia*, February 2003, p4.

9.50 The Minister for the Environment advised the Committee in October 2003 that the Environmental Enforcement Unit was coordinating the implementation of recommendations contained in the Robinson Review. The Minister informed the Committee that as at October 2003, 28 of the 33 Robinson Review recommendations were actively being implemented or were completed. She advised that it was anticipated that by June 2004, the Environmental Enforcement Unit would be addressing or would have completed all of the Robinson Review recommendations.¹²⁸³

Carew-Hopkins Review

9.51 In October 2003, the Minister advised the Committee that the new DoE had prepared a program to progressively implement the recommendations of the Carew-Hopkins Review. The Minister advised that the new DoE has a coordinated program for change management across the organisation and determined priority actions for the financial year 2003/2004.¹²⁸⁴

9.52 The Carew-Hopkins Review stated that industry groups expressed concern that DoE staff with little expertise, skills or understanding of industry were setting licence conditions and managing large projects.¹²⁸⁵ The review also noted there was a general view that both the DEP and the WRC had been de-skilled over a number of years, particularly in the areas of planning, environmental investigation and water resource investigation.¹²⁸⁶

9.53 The Carew-Hopkins Review made a number of recommendations to address the loss of expertise from the DoE. These included:¹²⁸⁷

- a review of the staff induction program;
- the inclusion of consideration of community engagement efforts in the performance evaluation of staff to reward staff through career progression initiatives; and
- development of career structures and recognition programs, aimed at retaining experienced staff, particularly within the technical areas.

¹²⁸³ Letter from the Minister for the Environment, October 1 2003.

¹²⁸⁴ Ibid.

¹²⁸⁵ Carew-Hopkins Review, pp28-29.

¹²⁸⁶ Ibid, pp27-28.

¹²⁸⁷ Ibid.

Response to Committee's requests for information

- 9.54 Throughout the course of the Committee's inquiry, the DEP was slow to respond to many of the Committee's requests for information. This was particularly so after the Committee's hearing in July 2002, at which the DEP agreed to provide additional information. The Committee received part of that information in September 2002, some in January 2003 and information in relation to budget figures in 2004. The Committee is of the view that this lack of timely response to its requests is due in part to the lack of adequate resources provided to the DEP to manage its workload adequately. The Committee also expresses its dissatisfaction with the late provision of further material (refer to paragraphs 1.19 and 1.20 of this report).

COMPLAINTS IN RELATION TO THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

- 9.55 During this inquiry, the Committee received evidence from a number of people who raised concerns regarding the regulatory performance of the DEP. The Committee has outlined those concerns below.

Evidence of alleged inadequacies of responses to complaints and lack of consultation processes

- 9.56 The Committee received evidence on November 21 2001 from Mr John Szkraba, Secretary, WCHAG, who expressed his concern with the manner in which the DEP handled community complaints. Mr Szkraba informed the Committee that members of the local community *"have trouble getting the DEP to recognise our complaints as complaints. It seems to only want to gather them as data - as information - and not register them as complaints against the industry."*¹²⁸⁸
- 9.57 Mr Szkraba submitted that during the installation of the LBF and for the following 12 months, *"although many complaints were lodged with Alcoa and the Department of Environmental Protection the matter was not considered or investigated by either body until the community formed an incorporated group. In fact, initially neither Alcoa nor the DEP wanted to accept the complaints submitted by the Wagerup community health awareness group as official complaints."*¹²⁸⁹
- 9.58 At the same public hearing on November 21 2001 Mr Giglio Martelli, then Vice President, WCHAG, expressed the view that *"the DEP tries and I think it is starting to realise that there is a problem there and I would like to think it is trying really hard to pinpoint it and help us out. My personal opinion is that in the past that was not the case."*¹²⁹⁰ He also expressed the view that *"I do not think the DEP has the resources*

¹²⁸⁸ Mr John Szkraba, Secretary, WCHAG, *Transcript of Evidence*, November 21 2001, p8.

¹²⁸⁹ Ibid, p1.

¹²⁹⁰ Mr Giglio Martelli, Vice President, WCHAG, *Transcript of Evidence*, November 21 2001, p7.

or the time - the people. It is not because it does not care, but I do not think it thinks the problem exists.”¹²⁹¹

- 9.59 Mr Martelli submitted that *“Even though I am very critical of the DEP, I think it has probably done the best it can with the resources and time it has.”*¹²⁹²
- 9.60 Mrs Cheryll Borserio, then Chairperson, WCHAG, expressed the view that *“I very definitely have an issue with the DEP. I am absolutely appalled at its consultation process.”*¹²⁹³
- 9.61 At the Committee’s hearing on November 28 2001, Mr van der Pal, Alcoa employee and safety representative, submitted that *“The workers and the community say that there was no adequate consultation or notification with the community that Alcoa was to construct and operate a liquor burning plant that would emit potentially offensive odours.”*¹²⁹⁴
- 9.62 At its hearing in November 2001, Hon Kate Doust MLC questioned Mr van der Pal as to whether, when he realised the LBF was to be set up at Wagerup, he took the matter outside Alcoa and made a formal complaint about his claims of lack of consultation and notification.
- 9.63 Mr William van der Pal advised the Committee that he took his complaint to the DEP and expressed his disappointment with the response that he received. He claimed that, in his view, the DEP did not investigate the matter as thoroughly as he would have liked.¹²⁹⁵
- 9.64 In its submission in January 2004, the YDCRC stated that *“While it may be true the DEP were under resourced and under staffed and this limited their effectiveness to some extent, certain things that have happened indicates to us that this is unlikely to be the core of the problem.”*¹²⁹⁶
- 9.65 The YDCRC submitted that a number of incidents including a lack of enforcement and what they claimed to be acceptance of questionable data by the DEP led to the conclusion by the community that *“whatever the DEP’s intent was, it was definitely not acting for the benefit of the community or affected people.”*¹²⁹⁷ The YDCRC

¹²⁹¹ Ibid.

¹²⁹² Ibid.

¹²⁹³ Mrs Cheryll Borserio, Chairperson, WCHAG, *Transcript of Evidence*, November 21 2001, p8.

¹²⁹⁴ Mr William van der Pal, Alcoa employee and safety representative, *Transcript of Evidence*, November 28 2001, p5.

¹²⁹⁵ Ibid, p11.

¹²⁹⁶ Submission No. 69, YDCRC, January 27 2004, p9.

¹²⁹⁷ Ibid, p10.

submitted that “*The general feeling in the community is that the Licensing Division of the DEP is an unofficial arm of the Department for Resources Development, rather than an Environmental Regulator and Protector.*”¹²⁹⁸

Evidence from Mr Keith James about the regulatory control of licensed premises

9.66 The Committee received a submission in November 2001 from Mr Keith James, Director, Stack-Air. Mr James advised the Committee that he is a specialist in stack emissions monitoring with almost 20 years experience in the field. He advised that he has operated his own consulting company since 1993 and prior to that time he worked for the DEP in the same area.¹²⁹⁹ In his submission Mr James raised concerns about the licensing of industrial premises under the EP Act and the associated regulations, including issues related to the monitoring of emissions from the Alcoa refinery at Wagerup.¹³⁰⁰

9.67 Specific serious concerns were raised in relation to what Mr James viewed to be:¹³⁰¹

- the suitability of the type of sampling that was being undertaken at a number of licensed premises;
- lack of action by the DEP over apparent breaches of licence conditions, such as failure to submit reports, exceeding licence limits and failure to report emissions;
- inadequate regulations and guidelines to ensure companies provide appropriate locations and facilities for sampling;
- insufficient detail in the licence conditions, including for VOC emissions;
- lack of consistency by the DEP in setting conditions, including for VOC emissions;
- no quality control over industry emissions performance data, from a regulatory perspective; and
- lack of technical expertise in the licensing branch of the DEP to enable it to carry out its responsibilities under the EP Act in a competent and effective manner.

¹²⁹⁸ Ibid.

¹²⁹⁹ Submission No. 9 from Mr Keith James, Director, Stack-Air, November 26 2001, p1.

¹³⁰⁰ Ibid, pp1-3.

¹³⁰¹ Ibid and attachments.

- 9.68 The DEP advised in its submission of July 2002 that it had identified the main issues that had been raised by Mr James in his evidence to the Committee and in his correspondence to the DEP. These issues were in relation to both the regulatory control of licensed premises generally and to Alcoa's refinery at Wagerup in particular.¹³⁰² A summary of the DEP's response to those issues is set out below.
- 9.69 In response to the issue raised by Mr James in November 2001 regarding the lack of quality control, from a regulatory point of view, over emissions data supplied to the DEP and lack of technical expertise and experience within the department, the DEP provided the following information to the Committee in its submission of July 2002:¹³⁰³
- Licensees producing significant emissions are required to monitor them and report the results to the DEP.
 - Licence conditions specify what is to be monitored, monitoring methods and in many cases how data is to be presented.
 - With respect to operations at Alcoa's refinery at Wagerup, the 2001/2002 licence required an independent audit of all emissions testing conducted on-site. The Committee notes that this has continued as a condition of Alcoa's subsequent licences. The independent auditor was required to report directly to the DEP.
 - The DEP's Licensing Branch retains environmental scientists with a good general knowledge of environmental issues. The DEP obtains specialist advice as and when required.
- 9.70 In response to what Mr James, in his submission of November 2001, regarded as inadequacies and inconsistencies in the licensing of VOCs emissions generally and in particular what he viewed to be the inappropriate licence conditions imposed on Alcoa's refinery at Wagerup in relation to particulate and VOC emissions, the DEP stated the following in its July 2002 submission to the Committee:¹³⁰⁴
- All licences with VOC testing requirements were reviewed by the DEP in 2002 to check they had the correct speciation detailed on the licence and to ensure a consistent approach to the regulation of VOC emissions in Western Australia.

¹³⁰² Submission No. 36 from the DEP, July 8 2002, paragraphs 48 and 49.

¹³⁰³ Ibid, paragraphs 47-86.

¹³⁰⁴ Ibid.

- The DEP reviewed the 2001/2002 licence for Alcoa's refinery at Wagerup and licences of similar industries in other jurisdictions (for example New South Wales), with the aim of applying a more comprehensive list of emissions limits which would be comparable, or preferably more stringent than standards that would be applied in other jurisdictions. However, based on comparison with emissions limits set in other jurisdictions for similar industrial facilities, the DEP did not believe this was a weakness in the licence for Alcoa's refinery licence at Wagerup.
- Ambient monitoring of VOCs at Wagerup had failed to show emission levels which would explain the health concerns expressed by members of the local community.

9.71 With regard to what Mr James considered to be the inappropriateness of the DEP's 'industry self monitoring regulations' and the lack of a requirement for independent accreditation of emissions testers, the DEP informed the Committee in its submission of July 2002 that:¹³⁰⁵

- in 2002, the DEP had conducted a review of the 'industry self monitoring regulations' and possible alternative approaches that would produce the desired environmental protection outcomes. The DEP believed that the changes to the regulations and licence conditions, resulting from the review, had adequately addressed most of Mr James's concerns; and
- independent accreditation of emissions testers had been addressed by the independent auditor and NATA accreditation was now required for particular emissions monitoring and analysing. (Refer to paragraphs 6.93, 6.166 and 6.168 of this report for further details.)

Evidence from the Department of Environmental Protection

9.72 During its inquiry, the Committee received a number of submissions from the DEP in which it explained, among other things, how it responded to the concerns raised by workers and the community, its complaints handling and public consultation procedures. The Committee has set out a summary of those submissions below.

Complaints from the community

9.73 The DEP advised the Committee that it received very few 'formal' complaints from the community prior to mid 1999. From July 1999 to June 2002, the DEP received

¹³⁰⁵

Ibid.

127 complaints from the community.¹³⁰⁶ Some of the complaints related to irritating physical effects that members of the local communities believed to be due to air-borne substances emanating from Alcoa's refinery at Wagerup.¹³⁰⁷

- 9.74 In evidence to the Committee in July 2002 Mr Peter Skitmore, Manager, Special Projects, DEP, advised the Committee that prior to the issuing of Alcoa's licence for 2002/2003 in September 2002:¹³⁰⁸

There was no requirement under the licence at the time to advise the DEP about those complaints. Subsequently Alcoa has done a complaint analysis and provided that to both the DEP and the community. In fact a copy of a very detailed analysis of the complaints is in our initial submission in the interim report from the Wagerup Working Group.

- 9.75 The Committee was advised in January 2003 that it was a condition of the 2002/2003 licence for Alcoa's refinery at Wagerup that it submit monthly complaints reports to the DEP.¹³⁰⁹

Conclusions drawn by the DEP from its analysis of complaints data

- 9.76 The Committee notes that the DEP undertook an analysis of approximately 600 complaints lodged by the community using the WCHAG sheet complaints system together with some phone-in complaints for the period February 27 1999 to October 31 2000. That analysis found, among other things, no clear correlation between complaints lodged and operations at the refinery site, although there was a high correlation between the winds from the refinery and complaints.¹³¹⁰
- 9.77 In June 1999, Mr Peter Skitmore, at that time, Director Regional Services, DEP, made the following statement to the former Standing Committee on Public Administration on complaints handling when, upon investigation, emissions levels from Alcoa's refinery at Wagerup had been within regulation but were still being raised as an issue by some people:¹³¹¹

¹³⁰⁶ Appendix 17 of Submission No. 53 from the DEP, April 9 2002; and Attachment 5 of Submission No. 52 from the DEP, January 24 2003.

¹³⁰⁷ Chemistry Centre Report 99E0247B, *Report on Investigation of Health and Irritation Complaints at Wagerup/Yarloop (1999 Testing)*, May 30 2000.

¹³⁰⁸ Mr Peter Skitmore, Manager, Special Projects, DEP, *Transcript of Evidence*, July 8 2002, p3.

¹³⁰⁹ Submission No. 52 from the DEP, January 24 2003, Alcoa Wagerup Refinery Licence 2002/2003, No. 6217/6, p9, conditions G4(a and b).

¹³¹⁰ *Interim Report of the Alcoa-Wagerup Community Health Awareness Group Working Group*, August 2001, p13.

¹³¹¹ Mr Peter Skitmore, Director Regional Services, DEP, *Transcript of Evidence*, June 16 1999, p27.

Nevertheless we may still receive some complaints about noise or odour and when we investigate those complaints we might find for argument's sake with noise that people can hear the noise but it is not above the regulations. Even though we go through that proactive process and we are within the regulations, some members of the community may feel that the industry is impacting on them with noise, odour or in other ways. We follow up those complaints to see whether they are outside the standards and if they are not how we can minimise those impacts through interaction with the industry. Even though operations might be within the standards, we have a mandate to say we want to minimise any impacts as far as possible.

DEP action regarding complaints about Alcoa's refinery at Wagerup

9.78 The DEP informed the Committee that since 1999 it had undertaken on-site inspections and monitoring at Alcoa's refinery at Wagerup.¹³¹² It also commissioned a series of broadly based sampling programs to investigate the emissions and health issues raised by the community. Samples taken included drinking water from residents' rainwater tanks, sludges from their gutters, air-borne particulate material and hair, urine and nails from complainants.¹³¹³

9.79 The DEP also advised that since 1999, it had, through its involvement in the WCHAG Working Group, investigated concerns raised by the community with respect to emissions from Alcoa's refinery at Wagerup. The DEP advised in January 2003 that these investigations had been ongoing since the formation of the WCHAG in 1999 and were continuing to the present day. Actions taken included:¹³¹⁴

- analysis of community complaints that were lodged with the DEP through WCHAG;
- independent testing of a number of factors including ambient air quality and water;
- sampling and monitoring of various factors such as water; and
- independent health studies.

9.80 The DEP advised that where complaints had been received in relation to areas outside the DEP's expertise such as vegetation damage or health of domestic animals, the

¹³¹² Submission No. 53 from the DEP, April 9 2002, pp8-10.

¹³¹³ Chemistry Centre Report 99E0247B, *Report on Investigation of Health and Irritation Complaints at Wagerup/Yarloop (1999 Testing)*, May 30 2000, p2.

¹³¹⁴ Submission No. 52 from the DEP, January 24 2003; and Submission No. 36 from the DEP, July 8 2002.

DEP had referred the matters to the expert agency; for example, the Department of Conservation and Land Management.¹³¹⁵

Reducing emissions

9.81 In April 2002, the DEP advised that “*Since becoming aware of widespread community concern in relation to emissions from the Wagerup Refinery, DEP has focused on reducing emissions from the refinery.*”¹³¹⁶ The DEP also advised that “*This position was adopted despite the fact that emission and ambient monitoring undertaken by Alcoa indicated that air quality was well within relevant health guidelines.*”¹³¹⁷

9.82 The DEP advised in April 2002 that it had placed emissions limits on Alcoa’s licence to control emissions.¹³¹⁸

Community consultation

9.83 The Committee heard evidence that there was little community consultation regarding Alcoa’s proposal to construct and operate a LBF plant at Wagerup. Mr William van der Pal submitted to the Committee that:¹³¹⁹

The workers and the community say that there was no adequate consultation or notification with the community that Alcoa was to construct and operate a liquor burning plant that would emit potentially offensive odours. Why was no notification given when Alcoa’s modelling of emissions suggested that it would impact on the local community and workforce?

9.84 The DEP responded to complaints that the community was not provided with adequate opportunity for input into the DEP’s statutory processes such as works approvals and licences. In this respect, the DEP advised the Committee in April 2002 that it was addressing such concerns by extending and improving its consultation with the community, local government, and other key stakeholders and was working towards refining and further improving this strategy in direct liaison with the community.¹³²⁰

¹³¹⁵ Ibid.

¹³¹⁶ Submission No. 53 from the DEP, April 9 2002, p30.

¹³¹⁷ Ibid.

¹³¹⁸ Ibid, p33.

¹³¹⁹ Mr William van der Pal, Alcoa employee and safety representative, Alcoa, *Transcript of Evidence*, November 28 2001, p5.

¹³²⁰ Submission No. 53 from the DEP, April 9 2002, p29.

Licence conditions

9.85 In April 2002, the DEP informed the Committee that it had amended the conditions of Alcoa's Wagerup licence to address a number of the issues raised by the community.¹³²¹ The amendments included more detailed provisions covering complaint record keeping, and reporting of complaints to the DEP on a monthly basis.¹³²²

9.86 In November 2001, Mr Ron Stone, Alcoa's Manager of Environment, Health and Safety made the following comment regarding environmental monitoring conditions on the Wagerup refinery licence:¹³²³

We certainly conduct environmental monitoring to assess the performance of our environmental equipment and the environmental performance of the plant. We are required to publish the results in an annual report to the Department of Environmental Protection. Our new licence requires us to report six-monthly, whereas in the past it was 12-monthly. Some of that monitoring is now required to be done two-monthly, whereas in the past it was either three-monthly, six-monthly or 12-monthly. Previously, there was no verification associated with that reporting apart from internal verification. Again, a requirement of the new licence is that external verification must be done of not only the results but also the techniques used in the monitoring.

9.87 The Committee notes that section 79 of the *Environmental Protection Amendment Act 2003* repealed sections 61 and 62 of the EP Act and replaced them with new sections 61, 62 and 62A. New section 62 of the EP Act (which commenced operation on November 19 2003) concerns works approval and licence conditions. It provides that a works approval or licence may be granted subject to such conditions as the Chief Executive Officer of the DEP considers to be necessary or convenient for the purposes of the EP Act relating to the prevention, control, abatement or mitigation of pollution or environmental harm. Section 62A of the EP Act sets out some kinds of conditions that may be attached to a works approval or licence, such as:

- the installation or operation of equipment for preventing, controlling, abating or monitoring pollution or environmental harm;

¹³²¹ Ibid, p28.

¹³²² Submission No. 41 from the DEP, September 16 2002.

¹³²³ Mr Ron Stone, Environment, Health and Safety Manager, Alcoa, *Transcript of Evidence*, November 21 2001, p10.

- meeting specified criteria or complying with specified limits as to the characteristics, volume and effects of emissions; and
- conducting analysis of monitoring data.

9.88 In July 2002, prior to the new sections of the EP Act being passed by the Western Australian Parliament, Mr Peter Skitmore, Manager, Special Projects, DEP, made the following comments:¹³²⁴

Section 62 is quite restrictive and deals with pollution control equipment and the way in which pollution control equipment operates. It is a traditional command and control-type piece of legislation. The proposals before the House at the moment will widen it to meet the objectives of the Act. It will provide the Department of Environmental Protection with an opportunity to require things like improvement plans, which we cannot require at the moment. It will give us broader opportunity for some of the monitoring and also we will be able to require different types of audits. We will certainly have a larger range of things that we can deal with, but with regard to this issue, because Alcoa has been cooperative with the DEP, the limitations of section 62 have not prevented us from moving forward. However, they have in some instances prevented us from requiring conditions of licence, as distinct from Alcoa undertaking things on a voluntary basis. We could have enshrined those things in statute, but in this instance they still occurred.

DEP's strategy

9.89 The DEP informed the Committee in April 2002 that it had developed a seven-point strategy for dealing with the issues surrounding Alcoa's refinery at Wagerup that were within its jurisdiction. These were:¹³²⁵

- further emissions reductions;
- continued involvement with and support for the WCHAG Working Group and assistance in facilitating independent monitoring of refinery emissions;
- progress towards a more comprehensive emissions based refinery licence;
- improved community consultation;

¹³²⁴ Mr Peter Skitmore, Manager, Special Projects, DEP, *Transcript of Evidence*, July 8 2002, p7.

¹³²⁵ Submission No. 53 from the DEP, April 9 2002, pp35-36.

- support for the Ministerial Council and the Coordinating Task Force to facilitate a whole of government approach and continued close liaison with other government agencies;
- consideration of additional independent monitoring; and
- review of the above strategy in conjunction with the renewal of Alcoa's licence in September 2002.

DEP liaison with other government departments

- 9.90 The Committee notes that the lack of interdepartmental coordination in relation to the issues raised by the Alcoa Wagerup refinery was identified by the then Standing Committee on Public Administration in 1999.¹³²⁶
- 9.91 A recommendation of that report was that a working party of senior officers from the DEP, DoH, DMPR and WorkSafe be convened to discuss the coordination of administrative responses to community complaints regarding environmental issues adversely affecting the health of workers or the community. The report also recommended that the DEP coordinate the working party.¹³²⁷
- 9.92 Further discussion of the former Standing Committee's report is provided in paragraphs 9.202 and 9.203 of this report.
- 9.93 The DEP advised the Committee in September 2002 that it had been liaising with other relevant government departments to address the issues raised by the Alcoa Wagerup Refinery, including the DMPR and the DoH.
- 9.94 The DEP also advised the Committee in September 2002 that:¹³²⁸
- it meets monthly with the DoH via the joint membership of the Wagerup Advisory Group;
 - DoH officers are invited to each weekly meeting the DEP holds with Alcoa to discuss the new licence and emission limits formulation;
 - the DEP regularly seeks DoH advice via letters, telephone calls and meetings on a range of matters where expert health advice and interaction is required as part of addressing this matter;

¹³²⁶ Western Australia, Legislative Council, Standing Committee on Public Administration, *Report in relation to the Administration of Environmental Complaints Relating to Public Health: A Case Study*, Report No. 12, September 1999.

¹³²⁷ Ibid, pp7-8.

¹³²⁸ Submission No. 41 from the DEP, September 16 2002, pp3-4.

- officers from the DEP, DMPR and DoH attend and interact at meetings of the Wagerup Medical Practitioners Forum;
- officers from the DEP, DoH and DMPR are on the Co-ordinating Taskforce, which meets approximately every two months and supports the Ministerial Council on Health, Environment and Industry Sustainability (refer to paragraph 9.210 and following for further information on the Ministerial Council); and
- officers from the DEP and DMPR liaise as necessary on interactions required to manage on-site activities at Alcoa and other industrial facilities.

DEP management of emerging environmental matters of community concern

- 9.95 The DEP responded to criticism that it was slow in responding to the concerns of the workers at Alcoa's refinery at Wagerup and members of the local communities. The DEP submitted that whilst there was community concern and complaints to Alcoa about noise and odour emissions from the refinery, the DEP received very few formal complaints from the community prior to mid 1999.¹³²⁹
- 9.96 The DEP submitted that *"The extent of community concerns with respect to this issue (Alcoa's refinery at Wagerup) was not appreciated or detected by DEP until a meeting with community members and workers in February 1999. However, once DEP was aware of this concern it was able to allocate resources and deal with the issue."*¹³³⁰
- 9.97 In April 2002, the DEP advised the Committee that it was refining its internal protocols to aid in early identification and resolution of emerging environmental issues including matters of community concern. It advised that this was to enable the DEP to be aware at a very early stage about emerging issues of concern and to deal with them in a proactive manner. The DEP submitted that *"The early identification and resolution of these issues is critical in achieving improved environmental protection, adequately responding to community expectations and preventing excessive demands on government resources."*¹³³¹
- 9.98 The DEP informed the Committee in September 2002 that it had developed an 'Issues Alert Management System' to capture issues and/or premises that have (or are likely to become) contentious, based on a range of triggers.¹³³²

¹³²⁹ Submission No. 53 from the DEP, April 9 2002, p7.

¹³³⁰ Ibid, p41.

¹³³¹ Ibid.

¹³³² Submission No. 41 from the DEP, September 16 2002, p4.

9.99 The DEP advised that the criteria for triggers or characteristics to alert it to emerging issues was being refined but was based on one or more of the following:¹³³³

- Licence non-compliance.
- Community complaints and inquiries.
- Issues referred by other agencies or local government.
- Parliamentary questions.
- Letters to the Minister for the Environment.
- Complaints to the Ombudsman and from local members of Parliament.
- Appeals against licence conditions.
- Media coverage.

9.100 The DEP advised that the 'Issues Alert Management System' was used as an information database and a proactive management tool to allow management and staff to focus on key issues, risks, consultation with stakeholders and desired outcomes.¹³³⁴

9.101 The DEP advised that the 'Issues Alert Management System' had become an integral component of the DEP's operations and would continue to be improved, reviewed and refined over time.¹³³⁵

RESOURCE ALLOCATION FOR ENVIRONMENTAL REGULATION

9.102 In a comparison of the budget statements for the years between 1999 and 2004/2005, the DoE has received an increase in Government appropriations to deliver its 'outputs' (that is, core services), of \$22 392 000 (actual) for 1999/2000 to \$24 695 000 (estimated) for 2004/2005. That represents an increase of just over nine percent.

9.103 The current pollution regulation budget includes a specific line item for \$2 million for the waste control site remediation due to the Bellevue fire. If this special budget item is deleted, the estimated total appropriation for 2004/2005 to deliver the DoE's outputs would be only \$22 695 000. That is an actual budget increase of only 1.3 percent over the past five years without taking into account inflation, salary increases and an increasing workload. Effectively, the DoE is expected to do more with less

¹³³³ Ibid.

¹³³⁴ Ibid.

¹³³⁵ Ibid, p5.

money. The Committee considers that this financial reality is reflecting in its performance.

9.104 The Committee notes that a number of reviews have been undertaken on various aspects of environmental regulation in Western Australia in relation to the combined DEP and Water and Rivers Commission. One of those reviews (the Welker Review) was to identify systemic problems with licence conditions, and recommend improvements to the current industry licensing system.¹³³⁶

9.105 The Welker Review noted that in 2001/2002, New South Wales and Victoria spent \$96 million and \$44 million respectively, on pollution regulation and management. This amounted to approximately \$32 000 per licence or \$12.70 per capita over the two States. By comparison Western Australia spent \$12 million in 2001/2002, which amounted to approximately \$13 300 per licence or \$6.30 per capita.¹³³⁷

9.106 The Welker Review stated that the above preliminary comparison would suggest that the pollution function on a per capita basis in Western Australia appears to be under funded.¹³³⁸

9.107 The Welker Review went on to state that the current licensing work load in Western Australia is onerous and results from a combination of the following:¹³³⁹

- The large number of licences being administered.
- The system of management of registered premises.
- Lack of resources.
- The need for annual or short term renewal of licences which in turn has led to the temptation to review the licences and responses to appeals against the licences.
- Community outrage and lack of confidence in the licensing process in a number of instances.

9.108 According to the Welker Review the workload and lack of resources had meant poor staff training and an inadequate policy and procedural framework that had led to inconsistencies and a degree of arbitrariness in the administration of the DEP's

¹³³⁶ Welker Environmental Consultancy, *Western Australian Licence Conditions, Independent Strategic Review - Final Draft*, February 2003. Prepared for the DEP, Perth Western Australia.

¹³³⁷ Ibid, p90.

¹³³⁸ Ibid.

¹³³⁹ Ibid, pp90-91.

licensing system. This in turn made enforcement and auditing of conditions more difficult.¹³⁴⁰

9.109 The Committee has made a number of findings and recommendations in relation funding and resources of the DoE (Refer to paragraphs 9.239 to 9.242, and Recommendation 19 of this report.)

9.110 The October 2004 DoE Material makes reference to the issue of DoE skills, resources and funding. The comments encompass responses on questions posed by the Committee to DoE in March 2004 on the DoE's view on what have been the major difficulties and effects on performance that have been experienced due to lack of funding and de-skilling referred to in the Welker Review and Carew-Hopkins Reviews.¹³⁴¹ The October 2004 DoE Material also includes some comments on staff resources and budgets for industry licensing and pollution management.¹³⁴²

9.111 In particular, the Committee notes that the DoE states that:¹³⁴³

While the Department of Environment's industry licensing function has experienced challenges at a number of levels, all these areas are being addressed and the additional resources and efficiency gains of late are being used in this regard. However at the same time, industry and government demands for reduced decision-making times and simpler assessment processes do provide a continuing challenge and expanding work load.

THE DEPARTMENT OF MINERALS AND PETROLEUM RESOURCES

9.112 The Committee has set out below a summary of the DMPR's regulatory role and how this relates to Alcoa's refinery at Wagerup.

The role of the Department of Minerals and Petroleum Resources in occupational health and safety regulation generally

9.113 The DMPR is responsible for the administration of the regulatory regime that deals with occupational health and safety concerns. The DMPR is responsible for the administration of the *Mines Safety and Inspection Act 1994 (MSI Act)*, *Mines Safety and Inspection Regulations 1995 (MSI Regulations)*, *Enforcement and Prosecution Policy June 2003*, Codes of Practice and Guidelines.

¹³⁴⁰ Ibid, p91.

¹³⁴¹ Submission from the DoE, pp7-8, attached to letter from the Minister for the Environment, October 5 2004.

¹³⁴² Ibid, pp9-11.

¹³⁴³ Ibid, p8.

- 9.114 The objective of this legislative regime is to prevent environmental hazards that could impact adversely on the health, safety and welfare of employees of a mine. (Refer to paragraphs 9.214 to 9.221 of this report for information on the Government's reform of occupational health and safety legislation).
- 9.115 The DMPR regulates and inspects mines and mining operations in order to promote and ensure the health, safety and welfare of persons employed at mines and mining operations. The jurisdiction of the DMPR is restricted to inspection and regulation of mine sites. In this respect, a mine refers to both a mine site and mining operations associated with it, such as processing plants and refineries.
- 9.116 Management of occupational exposure to emissions within refineries covered by the MSI Act is specifically addressed in Part 9 of the MSI Regulations. Part 9 includes requirements for the principal employer to ensure atmospheric contaminants in the workplace are maintained at levels below the relevant exposure standard. This reduction in potential exposure can be achieved through engineering, process, administrative, or other controls.
- 9.117 Part 9 also includes requirements for employees to be provided with suitable respiratory protective equipment. Sampling of atmospheric contaminants likely to cause occupational exposure in the workplace is also addressed in Part 9.
- 9.118 As previously noted, it is the responsibility of the DEP to manage refinery emissions through the issue, administration and enforcement of an operating licence.
- 9.119 The legislative regime referred to above relies predominantly on industry self-regulation to govern mines safety. The duty of care approach makes it the employer's responsibility to manage safety. The legislation and the regulations set out the objectives and define standards of safety, and contain some elements which are prescriptive.¹³⁴⁴
- 9.120 As noted in February 2002 by R Laing in the *Review of the Mines Safety and Inspection Act 1994, Consultation Draft*:¹³⁴⁵

The objects of the MSIA [MSI Act] indicate it is designed to promote and improve safety for people at mines, especially employees, by identifying and reducing hazards and by eliminating or controlling risk. It does so under general duties obligations within a largely self regulatory regime.

¹³⁴⁴ DoIR website:
www.doir.wa.gov.au/documents/safetyhealthandenvironment/shed_safety_guide_dutyofcare.pdf
(accessed March 18 2004).

¹³⁴⁵ R Laing, *Review of the Mines Safety and Inspection Act 1994, Consultation Draft*, DMPR, Perth, February 2002, p20. The objects of the MSI Act are set out in section 3.

- 9.121 The DMPR audits safety plans used by companies, and audits safety systems in practice. The companies monitor emissions and provide DMPR with the results.¹³⁴⁶
- 9.122 The DMPR may have the results of emissions monitoring independently checked by an inspector. The results are compared to or measured against the national standards.
- 9.123 Under the MSI Act inspectors may enter, inspect and examine a mine, remove samples of substances, take possession of any plant or thing, require the attendance of any person, require a person to give information, and initiate and conduct prosecutions against persons offending against the MSI Act. By notice in writing the DMPR may require the owner, agent or manager of a mine to remedy any aspect of the mine which they believe to be dangerous. For example, section 24 of the MSI Act provides that an inspector is under a duty to report on or to remedy matters that relate to the health and safety of employees at that mine.
- 9.124 The MSI Regulations set out appropriate exposure standards in Part 9.11. WorkSafe Australia has put out a list of contamination standards that apply across Australia.

The role of the Department of Minerals and Petroleum Resources at Alcoa's refinery at Wagerup

- 9.125 The DMPR is required to ensure that Alcoa's refinery at Wagerup complies with the regulatory regime dealing with occupational health and safety and with the national and international occupational atmospheric contaminant exposure and health standards, which the regime invokes.¹³⁴⁷

COMPLAINTS IN RELATION TO THE DEPARTMENT OF MINERALS AND PETROLEUM RESOURCES

Concerns relating to the Department of Minerals and Petroleum Resources

- 9.126 During its inquiry, the Committee was informed of a number of concerns relating to the performance of the DMPR in relation to the management of Alcoa's refinery at Wagerup. For example, concerns alleged a lack of timely response by the DMPR to issues raised with it in relation to Alcoa's refinery at Wagerup and difficulties with obtaining assistance from the DMPR in relation to accessing information held by Alcoa.

¹³⁴⁶ DoIR website:
www.doir.wa.gov.au/documents/safetyhealthandenvironment/shed_safety_guide_contamproc.pdf.
 (accessed March 18 2004).

¹³⁴⁷ Western Australia, Legislative Council, Standing Committee on Public Administration, *Report in relation to the Administration of Environmental Complaints Relating to Public Health: A Case Study*, Report No. 12, September 1999, Appendix 2 – letter from L C Randford, Director General, Department of Minerals and Energy, to Hon Kim Chance MLC, Chairman, former Standing Committee on Public Administration, December 11 1998.

- 9.127 An example of the perception that the DMPR was not adequately performing its duties was given to the Committee at its hearing in July 2002 by Mr Ferguson, Secretary of the AMWU. Mr Ferguson advised that he had not had much contact personally with the then Department of Minerals and Energy, however advised that he had “*spoken to AMWU members on the job, and they were less than satisfied with the performance of the department.*”¹³⁴⁸ Mr Ferguson claimed that “*In the view of the union, the department was just supporting Alcoa’s position, and was also in a state of denial. That is the opinion I am receiving from our members on the job.*”¹³⁴⁹
- 9.128 The Committee also heard evidence from Mr William van der Pal, Alcoa employee and safety representative, about the manner in which the then Department of Minerals and Energy responded to his complaints. At the Committee’s hearing in November 2001, Mr van der Pal expressed the view that:¹³⁵⁰

There is a huge amount of frustration. For example, when we seek access to the Department of Minerals and Energy inspectors, they often spend two or three hours a day in the office with management and then give us 10 to 15 minutes to explain our position before they say that they must head off to Collie. We do not get a fair hearing.

- 9.129 Mr van der Pal also claimed that often he did not receive a response to letters written to staff of the then Department of Minerals and Energy.¹³⁵¹ He submitted that when he queried with them why he had not received a response, he was told “*there was not enough time to deal with our issues.*”¹³⁵²

Evidence in response from the Department of Mineral and Petroleum Resources

- 9.130 The Committee received evidence from the DMPR explaining its responses to the types of concerns raised above. The DMPR’s response to these concerns is set out below.
- 9.131 The Committee notes that as part of the inquiry conducted by the former Standing Committee on Public Administration into the *Administration of Environmental Complaints relating to Public Health: A Case Study* (Report Number 12; September 14 1999), that Committee wrote to the then State Mining Engineer with regard to issues raised in relation to Alcoa’s refinery at Wagerup. In particular:

¹³⁴⁸ Mr Jock Ferguson, Secretary, AMWU, *Transcript of Evidence*, July 8 2002, p6.

¹³⁴⁹ Ibid.

¹³⁵⁰ Mr William van der Pal, Alcoa employee and safety representative, *Transcript of Evidence*, November 28 2001, p12.

¹³⁵¹ Ibid.

¹³⁵² Ibid.

- the position taken by the then Department of Minerals and Energy; and
- the steps, if any, taken by the then Department of Minerals and Energy to respond to the issues.

9.132 The then Director General of the Department of Minerals and Energy replied to the former Standing Committee's letter in December 1998, advising that:¹³⁵³

- the Department of Minerals and Energy was first advised of employee concerns in relation to issues at Wagerup in May 1997;
- within three days, the District Inspector of Mines 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;
- Alcoa undertook measures to attempt to ameliorate the problems and progress made by Alcoa was closely monitored during further site visits by Department of Minerals and Energy officers;
- in late July 1997, officers from the Department of Minerals and Energy visited Wagerup and held a meeting with Alcoa representatives. Department of Minerals and Energy officers continued with site visits to Wagerup;
- Department of Minerals and Energy officers attended an on-site meeting of the Alcoa Liquor Burning Monitoring Committee in June 1998 and held a further on-site review of the liquor burning risk program in July 1998;
- due to continued employee concerns reported by one of 41 safety and health representatives at the Wagerup site, the State Mining Engineer and other Department of Minerals and Energy officers held meetings in May and August 1998 with some of these representatives and members of the workforce; and
- inspectors from the Department of Minerals and Energy continued to visit the site to monitor progress and to discuss the matter directly with employees and Alcoa representatives.

¹³⁵³

Western Australia, Legislative Council, Standing Committee on Public Administration, *Report in relation to the Administration of Environmental Complaints Relating to Public Health: A Case Study*, Report No. 12, September 1999, Appendix 2, pp16-19 - letter from LC Ranford, Director General, then Department of Minerals and Energy to Hon Kim Chance MLC, Chairman, former Standing Committee on Public Administration, December 11 1998.

- 9.133 The Director General of the Department of Minerals and Energy also advised that as at December 1998, the mines inspectorate was not aware of any specific breach of the legislation which might warrant its enforcement.¹³⁵⁴
- 9.134 The Committee wrote to the DMPR in September 2003 requesting an update on the situation at Wagerup. In particular, the regulatory mechanisms utilised by the DMPR to deal with the environmental, public health and occupational health and safety concerns raised by Alcoa employees and members of the local communities in relation to emissions from Alcoa's refinery at Wagerup.
- 9.135 In his response to the Committee in October 2003, the Director General of the DMPR reiterated the advice provided to the former Standing Committee on Public Administration that prior to June 1999, the then Department of Minerals and Energy officers made numerous site visits to Alcoa's refinery at Wagerup to discuss issues associated with LBF operations and to a lesser extent the oxalate kiln. He also reiterated that extensive discussions were held with site health and safety representatives, other employees and management at Alcoa's refinery at Wagerup.¹³⁵⁵
- 9.136 The Committee was advised that since June 1999, the DMPR had undertaken the following activities and actions at Alcoa's refinery at Wagerup:¹³⁵⁶
- Inspectors and technical specialists had continued to undertake site visits, inspections and audits at the refinery.
 - The DoIR had worked closely with other government agencies, technical experts and the community in an effort to address employee and community concerns.
 - Although the DEP and the DoH are directly responsible for addressing community concerns on environmental and public health issues, the DoIR actively contributes to the resolution of the issues through the Ministerial Council and Coordinating Task Force. (Refer to paragraphs 4.251 to 4.253 of this report for more information about the Ministerial Council and Coordinating Taskforce.)
 - Specialist officers of the DoIR are members of the WMPF and are involved in initiatives for site visits proposed by the DoIR (refer to paragraphs 4.240 to 4.250 of this report for information about the WMPF).

¹³⁵⁴ Ibid, p19.

¹³⁵⁵ Letter from Director General, DoIR, October 3 2003, p2.

¹³⁵⁶ Ibid, pp2-3.

- DoIR officers have participated in a number of expert panel meetings, technical forums and public meetings to address issues such as emissions management from Alcoa's refinery, atmospheric dispersion modelling studies, and causes, diagnosis and treatment of MCS.
 - DoIR officers have held one-on-one meetings with community members at Yarloop to answer their concerns about emissions from the refinery.
- 9.137 The Committee also notes action taken by the DMPR in relation to access to information held by Alcoa included making entries in the mines record book and correspondence between Alcoa and the DMPR in relation to access.¹³⁵⁷
- 9.138 During its inquiry the Committee heard evidence from two witnesses who had worked for the then Department of Minerals and Energy (DMPR and now the DoIR) and who also provided professional advice (each on one occasion) to Alcoa.
- 9.139 One witness had ceased employment with the DME prior to providing advice to Alcoa, however, one witness was retained by the DME at the time he undertook consultancy work for Alcoa.
- 9.140 The Committee is of the view that care needs to be taken by the DMPR and industry when retaining specialist services to ensure that there is no actual or apparent conflict of interest arising when advisers are used concurrently. This is especially important in light of the DMPR's regulatory role.
- 9.141 As outlined above, the Committee has received general evidence of frustration from some people in relation to responses they received from the DMPR and the manner in which the DMPR was performing its duties. In the Committee's view, this appears to have led to feelings of mistrust between the community and relevant government departments, including the DMPR. This is unfortunate, particularly in a regime that is premised on self-regulation.
- 9.142 While there is anecdotal evidence before the Committee that on some occasions the DMPR may have been tardy in responding to complainants, and that the DMPR did not enforce the regulatory regime in the manner in which some people expected, this of itself does not necessarily mean the DMPR did not respond adequately to the situation.
- 9.143 The Committee observes that many complaints in relation to the DMPR were being made at a time when people were complaining to other relevant government departments about the Alcoa refinery at Wagerup.

¹³⁵⁷Mr James Torlach, Former State Mining Engineer, DMPR, *Transcript of Evidence*, July 8 2002, p6.

- 9.144 The Committee notes that the disjointed responses and lack of coordination between relevant government departments was the subject of the 1999 former Standing Committee on Public Administration report which is discussed at paragraph 9.131 and following of this report. The Committee notes developments since 1999 involving the DMPR in its approach to the experiences relating to the Alcoa refinery at Wagerup.

DEPARTMENT OF HEALTH

- 9.145 The Committee has set out below a summary of the DoH's regulatory role and how this relates to Alcoa's refinery at Wagerup.

The role of the Department of Health in public health regulation generally

- 9.146 The Population Health Division of the DoH has responsibility for minimising environmental causes of disease and encouraging structural and behavioural change which reduce the incidence of communicable and chronic disease.¹³⁵⁸ This includes dealing with concerns relating to public health and investigating health problems in the community.¹³⁵⁹ The DoH does not have jurisdiction to investigate air pollution problems, which are the responsibility of the DEP under the EP Act.
- 9.147 The DoH *"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."*¹³⁶⁰
- 9.148 The DoH undertakes investigations into public health concerns. The Committee was advised by the DoH that the WMPF, of which DoH was a participant, noted *"The Forum believes that lives are affected. There is considerable weight of medical opinion that there is a medical problem. However, we don't have a specific chemical as a causative target for which a solution can be developed or regulated."*¹³⁶¹

The role of the Department Health at Alcoa's refinery at Wagerup

- 9.149 As previously noted, the WMPF, chaired by Professor D'Arcy Holman, convened key medical experts, local practitioners, practitioners and specialists from Perth, epidemiologists and industry representatives together with officers from the DoH,

¹³⁵⁸ DoH Annual Report 2001/2002, p42.

¹³⁵⁹ The Executive Director, Public Health has statutory responsibilities under the *Health Act 1911, Radiation Safety Act 1975, Cremations Act 1929, Anatomy Act 1930, Fluoridation of Public Water Supplies Act 1966* and other health-related legislation.

¹³⁶⁰ Western Australia, Legislative Council, Standing Committee on Public Administration, *Report in relation to the Administration of Environmental Complaints Relating to Public Health: A Case Study*, Report No. 12, September 1999, Appendix - letter from Paul Psaila-Savona, Executive Director, Public Health, DoH to Hon Kim Chance MLC, Chairman, former Standing Committee on Public Administration.

¹³⁶¹ The Wagerup Medical Practitioners' Forum Conclusions and Recommendations and Mr Michael Jackson, Executive Director, Population Health, DoH, *Transcript of Evidence*, July 8 2002, p3.

DEP and DMPR. The WMPF was convened on September 19 2001 in Perth and on October 23 2001 in Mandurah.

- 9.150 The recommendations of the WMPF were formulated towards the end of 2001 and were developed into a document for public presentation to the Waroona Shire Council and to a public meeting in Waroona on February 6 2002. The recommendations of the WMPF are set out in paragraph 4.247 of this report.
- 9.151 At the Committee's hearing in July 2002, Mr Michael Jackson, Executive Director, Population Health, DoH, discussed the WMPF and submitted that:¹³⁶²

The forum recognised a sense of concern. Its members believed that people's concerns were genuine; that the concerns of the community and workers should be taken seriously; that lives were being affected and that there is considerable weight of medical opinion, borne out by the collective expertise and experience, but that there was no specific chemical or causative chemical agent for which we could develop a solution or write some sort of regulation. The most important conclusion drawn was that there appeared to be an association between the health problems and the Alcoa refinery. That was an important step at that time.

- 9.152 As previously noted, the recommendations from the WMPF led to the formation in February 2002 of the Ministerial Council and the Coordinating Task Force. The Ministerial Council formally responded to the recommendations of the WMPF in September 2002. A detailed examination of the Ministerial Council's response, including the actions taken by the DoH, is provided in paragraphs 4.254 to 4.276 of this report.
- 9.153 The Committee notes that in the DoH's Annual Report for 2001/2002, the DoH outlined initiatives it had taken to address community concerns in relation to Alcoa's refinery at Wagerup:¹³⁶³
- Ongoing meetings of the WMPF to provide local medical expertise to the community.
 - The establishment of a clinic at the Yarloop Hospital staffed by a specially trained occupational health nurse.

¹³⁶² Mr Michael Jackson, Executive Director, Population Health, DoH, *Transcript of Evidence*, July 8 2002, pp2-3.

¹³⁶³ DoH Annual Report 2001/2002, pp48-49.

- Auditing results of regular and intensive monitoring of the health of Alcoa workers.
- The establishment of a special foundation to assist government, community and industry in their investigations of health issues resulting from industrial emissions, not only from Alcoa's refinery at Wagerup, but also other industries where the potential to impact on environmental health had been identified.
- Regular meetings with the community and provision of ongoing information and feedback on any progress or development.

9.154 At its hearing in July 2002, Mr Michael Jackson, Executive Director, Population Health, DoH, submitted that:¹³⁶⁴

The Department of Health is encouraging the development of health impact assessments for this type of initiative when industry is planning to undertake particular work. That applies in instances such as Bellevue, Brookdale, Cockburn Cement and others. Rather than just have an environmental impact assessment, there needs to be an impact on public health before adverse events occur. At the moment, we are trying to clean up after the event rather than anticipate and do our work beforehand.

SUMMARY OF SUBMISSIONS RECEIVED IN RELATION TO PERCEIVED DEFICIENCIES IN EMISSIONS EXPOSURE GUIDELINES

9.155 The Committee received a number of submissions during its inquiry that expressed concern regarding what some people perceived to be deficiencies in emissions exposure guidelines. The Committee has summarised those submissions below.

Emissions exposure guidelines

9.156 In relation to ambient air¹³⁶⁵ quality guidelines, the Committee was advised by Dr Peter Di Marco, Principal Toxicologist, DoH, in July 2002 that in general, there were no ambient air quality guidelines in Australia. He further advised the Committee that:¹³⁶⁶

¹³⁶⁴ Mr Michael Jackson, Executive Director Population Health, DoH, *Transcript of Evidence*, July 8 2002, p14.

¹³⁶⁵ "The air occurring at a particular time and place outside of structures. Often used interchangeably with 'outdoor air'": http://glossary.eea.eu.int/EEAGlossary/A/ambient_air (accessed July 30 2004).

¹³⁶⁶ Dr Peter Di Marco, Principal Toxicologist, DoH, *Transcript of Evidence*, July 8 2002, p13.

- guidelines were in the process of being developed through the National Environment Protection Council, DoH and DEP;
- the DoH aims to develop ambient air quality guidelines so that advice may be provided to the community regarding the safe level of chemicals; and
- in the absence of an Australian guideline, the DoH would initially defer to the World Health Organisation (WHO) and to other organisations if WHO did not have guidelines.

9.157 In a letter dated March 19 2004, the DoH provided the following update regarding the development of ambient air quality guidelines for Western Australia:¹³⁶⁷

- The development of guidelines for Western Australia did not progress, as efforts focused on the national approach to be used in the *National Environment Protection (Air Toxics) Measure* that is currently being developed.
- In the interim, where an air pollutant is not covered by the *National Environment Protection (Ambient Air Quality) Measure*, the DoH would initially defer to the WHO and to other organisations if WHO did not have guidelines.

9.158 The DoH letter went on to inform the Committee that although the DoH has responsibility for providing public health advice, it has no statutory powers to enforce air quality guidelines as this was a DEP responsibility under the EP Act. In circumstances where there are reports or indications of health concerns associated with industrial emissions, the DoH requests the DEP (now the DoE) to have the issues investigated. An environmental health risk assessment approach is adopted, whereby attempts are made to identify the hazard, review the dose response for the compounds identified and undertake an exposure assessment in order to characterise the risk. The DoH stated that “*this strategy was consistent with the national approach to environmental health risk assessment that has been endorsed by the enHealth Council*”.¹³⁶⁸

9.159 The DoH also noted in its letter of March 2004 that when issues involving public health concerns arise, they are referred to the DoH by the DEP for assessment. The DoH advised that it then provides advice to the DEP regarding investigative approaches and the requirements for data collection to facilitate assessment of any

¹³⁶⁷ Letter from the Executive Director, Population Health, DoH, March 19 2004.

¹³⁶⁸ Ibid. The “enHealth Council” provides national leadership on environmental health issues. It is also responsible for the implementation of the National Environmental Health Strategy: refer to the enHealth website: www.enhealth.nphg.gpv.au (accessed October 22 2004).

public health risks. The DoH assessment of the health risk is communicated back to the DoE for implementation of recommendations as required.¹³⁶⁹

9.160 In relation to emissions generally, the DEP advised the Committee in April 2002 that, based on its research, the only emission guidelines available for Australia were the *National Guidelines for Control of Emission of Air Pollutants from New Statutory Sources, 1985*, published by the National Health and Medical Research Council.¹³⁷⁰ The DEP also advised that the range of emission limits within those guidelines did not contain any limits on VOCs.¹³⁷¹

9.161 The Committee followed up on this matter with the Minister for the Environment. The Minister reiterated the advice provided by the DoH that the interim position agreed to by the DoE and the DoH for the recommending of guideline values (in the absence of Western Australian standards) has been to use the *National Environment Protection Measure* guidelines and, in the absence of these, revert to the WHO guidelines; and, in the absence of both, to review guidance from other international sources.¹³⁷²

9.162 The Minister advised that for compounds not covered by the *National Environment Protection Measure*, guidelines recommended by the DoE are decided on a case by case basis.¹³⁷³

9.163 In August 2002, the DoH provided guidance for a number of compounds in ambient air that are considered protective of the general population for application to the situation at Wagerup. However the guideline values established are not appropriate for more general adoption without further DoH review.¹³⁷⁴

9.164 The Minister advised that the *National Environment Protection (Air Toxics) Measure* was made by the Environment Protection and Heritage Council on April 16 2004. It includes a guideline and protocols to monitor and report on five priority air toxics, namely benzene, polycyclic aromatic hydrocarbons, formaldehyde, toluene and xylenes. These air toxics have been shown to be responsible for a range of health problems, including asthma, respiratory illnesses and cancer.¹³⁷⁵

¹³⁶⁹ Ibid.

¹³⁷⁰ Submission No. 53 from the DEP, April 9 2002, p37.

¹³⁷¹ Ibid.

¹³⁷² Letter from the Minister, May 17 2004, p1.

¹³⁷³ Ibid.

¹³⁷⁴ Ibid.

¹³⁷⁵ Ibid, p2.

- 9.165 Five compounds are included in both the *National Environment Protection (Air Toxics) Measure* and the DoH Wagerup specific guidance, however, there are differences in both averaging times and the guideline values themselves, meaning that they are not directly comparable for all compounds.¹³⁷⁶
- 9.166 In relation to the status of the Wagerup-specific guidance and the formulation of the *National Environment Protection (Air Toxics) Measure*, the Minister advised that a review of the ambient air guidance values needs to be undertaken to take account of the more recent toxicological assessments that were conducted for the *National Environment Protection (Air Toxics) Measure*.¹³⁷⁷
- 9.167 The Minister also advised that establishing ambient air quality guideline values for the many other compounds of potential concern is ongoing and the DoE is planning to substantially progress the work over the coming year. The work will be undertaken collaboratively with the DoH.¹³⁷⁸
- 9.168 The Committee received evidence that despite significant emissions reductions in 2003, Alcoa's refinery at Wagerup was still emitting very large quantities of toxic chemicals led by an average daily quantity of 52.5 kilograms of formaldehyde into the receiving environment.¹³⁷⁹
- 9.169 Further, in 2003, the most significant compounds (by weight) emitted from Alcoa's refinery at Wagerup corresponded to the compounds reported in community monitoring (refer to paragraph 6.118 of this report), specifically, formaldehyde and other aldehydes and ketones.
- 9.170 The Committee also notes that the mass emission rate for benzene measured at Alcoa's refinery at Wagerup more than doubled between the first half of 2002 to 2003, from a daily average of 2.1 kilograms per day to 4.7 kilograms per day.¹³⁸⁰ A table from the CSIRO Atmospheric Research *Wagerup Air Quality Review* showing daily mass emission rates of chemical species emitted from the refinery in the first half of 2002, and in 2003, is attached as Appendix 13 to this report.
- 9.171 In answer to a question from Hon Jim Scott MLC at the Committee's hearing in July 2002 regarding the adequacy of current exposure levels in the regulations and whether

¹³⁷⁶ Ibid.

¹³⁷⁷ Ibid.

¹³⁷⁸ Ibid.

¹³⁷⁹ CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, May 2004, Table 2.8, p57.

¹³⁸⁰ Ibid, Table 2.7, p54.

they should be reviewed, Associate Professor Galton-Fenzi, Mines Occupational Physician, DMPR responded:¹³⁸¹

I am keen for exposure levels to be regularly reviewed. No doubt that must be done through a committee process and by looking at the world literature. That is very important. I support that entirely. However, when we look at how we identify whether the current exposure levels are appropriate, we have to rely on departments such as the Department of Mineral and Petroleum Resources through the health surveillance protocols. If there is an assurance that health affects are occurring, it should be acted upon as quickly as possible and its association with the exposures that have been measured should be identified. That is done through the CONTAM system. If there were a clear association, those levels would need to be dropped. That would go without saying.

9.172 In relation to the structure of review processes within the DMPR for regulations covering exposure levels, Associate Professor Galton-Fenzi stated:¹³⁸²

There is regular review. It is in the duty statements of all senior officers involved in the inspectorate, and certainly in those of the specialist groups - the engineers, occupational health and safety officers and industrial hygienists. We regularly receive international papers and information from the States. We are regularly in contact with other agencies such as those in Queensland, the National Institute for Occupational Safety and Health, and the Environmental Protection Authority, so there is always an updating process for that review. Clearly, within our own department, the health surveillance program and the CONTAM system - the air contaminant system - are reviewed to ensure continuing compliance, so a formal process goes on all the time.

9.173 The Committee also notes the view that the emissions exposure standards are not adequate, as expressed at the Committee's hearing in February 2002 by Mr Anthony Hall, Chairperson, YDCRC:¹³⁸³

I know that exposure standards are reviewed all the time. In this case, obviously whatever standard exists is not adequate and needs to be reviewed. I have no doubt about that.

¹³⁸¹ Associate Professor Brian Galton-Fenzi, Mines Occupational Physician, Mines Operating Division, DMPR, *Transcript of Evidence*, July 12 2002, p16.

¹³⁸² Ibid.

¹³⁸³ Mr Anthony Hall, Chairperson, YDCRC, *Transcript of Evidence*, February 18 2002, p17.

- 9.174 In response to the Committee's query regarding whether there were any guidelines for VOCs, the DoE responded in October 2004, that¹³⁸⁴

The NHMRC 1985 Emission Guidelines have been utilised by the Victorian EPA and are now expressed as Emission Limits in its State Environmental Protection Policy (Air Quality Management) published in December 2001. ... As can be seen, that Policy does not contain any limits relevant to VOCs. The DoE is not aware of any relevant guidelines for emissions limits for VOCs.

The DoE continues to utilise the expert advice of the Department of Health (DoH) on suitable ambient guidelines for VOCs on an individual species basis. The DoH has based its advice on the World Health Organisation guidelines. VOC targets (which for some species are lower than in the WHO guidelines) have been specifically developed for Wagerup by DoH and are being utilised by DoE. A copy of that information has been previously provided to the Committee.

Period of exposure

- 9.175 As previously noted, Awn Pty Ltd (Air Water Noise) Consultants (**AWN**) were appointed to conduct an environmental audit of Alcoa's refinery at Wagerup between April 2002 and May 2003 (refer to paragraphs 6.153 to 6.167 of this report). Awn noted in its report that most industrial processes exhibit a significant degree of emission variability. Awn submitted that this should be addressed in the planning for an emission monitoring program; for example, through the number of samples collected to adequately characterise the source and sampling under 'worst case' conditions.¹³⁸⁵
- 9.176 Awn also queried the use of average data and noted that "*Maximum community impacts typically relate to short duration events, not long term average emissions.*"¹³⁸⁶

¹³⁸⁴ Submission from the DoE, p4, attached to letter from the Minister for the Environment, October 5 2004.

¹³⁸⁵ Awn, *Environmental Audit Alcoa World Alumina Australia Wagerup Refinery, April 2002 - May 2003*, Awn Pty Ltd, Ferntree Gully Victoria, May 19 2003, p 6.22. This Report was prepared for Department of Environmental Water and Catchment Protection, Perth Western Australia.

¹³⁸⁶ Ibid.

Limits of detection

- 9.177 In a submission to the Committee in April 2003, the Alliance for a Clean Environment expressed their concern regarding the integrity of the environmental monitoring science used by the DEP and industry.¹³⁸⁷
- 9.178 The Alliance for a Clean Environment expressed their concern, among other things, that the detection limits set for some compounds may not be sensitive enough to identify their presence in air.¹³⁸⁸ It queried whether, as a result, it might not be possible to identify whether the compounds were in air at ambient levels or at levels which may pose a risk to human health.¹³⁸⁹
- 9.179 The Alliance for a Clean Environment submitted that some compounds are harmful to health at very low levels and that it is therefore important to set the parameters of any monitoring for those compounds so as to be able to achieve detection at both ambient levels and health protection levels.¹³⁹⁰
- 9.180 In relation to limits of detection, the CSIRO review into air quality at Wagerup noted that sampling for VOCs and carbonyl compounds that were analysed from samples collected with the Yarloop community were at concentrations well below odour thresholds. The review noted that this suggested that the compounds causing the odour complaints in the community were either not targeted in the sampling and analysis methods used and/or that the detection limits were not adequate to detect compounds having very low odour thresholds.¹³⁹¹

Chemical mixtures

- 9.181 Dr Harper, an occupational physician who had seen a number of Alcoa workers, advised the Committee at its hearing in February 2002 that the controversy regarding the situation at Alcoa was that it was not a single chemical causing the problem but rather, a mixture of chemicals. He submitted that *“The difficulty is that in the environment the level of a given chemical may be well below the safety level defined by government standards, but when that chemical is mixed with others inside the body it can be toxic.”*¹³⁹²

¹³⁸⁷ Submission No. 63 from Alliance for a Clean Environment, April 1 2003, p1.

¹³⁸⁸ Ibid, p2.

¹³⁸⁹ Ibid.

¹³⁹⁰ Ibid.

¹³⁹¹ CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, May 2004, p8.

¹³⁹² Dr Andrew Harper, private medical practitioner, *Transcript of Evidence*, February 18 2002, p3.

- 9.182 Dr Harper expressed his opinion that *“It is absolutely appropriate that the symptoms people are reporting be treated as valid evidence.”*¹³⁹³ He expressed his view that doctors are trained to look at physical signs, and that *“there is a strong tendency to adhere to that when one is under the difficult circumstances of an industrial health problem, but in everyday medical practice the singularly most important part of a medical assessment is the history provided by the patient.”*¹³⁹⁴
- 9.183 He also stated that *“It is absolutely inappropriate that the absence of physical signs be treated as having more status and import than the clinical symptoms.”*¹³⁹⁵
- 9.184 In answer to a question by Hon Jim Scott regarding the adequacy of regulations governing emissions in workplaces, Dr Harper expressed his opinion that *“Regulations that focus on individual chemicals are not appropriate.”*¹³⁹⁶ He submitted that since the Second World War, thousands of industrially made chemicals had been produced but only a small proportion had been tested for toxicity. Dr Harper submitted that *“Virtually no mixtures have had toxicological assessment before getting into the industrial area.”*¹³⁹⁷
- 9.185 Dr Harper submitted that the regulations are applicable for singular substances such as lead, however his view was that *“when we are dealing with this Alcoa-type environmental contamination, we need to think about it differently.”*¹³⁹⁸
- 9.186 With regard to the consideration of chemical mixtures, the DoH referred the Committee to a paper titled, *A Review of the Ecotoxicity of Mixtures, Approaches to, and Recommendations for, their Management*, presented at the Fifth National Workshop on the Assessment of Site Contamination in 2003.¹³⁹⁹ Mr Warne of the New South Wales Environment Protection Authority made the observation that *“There is a marked dichotomy in the manner in which the toxicity of mixtures is dealt with.”*¹⁴⁰⁰ Mr Warne went on to describe the two basic approaches that have been used to evaluate the toxicity of chemical mixtures:¹⁴⁰¹

¹³⁹³ Ibid, p4.

¹³⁹⁴ Ibid.

¹³⁹⁵ Ibid.

¹³⁹⁶ Ibid, p6.

¹³⁹⁷ Ibid.

¹³⁹⁸ Ibid.

¹³⁹⁹ Michael St J Warne, *A Review of the Ecotoxicity of Mixtures, Approaches to, and Recommendations for, their Management*, presented at the Fifth National Workshop on the Assessment of Site Contamination, 2003.

¹⁴⁰⁰ Ibid, p1 (page 253 of the proceedings).

¹⁴⁰¹ Ibid.

- The first approach is where the mode of action or site of action of the chemicals in the mixture is clarified in order to determine which model will predict the toxicity of the mixture.
 - The second approach is where the type of interaction between the chemical is not relevant; rather the total toxicity of the mixture is measured.
- 9.187 The author examined the strengths and weaknesses of the two approaches in dealing with the toxicity of mixtures, and reviewed the ecotoxicity of mixtures and the various management strategies implemented by regulatory agencies for dealing with chemical mixtures.
- 9.188 Mr Warne recommended that environmental quality guidelines be derived for individual chemicals rather than mixtures.¹⁴⁰²
- 9.189 He also recommended that a system based largely on the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, 2000), but containing an additional feature, be used to deal with mixtures in contaminated sites.¹⁴⁰³ Mr Warne's recommended system was:¹⁴⁰⁴
- where mixtures that contain chemicals with unknown modes of action or different modes of action - it is assumed that the toxicity is mildly synergistic (that is, all mixtures are 2.5 times more toxic than concentration addition). Mr Warne stated that this assumption would provide adequate protection from 95 percent of mixtures;
 - where mixtures contain chemicals with the same mode of action - it is assumed that the toxicity is concentration additive; and
 - conducting mixture toxicity experiments or direct toxicity assessment and, where appropriate, toxicity identification and evaluation procedures for complex mixtures. Mr Warne stated that direct toxicity assessments had a number of advantages over mixture toxicity experiments and was therefore the preferred approach.
- 9.190 A review commissioned by Alcoa and conducted by CSIRO Atmospheric Research into Wagerup air quality noted that a listing of the chemicals being emitted from Alcoa's refinery at Wagerup had been compiled, which identified 261 substances

¹⁴⁰² Ibid, p19 (page 271 of the proceedings).

¹⁴⁰³ Ibid.

¹⁴⁰⁴ Ibid, p20 (page 272 of the proceedings). 'concentration addition' means the combined toxicity of each constituent chemical.

emitted, plus a further ten substances that could not be identified because of incorrect names.¹⁴⁰⁵

- 9.191 The Committee notes that when determining exposure limits for mixtures of chemicals, the DoH does not add the toxicities of the individual chemicals in the mixture to obtain the total toxicity of the mixture. The DoH refers to the toxicity of individual chemicals and takes the view that if they are at safe levels considered singularly, the mixture is considered safe.¹⁴⁰⁶
- 9.192 In contrast, the United States of America adds the individual chemical toxicities together. This is known as the United States Environmental Protection Authority hazard index.¹⁴⁰⁷
- 9.193 Although it has not been applied to the emissions at Wagerup, when an additive methodology was applied recently to produce a *Health Risk and Toxicological Assessment of Emissions from the Upgraded Alcoa Pinjarra Alumina Refinery*¹⁴⁰⁸ it was found that current (that is, pre-upgrade) emissions at one location represented a 2.67×10^{-6} cancer risk. This is more than double the accepted health risk of 1×10^{-6} .¹⁴⁰⁹
- 9.194 That same assessment stated that “*In the upgrade scenario the total cancer risk at Location 1 is less than the target risk level of 1×10^{-6} when either the Ausplume or Calpuff models are applied to predict ground level concentrations.*”¹⁴¹⁰
- 9.195 In a letter to the Committee in April 2004, the DoE noted that the issue of mixtures of compounds at low levels “*appears to be an area where there are no clear guidelines. This area certainly remains as one possible explanation for community concerns regarding health impacts where all the relevant health guidelines for the individual compounds levels in ambient air quality have been met.*”¹⁴¹¹

¹⁴⁰⁵ CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, May 2004, p11.

¹⁴⁰⁶ Telephone conversation between Committee staff and Mr Mark Feldwick, Environmental Health, Toxicology Section, DoH, March 31 2004.

¹⁴⁰⁷ Ibid.

¹⁴⁰⁸ *Health Risk and Toxicological Assessment of Emissions from the Upgraded Alcoa Pinjarra Alumina Refinery* (Volume 1 of 2 volumes), prepared for Environ Australia Pty Ltd on behalf of Alcoa World Alumina Australia, prepared by Dr Roger Drew, DABT, Principal Consultant, Toxikos Pty Ltd, October 28 2003.

¹⁴⁰⁹ Ibid, pp35-36.

¹⁴¹⁰ Ibid, p36.

¹⁴¹¹ Letter from the DoE, April 21 2004, p11.

SUMMARY OF SUBMISSIONS RECEIVED IN RELATION TO PERCEIVED DEFICIENCIES IN ACCESSING COMPENSATION FOR MULTIPLE CHEMICAL SENSITIVITY

- 9.196 The Committee received a number of submissions during its inquiry that expressed concern regarding what some people perceived to be deficiencies in relation to access to compensation for those people with MCS. The Committee has summarised those submissions below.
- 9.197 The Committee notes that MCS is not, as at the date of tabling this report, recognised as a compensable condition under the Western Australian occupational health and safety regulatory regime. (Refer to paragraphs 5.59 to 5.62 of this report for a discussion on the *Workers Compensation and Rehabilitation Act 1981*).
- 9.198 Mr Jock Ferguson, State Secretary, AMWU, submitted to the Committee in July 2002 that:¹⁴¹²

Multiple chemical sensitivity is a very complex issue and it should be recognised as a disease for which people can be compensated. Our members have suffered great trauma; they have suffered great physical, emotional and psychological strain.

- 9.199 Dr Moira Somers, General Practitioner and physician treating some of the workers employed by Alcoa at its Wagerup refinery, submitted that MCS does exist and is well recognised in the medical literature. Dr Somer made the following comment at the Committee's hearing in April 2002 with respect to access to workers' compensation by people experiencing MCS:¹⁴¹³

They have enormous issues with the workers compensation system because, first, there is no item number and, secondly, the insurance industry is extremely proactive in sourcing reports of people who argue that this condition does not exist.

- 9.200 Mr Michael Jackson, Executive Director, Population Health, DoH, made the following comments at the Committee's hearing in July 2002 regarding the difficulties workers have in obtaining recognition from the compensation system for MCS-type health problems:¹⁴¹⁴

We acknowledge that. We do not have the answer to that question. Multiple chemical sensitivity is not a recognised condition within

¹⁴¹² Mr Jock Ferguson, Secretary, AMWU, *Transcript of Evidence*, July 8 2002, p4.

¹⁴¹³ Dr Moira Somers, General Practitioner, *Transcript of Evidence*, April 10 2002, p13.

¹⁴¹⁴ Mr Michael Jackson, Executive Director, Population Health, DoH, *Transcript of Evidence*, July 8 2002, p14.

listed diseases. We acknowledge those concerns. To this point, whatever we call it, it fits into the “basket” of what is experienced.

INTERACTION BETWEEN STATE GOVERNMENT DEPARTMENTS

9.201 During its inquiry, the Committee received evidence of claims made about government departments generally, including:

- Lack of timely, and in some cases, any, response to complaints and/or queries.
- Lack of communication and coordination between government departments.
- Confusion within and between government departments as to areas of responsibility in addressing issues raised in relation to Alcoa’s refinery at Wagerup.

9.202 The Committee notes that in September 1999, the then Legislative Council Standing Committee on Public Administration expressed the following view regarding the responses of the DMPR, DEP and DoH to the worker and community health issues at Wagerup:¹⁴¹⁵

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.

DME [DMPR, now then DoIR] 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 the matter, HDWA [DoH] 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 on the one hand caused by air pollution, but on the other hand, it was said that the issue at stake was one of community health. ... There was apparently no formal process of consultation between these departments to coordinate administrative response.

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.

¹⁴¹⁵ Western Australia, Legislative Council, Standing Committee on Public Administration, *Report in relation to the Administration of Environmental Complaints Relating to Public Health: A Case Study*, Report No. 12, September 1999, p7.

9.203 As previously noted, the former Standing Committee on Public Administration recommended that a working party of senior officers from the DEP, DoH, DMPR and WorkSafe be convened to discuss the coordination of administrative response to community complaints regarding environmental issues adversely affecting the health of workers or the community. The report also recommended that the DEP coordinate the working party.¹⁴¹⁶

9.204 On November 1 1999, the then Minister for the Environment responded to the report of the former Standing Committee on Public Administration as follows:¹⁴¹⁷

- The Minister and the DEP endorsed the report and recommendations. The Minister for the Environment advised that the DEP was in the process of coordinating an initial working party meeting. The meeting would be at Chief Executive Officer or deputy Chief Executive Officer level, with participants from the DEP, DoH, DMPR and WorkSafe. The working party It would discuss the outcomes of the report and implications for the various agencies, including a coordinated position and protocol.
- The DEP had accepted the role of coordinating the working party and of maintaining a complaint database relating to environmental issues adversely impacting on the health of workers or the community. The administration and management of the database would be discussed at the initial meeting of the Working Party.
- Before the inquiry by the former Standing Committee on Public Administration commenced in late 1998, the DEP was providing a coordinating role for community complaints. In relation to issues regarding Alcoa's refinery at Wagerup, however, it had received only four complaints in the 18 months prior to 1999. The DEP was not aware of the broad based community concern regarding Alcoa's refinery at Wagerup until it attended a meeting with the WCHAG on February 19 1999.
- Since becoming aware of the community concerns, the DEP had undertaken extensive environmental monitoring of the refinery, which found emission levels were within national and international standards. Investigations were ongoing.

¹⁴¹⁶ Ibid, pp7-8.

¹⁴¹⁷ Government response to the recommendation of the report of former Standing Committee on Public Administration being Western Australia, Legislative Council, Standing Committee on Public Administration, *Report in relation to the Administration of Environmental Complaints Relating to Public Health: A Case Study*, Report No. 12, September 1999. The Government's response is a letter from the Minister for the Environment to the Legislative Council (Mr Malcolm Peacock, Usher of the Black Rod) November 1 1999. The Government's response is in accordance with the Legislative Council's Standing Order 337.

- 9.205 Refer to paragraphs 9.93 to 9.94 of this report for a discussion on the liaison undertaken by the DEP with other relevant government departments to address the issues raised by the Alcoa refinery at Wagerup.
- 9.206 In his evidence to the Committee at its hearing on July 8 2002, Mr Jock Ferguson, Secretary of the AMWU, submitted that *“there should be greater vigilance by the regulators. Appropriate departments must monitor emissions on a more regular basis and publicly report the findings.”*¹⁴¹⁸
- 9.207 Mr Ferguson also submitted that *“A whole of government approach, on a departmental basis, should be taken when an issue like this arises. We found that departments did not liaise with each other. It is an issue that cuts across various departments. It should not be handballed around. There must be coordination between departments so they understand what should happen and what are their responsibilities.”*¹⁴¹⁹
- 9.208 In relation to occupational health and safety issues, Mr Ferguson expressed his disagreement with the principle that workers employed at mine sites (which includes refineries) are covered by the MSI Act while workers at any other work place are covered by the *Occupational Safety and Health Act 1984 (OSH Act)*. He submitted that *“Everyone should come under the provisions of the Occupational Safety and Health Act.”*¹⁴²⁰
- 9.209 In answer to a question from the Chairman regarding the roles of the various departments (the DoH, DEP, and DMPR) and their ability to liaise and deal with health and environmental issues relating to emissions from Alcoa’s refinery at Wagerup, Dr Peter Di Marco, Principal Toxicologist, DoH made the following comments:¹⁴²¹

At government level, we do work very well with other departments, but there is some confusion and concern in the mind of the community about where to get information or satisfaction on complaints. For example, if people feel sick, regardless of whether they are workers or part of the general community, they feel that they should address their concerns to the Department of Health. In fact, if they are workers, they should be addressing their concerns to the Department of Mineral and Petroleum Resources, or WorkSafe if they are not in the

¹⁴¹⁸ Mr Jock Ferguson, Secretary, AMWU, *Transcript of Evidence*, July 8 2002, p4.

¹⁴¹⁹ Ibid.

¹⁴²⁰ Ibid.

¹⁴²¹ Dr Peter Di Marco, Principal Toxicologist, DoH, *Transcript of Evidence*, July 8 2002, p16.

mining industry, while members of the broader community should contact the Department of Health. That causes some concern...

- 9.210 The Committee notes that because of the division of responsibilities between the various State Government departments, the Ministerial Council chaired by the Minister for Environment was established in February 2002 to facilitate a coordinated approach to deal with the Wagerup issue. A whole of government strategy is being developed to address community and worker health concerns about emissions from the Alcoa's refinery at Wagerup.¹⁴²²
- 9.211 The Committee also notes that the Ministerial Council is seeking to establish an Environmental Health Foundation to "*assist and advise government in preventing or reducing harmful human health effects from exposure to hazardous substances.*"¹⁴²³
- 9.212 The Environmental Health Foundation is discussed further in paragraphs 4.287 to 4.300 of this report.
- 9.213 The Committee notes Dr Peter Di Marco's comments that the Environmental Health Foundation will "*go a long way towards addressing these environmental concerns, and making sure that the appropriate departments are brought on board to do the work required.*"¹⁴²⁴

STATE GOVERNMENT REFORM OF THE OCCUPATIONAL SAFETY AND HEALTH REGIME

- 9.214 In 2002, the Minister for Consumer and Employment Protection initiated a review of the OSH Act in conformity with section 61 of that Act: R Laing, *Review of Occupational Safety and Health Act 1984, Final Report, November 14 2002*. This review resulted in 107 recommendations, the majority of which have been supported by the State Cabinet.¹⁴²⁵
- 9.215 The Committee notes that State Cabinet has agreed to introduce four new penalty options for breaches of Western Australia's occupational health and safety legislation.¹⁴²⁶ Other major areas of change endorsed by State Cabinet include:¹⁴²⁷
- the expansion of the general duties of care, largely to 'close the gaps', particularly with respect to the labour hire industry; and

¹⁴²² Submission No. 53 from the DEP, April 9 2002, p34.

¹⁴²³ Concept Paper - *Establishment of an Environmental Health Foundation*.

¹⁴²⁴ Dr Peter Di Marco, Principal Toxicologist, DoH, *Transcript of Evidence*, July 8 2002, p16.

¹⁴²⁵ Department of Consumer and Employment Protection, *Safetyline Magazine*, October 2003, p4.

¹⁴²⁶ Ibid.

¹⁴²⁷ Ibid, p5.

- establishing a Safety and Health Tribunal drawn from the Commissioners of the Western Australian Industrial Relations Commission, to hear appeals and related matters.
- 9.216 The Committee also notes that the State Government intends to amend legislation to ensure the WorkSafe Western Australian Commission assumes a pre-eminent role in setting occupational health and safety policy and directions for all workplaces within the State's jurisdiction, including those in the mining industry.¹⁴²⁸
- 9.217 The Minister for State Development also initiated a review of the *Mines Safety and Inspection Act 1994*, in conformity with section 110 of that Act: R Laing, *Review of the Mines Safety and Inspection Act 1994 Final Report, January 2003*. This review made 61 recommendations, most of which related directly to amendments of the MSI Act. The Minister for State Development advised the Committee in October 2003 that the State Cabinet supported 51 of those recommendations.¹⁴²⁹ The Minister noted that 30 of the recommendations were common to recommendations made in the review of the OSH Act referred to above.¹⁴³⁰
- 9.218 The Minister for State Development advised the Committee that the majority of proposed amendments relate to clarifying provisions of the MSI Act and changes to administrative arrangements.¹⁴³¹ The most significant changes include:¹⁴³²
- provisional improvement notices;
 - election of safety and health representatives;
 - safety and health committees;
 - alternative non-monetary penalties; and
 - increased penalties.
- 9.219 The Committee notes that the mines safety inspectorate will remain with the DMPR.¹⁴³³
- 9.220 The Minister for State Development advised the Committee in October 2003 that drafting instructions were being prepared for legislative amendments to both the OSH

¹⁴²⁸ Ibid.

¹⁴²⁹ Letter from the Minister for State Development, October 9 2003.

¹⁴³⁰ Ibid.

¹⁴³¹ Ibid.

¹⁴³² Ibid.

¹⁴³³ Department of Consumer and Employment Protection, *Safetyline Magazine*, October 2003, p5.

Act and the MSI Act and that the DMPR and the Department of Consumer and Employment Protection were liaising closely to ensure consistency of provisions in both Acts. The Minister anticipated that a bill would be before Parliament for the autumn session of 2004.¹⁴³⁴

- 9.221 The Committee notes that the Occupational Safety and Health Legislation Amendment and Repeal Bill 2004 was introduced into the Legislative Assembly on April 8 2004. As at October 8 2004 the Occupational Safety and Health Legislation Amendment and Repeal Bill 2004 was being debated at second reading stage in the Legislative Council. The Committee further notes that on August 25 2004, a bill to amend the MSI Act (the Mines Safety and Inspection Amendment Bill 2004) was introduced into the Legislative Assembly. As at October 8 2004, the bill's second reading was still being debated in the Legislative Assembly.

COMMITTEE FINDINGS

- 9.222 The Committee finds that the regulatory processes in Western Australia have failed to adequately protect the communities and workforce at Alcoa's refinery at Wagerup.
- 9.223 The Committee is of the view that if the complaints from the community and Alcoa workers been acted upon in a timely and satisfactory manner by the relevant State Government departments at the time they were made, many of the subsequent problems at Wagerup could have been prevented or substantially reduced.
- 9.224 The Committee has found that a significant lack of trust continues to be felt in the community towards State Government departments involved in the issues surrounding the Alcoa refinery at Wagerup. There is a perception by some members of the local community that those departments are failing to adequately recognise and respond to their concerns.
- 9.225 However the Committee notes that the DoE and DoH are now more proactive in their approach to the concerns raised by Alcoa's employees at its Wagerup refinery and the members of the local community in relation to adverse health impacts than appeared to the Committee to be the case when this inquiry commenced in 2001. For example, it is now a condition of the licence for Alcoa's refinery at Wagerup that it submit monthly complaints reports to the DoE. The Committee believes this inquiry assisted in bringing about these changes.
- 9.226 In particular, the Committee notes that the DoE has:

¹⁴³⁴ Letter from the Minister, October 9 2003.

- amended Alcoa's licence to address a number of issues raised by the community, such as more detailed provisions concerning complaint record keeping and reporting of complaints to the DEP on a monthly basis;¹⁴³⁵
- developed a strategy for dealing with the issues surrounding the Alcoa refinery at Wagerup, such as requiring further emissions reductions, continued involvement with the WCHAG and improved community consultation;
- developed an 'Issues Alert Management System' to capture issues and/or premises that have, or are likely to, become contentious;
- initiated a prosecution for an alleged breach of Alcoa's licence conditions;
- established a new enforcement unit; and
- taken steps to increase the number of inspections by re-including these in its internal performance measures.

9.227 The Committee finds that the DoIR (more particularly when it was DMPR) has:

- undertaken site visits and inspections to Alcoa's refinery at Wagerup;
- worked with other government departments, technical experts and the community in an effort to address employee and community concerns; and
- been involved in public meetings, expert panel meetings and technical forums.

9.228 However, the Committee finds that, in some instances, the DoIR seems to have lacked awareness and urgency in dealing with the emissions and workers' health problems at Wagerup. The Committee notes that the DoIR has been unaware of some serious emission events that have impacted on worker and community health.¹⁴³⁶ A more proactive approach may have prevented some of the health problems which afflicted the workforce.

9.229 The Committee is concerned that these instances indicate that the DoIR appears to have been out of the information loop regarding emission events at Wagerup.

¹⁴³⁵ The October 2004 DoE Material also notes that the new 2004/2005 licence (issued on August 12 2004 for one year) included new conditions relating to, for example: alternative management of sodium oxalate storage and disposal; environmental risk assessment of chemical storage and containment at the refinery; reporting on noise monitoring results; operation of a monitoring program to measure dust levels from the residue disposal areas in line with CSIRO recommendations; and the management of calciner emissions to defined levels (monitoring is now required to be bi-monthly, up from three-monthly in the previous licence).

¹⁴³⁶ For example, letter from DoIR, June 9 2004.

- 9.230 The Committee notes that the DoIR has no duty of care responsibilities in relation to the workforce and exposures beyond enforcing the MSI Act and MSI regulations (refer to paragraph 5.14 of the report). While the Committee agrees that the primary responsibility for worker safety and health lies with the employer, it finds that the DoIR should upgrade the level of their involvement and proactively intervene in situations where worker safety may be compromised.
- 9.231 The Committee is of the view that the DoIR should be proactive in monitoring for potential occupational health problems and should take action at the first indication that members of the workforce are at risk of, or are experiencing, health impacts.
- 9.232 The Committee believes that the DoH, DEP and DoIR should give public health concerns and/or impacts priority in their risk assessments and response actions, even if no cause of those health concerns/impacts can be identified and the levels of measured environmental contaminants are below the levels set under health guidelines.
- 9.233 The Committee notes that the DoE, in responding to concerns at Wagerup and as the body responsible for regulating emissions, has begun to work more closely with the DoH in examining and reporting on health risks and impacts.
- 9.234 Whilst the DoH may be consulted as part of the Part IV assessment process of the EP Act, the experience at Wagerup highlights that there is a need for the DoH to take a greater role in taking regulatory responsibility. The Committee is of the view that the DoH should take an all-encompassing view of, and a responsibility for, public health issues involving chemical/industrial emissions exposure. This should include the health concerns of, and impacts on, workers on industrial premises.
- 9.235 The Committee notes the establishment of the Ministerial Council, which has coordinated a whole of government response to the issues at Wagerup. The Ministerial Council has assisted in integrating the Government's response to the issues at Wagerup.
- 9.236 The Committee notes that although the DEP apparently did not receive a large number of community complaints prior to 1999 (see paragraph 9.95 of this report), at this time a previous parliamentary inquiry by the former Legislative Council Standing Committee on Public Administration was taking place to, among other things, examine the adequacy of the DEP's performance in dealing with this issue.¹⁴³⁷
- 9.237 The Committee finds that the licensing process was poorly managed by the DEP during the period from October 2000 to July 2001 when Alcoa was operating at its Wagerup refinery at a daily production rate in excess of its licence conditions. The

¹⁴³⁷

Western Australia, Legislative Council, Standing Committee on Public Administration, *Report in relation to the Administration of Environmental Complaints Relating to Public Health: A Case Study*, Report No. 12, September 1999.

Committee finds that the DEP should have promptly initiated a formal review process of Alcoa's licence when the increase in production was forecast in October 2000 rather than when production had already increased and after an approach by Alcoa in June 2001 (refer to paragraphs 9.30 to 9.35 of this report).

- 9.238 The Committee notes the lack of timely response by the DEP to the Committee's requests for information during this inquiry. The Committee is of the view that this was due in part to the lack of adequate resources provided to the DEP. In some cases the DEP took over one year to respond to items of correspondence from the Committee.
- 9.239 The Committee notes the comparison of resources allocated to environmental regulation and management made between Western Australia and New South Wales and Victoria in the Welker Review. The Committee finds that NSW and Victoria spend approximately twice as much per capita on environmental regulation and management as Western Australia (refer to paragraphs 9.104 to 9.107 of this report). The Committee is of the view that the current funding provided to the DoE is insufficient for it to adequately carry out its regulatory role.
- 9.240 The Committee finds that the DoE has received an actual budget increase of only 1.3 percent over the past five years without taking into account inflation, salary increases and an increasing workload. The Committee finds that the DoE is expected to do more with less money and that this financial reality is affecting its performance.
- 9.241 The Committee notes comments made in the Welker Review regarding funding and staff training. In particular, the Committee notes comments that the workload and lack of resources had meant poor staff training and an inadequate policy and procedural framework that had led to inconsistencies and a degree of arbitrariness in the administration of the DEP's licensing system and that this, in turn, made enforcement and auditing of conditions more difficult (refer to paragraph 9.108 of this report).
- 9.242 The Committee also notes the comments made in the Carew-Hopkins Review in relation to the de-skilling of the DEP (namely, that industry groups expressed concern that DoE staff with little expertise, skills or understanding of industry were setting licence conditions and managing large projects).
- 9.243 The Committee notes that, as of September 2002, it is a condition of Alcoa's licence for the Wagerup refinery that it submit monthly complaints reports to the DEP. The Committee believes that such monthly reports need to be accompanied by a complaints reporting system that is more accessible to the public. (Refer to Recommendation 2 of this report).
- 9.244 The Committee notes that some Alcoa employees and members of the local community were still experiencing adverse health impacts despite the fact that the

measured emission levels at Alcoa's refinery at Wagerup were below the relevant health standards and guidelines.

- 9.245 The Committee notes the development by the DoH of specific ambient air quality guidelines for the Alcoa refinery at Wagerup. However the Committee is concerned that general Western Australian air emission guidelines have not been updated since 1985. The Committee notes that the guidelines do not specifically include VOCs. The Committee strongly encourages the Government to develop and finalise guidelines specific to Western Australia that include VOCs and standards for multiple chemical exposure (Refer to Recommendation 20).
- 9.246 The Committee finds that the DoH and DoE need to pay greater attention to assessing cumulative health impacts when very large numbers of chemicals are involved (albeit at apparently safe individual levels). This issue of the additive effect of chemical mixtures has received little attention at Wagerup although the refinery emits in excess of 261 separate, and toxic, chemicals.
- 9.247 The Committee notes the intention of the State Government to amend legislation to ensure the WorkSafe Western Australian Commission assumes a pre-eminent role in setting occupational health and safety policy and directions for all workplaces within the State's jurisdiction, including those in the mining industry.
- 9.248 In the longer term, the majority of the Committee considered that these problems would be better addressed by a change in the administrative and legislative structures so that the mines safety function of the DoIR be transferred to Worksafe. Hons Bruce Donaldson and Robyn McSweeney MLCs dissented from this view.
- 9.249 The Committee notes that workers employed at mine sites (which include refineries) are covered by the MSI Act while the majority of other workers at any other work place are covered by the OSH Act. The majority of the Committee is of the view that, in addition to the proposed amendments to the MSI Act and the OSH Act (refer to paragraphs 9.214 to 9.221 of this report), the State Government should amend the legislative regime to require that all occupational safety and health matters in Western Australia come under one Act, namely the OSH Act. Hons Bruce Donaldson and Robyn McSweeney MLCs dissented from this view.
- 9.250 The Committee considers that it is inappropriate for the DoIR to continue to combine the roles of regulator of mine safety and facilitator of mine developments. The majority of the Committee is of the view that industry and workers will be better served by a single dedicated occupational safety and health department for all workplaces. Hons Bruce Donaldson and Robyn McSweeney MLCs dissented from this view.
- 9.251 The Committee notes that issues faced by government departments can be extremely complex and technically difficult. In such circumstances the level of expertise

required to investigate, monitor and analyse data may not generally be available within Government, and departments are often required to seek external specialist advice.

- 9.252 However, the Committee is concerned that consultants from regulatory agencies with *direct* involvement with the regulation of Alcoa's refinery at Wagerup are also able to act as consultants for Alcoa on the same issue. In addition, senior officers from regulatory agencies with *direct* regulatory involvement with Wagerup are able to leave the agencies and work for Alcoa as consultants a short time after making important regulatory decisions affecting Wagerup. The Committee considers that the above practices could be construed as a conflict of interest.

RECOMMENDATIONS

Recommendation 19: The Committee recommends that significant increased funding be provided by the State Government to the Department of Environment in line with funding in other States to enable it to adequately carry out its regulatory role.

Recommendation 20: The Committee recommends that the Government, as a matter of priority, develop and finalise air emission guidelines specific to Western Australia and that these should include volatile organic compounds (VOCs) and standards for multiple chemical exposure.

Recommendation 21: The Committee recommends that the Department of Environment requires Alcoa, as a licence condition, to inform the Department of Industry and Resources as well as the Department of Environment, when emission events occur.

Recommendation 22: The Committee recommends that the Department of Health, as a matter of priority, derive a hazard index for locations near to Wagerup in order to assess the health risks caused by the cumulative impact of the very high number of chemicals mixed together in the emissions from Alcoa's refinery at Wagerup.

Recommendation 23: The Committee recommends that the regulatory regimes and practices relating to the:

- Department of Industry and Resources;
- Department of Environment; and
- Department of Health,

be reviewed to ensure that action is taken when worker or public health is harmed, or is likely to be harmed, by emissions from industrial facilities and that the exercise of such powers not be dependent on whether or not regulations, guidelines or licence conditions are being breached.

Recommendation 24: The Committee recommends that the regular recording and auditing of workplace accidents and emission incidents be made a part of the safety and health regime of the Department of Industry and Resources. This information should be used for early identification of safety and health problems and for identifying whether existing safety and emission regulations are effective. The information should be publicly available.

Recommendation 25: The Committee recommends that the Department of Industry and Resources be adequately funded to undertake the responsibilities referred to in Recommendation 24.

Recommendation 26: The Committee recommends that the Government carry out a review of legislation and administrative procedures governing the engagement of consultants by government agencies to reduce the potential for conflict of interest.

Recommendation 27: The majority of the Committee recommends that the Government review and report on the role of the Department of Industry and Resources as both regulator of mine safety and facilitator of mine developments with a view to determining whether such roles might be better addressed in separated agencies. The report of any review should be tabled in Parliament. Hons Bruce Donaldson and Robyn McSweeney MLCs dissented from this Recommendation.

Recommendation 28: The majority of the Committee recommends that, in addition to the proposed amendments to the *Mines Safety and Inspection Act 1994* and the *Occupational Safety and Health Act 1984* (refer to paragraphs 9.214 to 9.221 of this report), the Government amend the legislative regime to require that all occupational safety and health matters in Western Australia come under one Act, namely the *Occupational Safety and Health Act 1984*. Hons Bruce Donaldson and Robyn McSweeney MLCs dissented from this Recommendation.

Recommendation 29: The Committee recommends that the Government review legislation and make necessary amendments to ensure that the Department of Health has a formal role in advising the Environmental Protection Authority in relation to the assessment of projects that may impact on public health.

CHAPTER 10

COMMITTEE OVERVIEW: THE PAST, PRESENT AND FUTURE FOR ALCOA'S REFINERY AT WAGERUP

OVERVIEW OF CHAPTER

- 10.1 In this chapter the Committee has drawn together its observations in relation to what it considers to be a number of the more significant matters concerning Alcoa's refinery at Wagerup. The Committee has considered these matters in terms of the past, present and future operations and management of the refinery in order to provide an overview of the issue.

SIGNIFICANT EVENTS AT WAGERUP: 1996 TO 2001

- 10.2 The Committee has set out a comprehensive time line of events relevant to this inquiry at the beginning of this report. From that time line, it can be seen that a number of significant events occurred at Alcoa's refinery at Wagerup during the period 1996 to 2001.
- 10.3 The Committee has selected the period commencing in 1996 as this was the year in which the liquor burner facility (**LBF**) was installed at Wagerup and the period during which there was a significant increase in the number of complaints made about the refinery by workers and members of the local communities. A number of community based groups were established during this period to attempt to deal with the issues arising from the refinery. Further, the Committee commenced its inquiry into Alcoa's refinery at Wagerup during this period which increased public awareness of the issues.
- 10.4 One of the most significant events that occurred during this period was the installation and commissioning of the LBF during 1996. The emissions from the LBF caused industrial unrest and were the reason for a significant number of community complaints. The LBF was designed to reduce the total organic carbon in the caustic liquor stream.
- 10.5 The Committee understands the importance of the LBF to the efficiency of the alumina production process due to the high level of organic content in the bauxite being mined in Western Australia. However, the Committee is of the view that due consideration was not given to possible health and pollution concerns in relation to the LBF technology prior to installation at Wagerup.
- 10.6 In the Committee's opinion, both Alcoa and the State Government departments and agencies responsible for approving the installation of the LBF at Wagerup should have

- been aware of the potential risks due to the experiences at Alcoa's Kwinana refinery (Refer to paragraphs 2.75 and 2.76 of this report).
- 10.7 The LBF technology was relatively new, having been purchased from a Japanese company and up-scaled for Alcoa's purposes at Wagerup.
- 10.8 Complaints to Alcoa and the Department of Environmental Protection (**DEP** now DoE) from workers and members of the local communities regarding emissions from Alcoa's refinery at Wagerup increased markedly after the LBF was installed. To address these complaints, Alcoa closed the LBF in November 1997 while emissions control equipment was installed. A catalytic thermal oxidiser (**CTO**) was installed on the LBF during 1998 to remove volatile organic compounds (**VOCs**). Alcoa estimated that VOCs were reduced from this source by 90 percent compared to 1996 levels.¹⁴³⁸
- 10.9 During 2000 the oxalate kiln, which was known to be a source of VOCs, was closed down. Alcoa also developed and implemented a new noise reduction program.
- 10.10 During 2001 a dehumidifier was installed on the LBF to further reduce VOC emissions. Alcoa also established a Community Development Fund and released its Wagerup Land Management Draft Proposal.
- 10.11 Despite Alcoa undertaking these emissions reductions and community based programs, in the Committee's considered opinion, from 1996 to 2001 Alcoa failed to adequately recognise and respond to the complaints it received from the workers and local community.
- 10.12 The Committee notes evidence received in November 2001 that, although people did lodge complaints with the DEP, those people felt that the DEP did not treat those approaches to their satisfaction. The Committee notes the DEP's advice, however, that prior to 1999, they did not receive many 'formal' complaints. These different positions indicate to the Committee that the DEP's complaints handling procedures were less than satisfactory. (Refer to Recommendation 2 of this report).
- 10.13 A range of extremely serious and complex issues were developing at Alcoa's refinery at Wagerup from 1996 to 2001 that required an unequivocal and comprehensive response from both Alcoa and government departments and agencies. The Committee is of the view that such responses were lacking.
- 10.14 As a result, a breakdown in trust occurred between some of the workers at Alcoa's refinery at Wagerup and members of the local communities, and Alcoa and

¹⁴³⁸ Submission No. 51 from Alcoa, March 4 2003.

government departments and agencies. This has had significant and ongoing impacts that have exacerbated the already difficult situation at Wagerup.

- 10.15 The Committee finds that the DEP appeared to be overwhelmed by the volume and complexity of issues being raised with it in relation to the Alcoa refinery at Wagerup. In the Committee's view, this was due in part to a lack of adequate resources which in turn contributed to inadequate expertise and staffing within the DEP. This matter is discussed further in paragraphs 9.239 to 9.242 of this report. (Refer to Recommendation 19 of this report).
- 10.16 The Committee is of the view that, in contrast to the DEP, the Department of Minerals and Petroleum Resources (**DMPR** then **DoIR**) was not involved to any great degree in the issues of concern in relation to Alcoa's refinery at Wagerup which emerged during the period 1996 to 2001. The Committee expresses its concern at this lack of involvement by the DMPR during this crucial period.
- 10.17 The Committee notes that the Department of Health (**DoH**) did respond to some of the issues being raised in relation to Alcoa's refinery at Wagerup during the period 1996 to 2001, despite there being no statutory requirement for it to do so.

Lessons to be learned from the Wagerup experience

Location of industrial premises

- 10.18 A description of the meteorological conditions specific to the area of Alcoa's refinery at Wagerup is provided in paragraph 6.207 and following of this report. In particular, the Committee notes that the location of the refinery close to the Darling Range escarpment and the effects of the particular weather patterns at Wagerup can influence emissions dispersion and pollution events.
- 10.19 The Committee considers that the siting of a high emissions based industrial precinct (such as Alcoa's refinery at Wagerup) next to the Darling Range escarpment, whilst close to the ore body, was inappropriate. The Committee notes that potential problems with emissions dispersions were already identified at the site in 1978.¹⁴³⁹
- 10.20 The Committee considers that the site selection process for large scale future industrial premises in Western Australia should be required to include an independent, expert study of the particular meteorological conditions at and adjacent to the proposed site. Such a study would help to predict any potential adverse impacts the industrial premises may have on the land and communities within a certain distance from the proposed site and may assist in preventing an occurrence of the issues experienced at Wagerup. This could be required as part of the assessment process

¹⁴³⁹

Wagerup Alumina Project, Environmental Review and Management Program, May 1978.

under Part IV of the *Environmental Protection Act 1986 (EP Act)*. (Refer to Recommendation 15 of this report).

Buffer zones

- 10.21 Further compounding the site issues, the Committee considers it extremely significant to the Wagerup experience that an adequate formal buffer was not established at the time the refinery was constructed. The Committee is of the view that this became a critical factor after the installation of the LBF in 1996.
- 10.22 At the Committee's final hearing into the Alcoa refinery at Wagerup on September 8 2003, it heard evidence from Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia. In discussing the problems at Wagerup, Mr Osborn submitted that "*The absence of a coherent, formal land use framework has been a root cause of the problems at Wagerup.*"¹⁴⁴⁰
- 10.23 The Committee believes that in order to minimise or prevent similar land use conflicts occurring in the future there should be provisions in relevant region schemes or local government Town Planning Schemes for buffer areas where practicable. Such buffer areas should be designed to prevent potentially conflicting land uses from being developed within the buffer.

Multiple chemical sensitivity

- 10.24 On the basis of the evidence provided, the Committee finds that the condition referred to as multiple chemical sensitivity (MCS) is extremely debilitating physically, emotionally and socially. The evidence suggests that it is unlikely that people who experience symptoms of MCS will ever make a complete recovery.
- 10.25 The evidence provided to the Committee indicates that at least nine employees of, and at least one resident in proximity to, Alcoa's refinery at Wagerup have developed symptoms of MCS.
- 10.26 The Committee considers that during the period 1996 to 2001, the issue of MCS (including diagnosis, treatment and prevention) was not clearly understood by many health professionals and relevant authorities.
- 10.27 This failure to understand MCS contributed to a lack of recognition of the condition by the relevant authorities. This gave rise to difficulties with respect to obtaining workers' compensation for those people with the condition.

¹⁴⁴⁰ Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, *Transcript of Evidence*, September 8 2003, p2.

- 10.28 The Committee recognises the clinical difficulties associated with the diagnosis and treatment of MCS and the incomplete medical understanding of the pathogenesis in the body that gives rise to the symptoms of MCS.
- 10.29 Recognising the debilitating effects MCS has on sufferers and their families, the Committee is of the view that a significant effort should be made to prevent symptoms of MCS occurring in the future. This goal should be achieved through, among other things, the prevention of peak emissions events which may trigger symptoms of MCS in some people. (Refer to Recommendations 5 to 8 inclusive and Recommendations 10 and 11 of this report).

Emissions levels

- 10.30 The Committee is also of the view that it is extremely important that further research be undertaken into the cumulative health impacts of the multiplicity of chemicals that are emitted from facilities such as alumina refineries. The Committee considers that one area of research should be to ascertain the health hazard index of chemical emissions when they are combined for locations such as those near to Wagerup. (Refer to Recommendation 22 of this report).

THE PERIOD OF THE COMMITTEE'S INQUIRY: 2001 TO 2004

- 10.31 The Committee has provided its opinion regarding the current situation (as at July 2004) at Alcoa's refinery at Wagerup. The Committee has considered, in light of the evidence provided to it, to what extent the problems and mistakes that occurred in the past in relation to the operations and management of the refinery have now been resolved.

Recognition by Alcoa of issues relating to the Wagerup refinery

- 10.32 The Committee is pleased to note that Alcoa, through its Managing Director Mr Wayne Osborn, has publicly apologised for its role in the issues that have arisen in relation to the Wagerup refinery.
- 10.33 In his opening statement to the Committee at its hearing on September 8 2003 Mr Osborn placed on record Alcoa's "*unreserved apology for its part in a particularly sad period in an otherwise happy and mutually rewarding 40-year history in Western Australia.*"¹⁴⁴¹
- 10.34 Mr Osborn told the Committee that "*Alcoa is committed to restoring the trust and good relations of the community. I believe that the proceedings and the outcome of*

¹⁴⁴¹ Ibid, p1.

this inquiry can contribute to the process of rebuilding. Alcoa shares the belief that strong communities grow where sufficient trust exists."¹⁴⁴²

- 10.35 Mr Osborn noted that *"The complexity of the issues faced by Alcoa and the community surrounding the Wagerup refinery have been among the most difficult and challenging for any company and perhaps any community in Australia."*¹⁴⁴³ He noted that *"It has involved a range of different and sometimes interconnected factors and events, which have impacted on all of us."*¹⁴⁴⁴ Mr Osborn also noted that the issues have been dealt with *"within the context of deeply felt emotions."*¹⁴⁴⁵
- 10.36 He also submitted that *"Alcoa believes it has approached this matter with the utmost sincerity and good intentions of addressing the concerns and expectations of the community and its employees."*¹⁴⁴⁶
- 10.37 Mr Osborn also noted that *"Unacceptable odour and noise from the liquor burning unit during 1996-97 provoked the breakdown in relations between the refinery and its neighbours."*¹⁴⁴⁷ He submitted that *"Since then, Alcoa has been able to successfully address the odour and emission issues and it has provided a path for those employees with health problems. However, the social issues remain."*¹⁴⁴⁸
- 10.38 In his opening statement to the Committee, Mr Osborn also commented on, among other things, Alcoa's land management strategy and the range and complexity of social issues related to the Alcoa refinery at Wagerup, community complaints about odour, health (including MCS), noise and the environment, rehabilitation for workers, and the emissions issues at Wagerup (including emission reduction projects undertaken by Alcoa). Mr Osborn also spoke of the future for Alcoa and the local community.
- 10.39 A copy of Mr Osborn's opening statement to the Committee is attached as Appendix 14 to this report. That statement includes Alcoa's position in relation to, amongst other matters:¹⁴⁴⁹

¹⁴⁴² Ibid.

¹⁴⁴³ Ibid.

¹⁴⁴⁴ Ibid, pp1-2.

¹⁴⁴⁵ Ibid, p2.

¹⁴⁴⁶ Ibid.

¹⁴⁴⁷ Ibid.

¹⁴⁴⁸ Ibid.

¹⁴⁴⁹ Mr Wayne Osborn, Managing Director, Alcoa World Alumina Australia, *Opening Statement to the Committee*, Appendix 14 of this report, pp8-10.

While liquor burner emissions had been reduced, residents remained concerned. In response, Alcoa implemented a comprehensive emissions reduction program across the whole refinery.

In addition to the liquor burner odour reductions, nitrous oxide emissions from the Wagerup powerhouse were reduced by around 60 per cent. Significant reductions in dust and other emissions were achieved.

...

We have significantly reduced emissions while at the same time expanding refinery production.

We believe that Wagerup is now a world benchmark refinery for emission controls. The Government mandated independent audit of odour emission recently confirming we have successfully reduced refinery odour – by even more than we had originally expected.

...

Odour in 2001 was well below pre-liquor burner levels.

10.40 Mr Osborn went on to say:¹⁴⁵⁰

We have had a lot of questions from the Committee concerning the outcome for the Wagerup employees diagnosed with MCS. Their rehabilitation has been our major priority.

Nine of our 650 employees at Wagerup and one contractor were diagnosed as unfit to work in a refinery environment.

...

The lack of accepted diagnostic criteria, differing opinions within the medical field, the intermittent and unpredictable manifestation of symptoms, the unknown causation and the lack of recognition of MCS as an illness were all issues.

... All of this confirms previous monitoring by the Wagerup Working Group that identified no emission from the refinery at levels that would indicate an environmental or health risk. Refinery emission are well below ambient environmental limits.

¹⁴⁵⁰ Ibid, pp11, 15 and 19.

...

Alcoa has committed that we would only consider expansion of the refinery when there was broad community and government support.

We will continue to work with the Government and the community in the long-term planning for the future of Yarloop and the surrounding region.

...

Wagerup Refinery emissions are subject to the most stringent and comprehensive monitoring for any comparable industrial plant in Australia.

- 10.41 Alcoa has also demonstrated its recognition of the issues at Wagerup in practical and financial terms by undertaking comprehensive emissions reductions programs that, from 1996 to 2002, totalled approximately \$37 million. Alcoa has also spent approximately \$6.2 million on noise reduction programs at its Wagerup refinery since it was commissioned.
- 10.42 In addition, the Committee is pleased to note that Alcoa established a Community Development Fund of \$2 million to be spent on projects in the local communities adjacent to the Wagerup refinery and has participated in, and supported, many community groups.
- 10.43 The Committee recognises Alcoa's efforts to implement a land management strategy in 2001/2002 in an attempt to address the concerns of people living close to the refinery. The Committee notes that there is no legal or statutory requirement for Alcoa to implement such a strategy. The Committee is of the view that Alcoa implemented its land management strategy with good intentions and on the basis of the information available to it at the time. However, the land management strategy has not resolved all of the health and social issues.

Have the issues been resolved?

Emissions levels

- 10.44 As with many issues raised during this inquiry, the Committee received conflicting information in relation to the acceptability of current emission levels at Alcoa's refinery at Wagerup. For example see the view of the Australian Workers' Union (AWU) at paragraphs 10.74 to 10.76 of this report.
- 10.45 The Committee notes the alternative view stated by the Yarloop and Districts Concerned Residents' Committee (YDCRC), which expressed its disappointment

with the current situation at Wagerup. In particular, the YDCRC expressed its view that “*a great deal more needs to be done onsite to lower emissions*”.¹⁴⁵¹

- 10.46 In its review of air quality at Wagerup, CSIRO Atmospheric Research concluded that there had been a decline in odour emissions, following plant modifications to reduce odour emissions, with a reduction of more than a factor of four in odour emissions from 1996 to late 2002.¹⁴⁵²
- 10.47 The Committee finds that Alcoa’s refinery at Wagerup is still emitting large quantities of chemicals. The CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, notes those that are toxic; for example, in 2003, an average of 52.5 kilograms of formaldehyde and 4.7 kilograms of benzene were being emitted per day.¹⁴⁵³ In fact average daily benzene emissions had increased to more than double the rate in the first half of 2002.¹⁴⁵⁴
- 10.48 The Committee notes that experiments have been conducted to evaluate the effectiveness of the multflue stack before (June 2002) and after (August 2002) its construction, and to provide data on atmospheric dilutions achieved by a number of stacks and vents at the Alcoa’s refinery at Wagerup. The CSIRO Atmospheric Research review of air quality at Wagerup suggested that consideration should be given to the possibility that under certain meteorological circumstances (for example, convective mixing) a higher stack may cause higher ground-level concentrations at a given receptor than those due to a smaller stack depending on the downwind location of the receptor.¹⁴⁵⁵ This has been borne out by earlier modelling studies.¹⁴⁵⁶
- 10.49 In relation to emissions from the Wagerup refinery, the Committee finds that there is a need for a greater understanding of:
- the cumulative impact of chemical mixtures from the 261 compounds emitted;
 - the specific meteorology of the site and its interaction;
 - the physical features of the site; and

¹⁴⁵¹ Submission from the YDCRC, January 27 2004, p2.

¹⁴⁵² CSIRO Atmospheric Research, *Wagerup Air Quality Review*, Report C/0936, May 2004, p11.

¹⁴⁵³ Ibid, Table 2.7, p54. Refer to Appendix 13 of this report in relation to the figures for formaldehyde.

¹⁴⁵⁴ Ibid.

¹⁴⁵⁵ Ibid, p105.

¹⁴⁵⁶ Submission No. 61 from Alcoa dated April 10 2003 - Attachment - Patrick Coffey, *Wagerup Liquor Burner Stack Preliminary Dispersion Modelling*, June 1994; Memorandum from Patrick Coffey to ‘Distribution’, *Additional Dispersion Modelling WG Liquor Burner*”, dated August 23 1994; and Sinclair Knight Mertz, *Wagerup Refinery Atmospheric Tracer Modelling Study - Executive Summary*.

- the effect that the tall stacks project has had on ground level concentrations of emissions at various distances from the stacks.
- 10.50 The Department of Environment's (DoE) position in relation to emission levels is that *"All emission reductions required of Alcoa by the Department of Environment have been achieved."*¹⁴⁵⁷
- 10.51 The DoE advised the Committee that:¹⁴⁵⁸
- the program for further reductions is progressing in accordance with the schedule proposed;
 - the DoE has sought validation reports from Alcoa to demonstrate the extent of the reductions actually achieved;
 - whilst it is of the opinion that the most significant emission reduction opportunities have now been completed, it is continuing to identify and facilitate further reductions in emissions wherever it believes opportunities exist; and
 - any further reductions will not be as significant in scale as those already undertaken.
- 10.52 The DoE stressed that ambient air quality monitoring in the community, even during events identified by the community as impacting on them, has consistently shown contaminant levels to be very low and within both the relevant international health guidelines and those guidelines provided by the DoH. It advised the Committee that, notwithstanding this, the DoE will pursue further emission reductions that are reasonable and practicable.¹⁴⁵⁹
- 10.53 The conflicting information in relation to the acceptability of emissions levels illustrates the lack of consensus that continues to exist between the various stakeholders in relation to Alcoa's refinery at Wagerup.
- 10.54 The Committee considers that there is a need for a holistic research program in relation to air quality at Wagerup, such as that proposed to be conducted by the CSIRO (Refer to paragraph 6.243 and following of this report and refer to Recommendation 12 of this report).

¹⁴⁵⁷ Letter from the Minister for the Environment, June 18 2004, p2.

¹⁴⁵⁸ Ibid.

¹⁴⁵⁹ Ibid.

- 10.55 The Committee notes that VOC emission levels are related to the level of organic matter in the ore. Ore from the Willowdale minesite has a high level of organic matter. The organic matter was previously removed by the oxalate kiln (which has now been decommissioned) and is now removed by the LBF. Lower organic impurities going into the refinery process relate to lower VOC emissions.
- 10.56 The Committee notes that considerable effort has been expended in finding methods of reducing emissions and increasing their dispersion in the atmosphere. The Committee urges Alcoa to investigate the feasibility of reducing the organic input to the refinery through more rigorous screening and by the mixing of ores from the Alcoa refinery at Wagerup with ores containing lower organic content.

Complaints

- 10.57 The Committee notes that the total number of complaints in relation to Alcoa's refinery at Wagerup has decreased significantly since 2001 and that the majority of complaints come from a small number of complainants. Further, since 2001, there has been an overall decrease in the number of new complainants from each previous year, and for those complainants, an overall reduction in the number of complaints registered.
- 10.58 However, there are still many complaints being made in relation to the Alcoa refinery at Wagerup per year. (Refer to paragraphs 3.49, 3.50 and 3.65 of this report.)
- 10.59 This indicates to the Committee that the situation at Wagerup in relation to emissions from the refinery is improving for the majority of people still living in the area. The Committee notes that a number of people have moved away from the area since the LBF was commissioned.
- 10.60 A local resident advised the Committee that, on September 21 2003, an emission event was experienced at a property located in the vicinity of Alcoa's refinery at Wagerup. The odour was described as a very strong burnt chemical smell and the physical effects experienced by the people at the property included sore throats and burning sensations in their noses.¹⁴⁶⁰ This indicates to the Committee that events are still occurring at Alcoa's refinery at Wagerup that can contribute to ill-health.
- 10.61 However, the Committee notes that, during 2003, noise overtook odour as the most common cause for complaint and that the majority of complaints in relation to noise occurred within the boundary of Area A (being an area defined in Alcoa's Wagerup Land Management Strategy).

¹⁴⁶⁰ Email from Mr Terry Wilson to numerous recipients, September 21 2003, and sent to the Committee by Mr John Bradshaw MLA by letter dated May 14 2004.

Community stability

- 10.62 The Committee is of the view that division and social unrest continue to exist in the communities surrounding Alcoa's refinery at Wagerup. The Committee considers that this is one of, if not the, most significant unresolved social issue in relation to Alcoa's refinery at Wagerup. The Committee draws Alcoa's attention to paragraph 7.223 of this report and awaits, with interest, Alcoa's response to this complex issue.
- 10.63 The Committee recognises that the communities in the vicinity of Alcoa's refinery at Wagerup have experienced significant social disruption since 1996. This disruption has contributed to the destabilisation of the structure and demographics of the local communities. The Committee is of the view that these local communities require a period of stability to enable the divisions and rifts to mend.
- 10.64 The Committee notes that a questionnaire was conducted in February 2004 to collect information on the current 'livability' and long-term future of areas in the vicinity of Alcoa's refinery at Wagerup. The questionnaire was conducted by Mr Colin Walker from Geo & Hydro Environmental Management Pty Ltd in conjunction with a number of members of the local community.¹⁴⁶¹

Yarloop and Districts Concerned Residents Committee's perceptions

- 10.65 In response to its request for a final submission regarding the situation at Wagerup, the YDCRC provided the Committee with a submission dated January 27 2004.
- 10.66 In its submission the YDCRC expressed its disappointment with the current situation at Wagerup and outlined a number of areas where it was of the view that enough had not been done to adequately address their concerns. The YDCRC expressed the view that *"nothing has changed from the communities perspective."*¹⁴⁶² It submitted that *"In actual fact, things have only got worse, as the health situation has not improved, nor has noise or odour impacts, but businesses have closed and more and more people are forced to leave because there has been no assistance from any area."*¹⁴⁶³
- 10.67 The YDCRC also expressed its disappointment to the Committee in relation to what it perceived to be a lack of consultation with the community. It submitted that

¹⁴⁶¹ The questionnaires were sent to households in the region, including all of the Yarloop township and other towns including Waroona, Pinjarra, Harvey, Cookernup and Hamel. People living on farming properties were also included in the questionnaire. A total of 1100 questionnaires were sent, and a response rate of 15 percent was obtained. A copy of the questions and highlights of the responses to the questionnaire is set out in Appendix 15 of this report.

¹⁴⁶² Email from Mr Anthony Hall, Chairperson, YDCRC, January 27 2004.

¹⁴⁶³ Submission No. 69 from YDCRC, January 27 2004, p14.

*“decisions that profoundly affected our communities and members were made with no input and no consideration by or for the communities.”*¹⁴⁶⁴

10.68 The YDCRC expressed the view that:

- the lack of an original buffer zone around Alcoa’s refinery at Wagerup has resulted in *“mass social disruption and devastation to the communities immediately effected, including loss of property values, loss of custom to businesses,...”*¹⁴⁶⁵ and that *“the current buffer is inadequate in addressing impacts from the refinery in its current state”*;¹⁴⁶⁶
- *“a great deal more needs to be done onsite to lower emissions”*;¹⁴⁶⁷ and
- *“The lack of Government response, or more accurately urgency, in aiding the communities affected, is one of the more concerning aspects of our situation.”*¹⁴⁶⁸ and *“So far, very little has been done by either the Government or Alcoa that has had a positive benefit for the communities.”*¹⁴⁶⁹

10.69 The YDCRC expressed its view that *“If there had been a whole of Government approach in 1996 when the problems first became apparent, we feel the problem would not have escalated to the current levels,...”*¹⁴⁷⁰

10.70 The YDCRC submitted that, in their opinion, *“What is urgently needed to protect our health, amenity and the viability of the 2 impacted communities, is for all offsite impacts to be assessed and addressed as a whole.”*¹⁴⁷¹ The YDCRC submitted that its intention was to *“achieve an all of Agencies and Authorities coordinated investigation and response to the current level and type of impacts, and close scrutiny of all impacts as a result of any refinery expansion, prior to any expansion, with particular attention to ensuring that there will be no corresponding increase in impacts, controversy and no further increase in the buffer zone.”*¹⁴⁷²

¹⁴⁶⁴ Ibid, p16.

¹⁴⁶⁵ Ibid, p4.

¹⁴⁶⁶ Ibid, p1.

¹⁴⁶⁷ Ibid, p2.

¹⁴⁶⁸ Ibid, p4.

¹⁴⁶⁹ Ibid, p6.

¹⁴⁷⁰ Ibid, p11.

¹⁴⁷¹ Ibid, p1.

¹⁴⁷² Ibid.

- 10.71 The YDCRC also expressed its intent to “*ensure the viability and sustainability of the affected communities and area through measures that can be applied to protect the individual’s health, amenity and rights.*”¹⁴⁷³
- 10.72 In its submission the YDCRC outlined a range of options it would like implemented which, in its opinion, would address the impacts experienced at Wagerup. The impacts addressed include noise, amenity, land use, health, and social impacts.
- 10.73 The Committee draws these options to the attention of Alcoa and relevant government departments and agencies for consideration during their management and review of matters arising out of the Alcoa refinery at Wagerup.

Australian Workers’ Union perceptions

- 10.74 In response to its request for a final submission regarding the situation at Wagerup, the AWU provided the Committee with a letter dated January 22 2004. The letter from the AWU was written by Mr Tim Daly, Branch Secretary, on behalf of the AWU after a meeting of shop stewards that was held on January 20 2004.
- 10.75 Mr Daly advised the Committee that the views expressed to him at the shop stewards’ meeting were that:¹⁴⁷⁴
- there had been a marked reduction in the presence of odours and in the noise levels emitted from the refinery;
 - there had been considerable engineering work done at the refinery which had significantly reduced the level of odours;
 - the stewards had not received any complaints of nausea, nose bleeds or headaches for a considerable time;
 - there were still community issues that need to be addressed, some of which relate to the purchase or otherwise of property;
 - the AWU and members believe an emissions based licence is an appropriate way forward; and
 - the stewards believe that Alcoa is trying to do the right thing, however, “*with these sorts of things there are no absolute certainties.*”¹⁴⁷⁵

¹⁴⁷³ Ibid.

¹⁴⁷⁴ Letter from Mr Tim Daly, Branch Secretary, AWU, January 22 2004.

¹⁴⁷⁵ Ibid.

- 10.76 Mr Daly advised the Committee that, as at January 22 2004, the AWU had two members at Wagerup who had workers' compensation claims proceeding, one of which had been accepted and one of which had been declined. Mr Daly also advised that one AWU member received a final settlement in relation to health issues following the visit Dr Cullen's visit to Perth in February 2002.

Government departments

- 10.77 The Committee considers that until approximately 2001, the approaches by various government departments to the issues at Wagerup were, to a large extent, inadequate and led to a significant and lasting distrust in the community towards those government departments.
- 10.78 The Committee also considers that there is a significant degree of distrust of the tripartite process in the local community.¹⁴⁷⁶ Some members of the local communities consider that this process may be used as a justification for a possible future expansion of Alcoa's refinery at Wagerup.
- 10.79 The Committee notes that the DoE and the DoH have adopted a more proactive approach to the concerns raised in relation to Alcoa's refinery at Wagerup than was the case in 2001, when the Committee commenced its inquiry.
- 10.80 In relation to the DoE, the Committee notes that the department now, among other things, undertakes on-site inspections, sampling and monitoring at Wagerup, is involved in a number of expert and community working groups, has improved its consultation with the community and other stakeholders and conducts analysis of community complaints.
- 10.81 Despite these improvements, the Committee considers that there still exists in the community a substantial degree of distrust towards the DoE. Overcoming the problem will require a continued demonstration by the DoE of its commitment and good faith to addressing the community's concerns.
- 10.82 In relation to the DMPR/DoIR, the Committee notes that the department is undertaking site visits and inspections at the refinery, is involved in expert and community working groups and facilitates and participates in community meetings to address concerns about the refinery. However the Committee finds that, in some instances, the DoIR seems to have lacked awareness and urgency in dealing with the emissions and workers' health problems at Wagerup.

¹⁴⁷⁶ The tripartite process is referred to at paragraphs 4.302 and 5.9; also refer to the submission from the DoE, pp13-19, attached to letter from the Minister for Environment, October 5 2004.

- 10.83 In relation to the DoH, the Committee notes the department's role in the Wagerup Medical Practitioners (**WMPF**), the establishment of the Yarloop Community Clinic (**YCC**) and its involvement in regular meetings with the community. The Committee reiterates Recommendation 5 of this report that the Government give priority to the establishment of an Environmental Health Foundation.
- 10.84 The Committee notes that there is now greater interdepartmental coordination between the DoE, DMPR/DoIR and DoH than was the case when the Committee commenced its inquiry. The Committee also notes the important role of the Ministerial Council on Environment, Health and Industry Sustainability which has facilitated a whole of government response to the issues at Wagerup.

THE FUTURE FOR ALCOA'S REFINERY AT WAGERUP

- 10.85 The Committee has considered the future both specifically as it relates to Alcoa's refinery at Wagerup and generally by making a number of recommendations for the consideration of the Western Australian Government.

Expansion

- 10.86 One significant issue for the future of the Wagerup refinery is Alcoa's proposal to expand its production at Wagerup.
- 10.87 The proposed expansion will involve the construction of a third production unit, which will increase the refinery's production capacity by approximately two million tonnes per annum, to come on-stream by the end of 2007.¹⁴⁷⁷
- 10.88 The Minister for State Development has announced that, as a result of the proposed expansion, exports would be boosted by over \$550 million per annum, with State royalties boosted by approximately \$10 million per annum.¹⁴⁷⁸
- 10.89 The Committee notes the views expressed by Professor Holman, Chair in Public Health, School of Population Health, University of Western Australia, regarding a possible expansion of production at the Alcoa refinery at Wagerup. Responding to a request from the Committee's Chair for his views on this matter, Professor Holman stated at a Committee hearing in August 2003 that "*I am not in favour of it. I have formed the view that a period of stability is needed.*"¹⁴⁷⁹
- 10.90 The Committee notes that Professor Holman had previously stated the same opinion in a letter to the Minister for Health dated May 12 2003, a copy of which was provided

¹⁴⁷⁷ Hon Clive Brown MLA, Minister for State Development, Media Statement, May 5 2004.

¹⁴⁷⁸ Ibid.

¹⁴⁷⁹ Professor D'Arcy Holman, Chair in Public Health, School of Population Health, University of Western Australia, *Transcript of Evidence*, August 18 2003, p13.

by Professor Holman to the Committee. In that letter to the Minister for Health, Professor Holman advised that as Chair of the WMPF he had advised Ministers in verbal briefings that he *“believed it would be inappropriate to increase Alcoa’s production quota following the installation of the most recent package of emission-control measures.”*¹⁴⁸⁰

- 10.91 Professor Holman wrote that he gave this advice based on an assessment of history, the need for a period of observation and data collection over some years following the most recent control measures to determine if they had been effective, and his view that *“community life in the Town of Yarloop and surrounding districts had been damaged severely by the controversy and that a lengthy period of stability and time for the rifts to heal was needed.”*¹⁴⁸¹
- 10.92 In his letter to the Minister for Health, Professor Holman also wrote that *“Given that we do not understand which combination of emissions has caused the health problems, a ceiling on production is an appropriate control measure in addition to specific emission limits.”*¹⁴⁸²
- 10.93 The Committee notes that the focus of the YDCRC in relation to any future expansion at Alcoa’s refinery at Wagerup is on any corresponding increase in impacts. In a submission to the Committee the YDCRC expressed its intention to use the submission to *“endeavour to achieve an all of Agencies and Authorities coordinated investigation and response to the current level and type of impacts, and close scrutiny of all impacts as a result of any refinery expansion, prior to any expansion, with particular attention to ensuring that there will be no corresponding increase in impacts, controversy and no further increase in the buffer zone.”*¹⁴⁸³
- 10.94 The YDCRC submitted that *“What the community will not tolerate is to have to revisit this controversy, if it is ever resolved to our satisfaction, as a result of...an increase in impacts due to any expansion and have to further increase their buffer. Nor should we be expected to.”*¹⁴⁸⁴
- 10.95 In relation to the proposed future expansion of Alcoa’s refinery at Wagerup the majority of the Committee is of the view that, given that the proposal is subject to a

¹⁴⁸⁰ Letter from Professor Holman to the Minister for Health, May 12 2003.

¹⁴⁸¹ Ibid.

¹⁴⁸² Ibid.

¹⁴⁸³ Submission No. 69, from the YDCRC, January 27 2004, p1.

¹⁴⁸⁴ Ibid, p13.

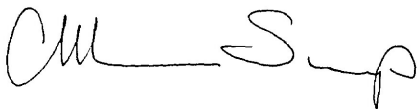
formal assessment under Part IV of the EP Act, it is inappropriate for the Committee to comment on the pending application.¹⁴⁸⁵

Alcoa's land management strategy

- 10.96 The Committee reiterates its opinion that the complex social issues at Wagerup, and in particular the financial stress being experienced by many people as a result of Alcoa's current land management strategy, should be addressed as a matter of priority.

Noise

- 10.97 The Committee notes that noise is currently the most common cause for complaint in relation to Alcoa's refinery at Wagerup. The Committee is of the view that noise emissions from the refinery are having an adverse impact on the lives of some people living in close proximity. (Refer to paragraphs 8.105 to 8.107 and 8.149 to 8.154 of this report for comment on noise reduction programs undertaken by Alcoa).
- 10.98 Industrial facilities such as Alcoa's refinery at Wagerup will produce noise emissions and people who live in close proximity to the refinery will be affected to some extent. The challenge is to keep these noise levels at acceptable limits and to ensure that noise levels do not have an adverse impact on the lives of some people living in close proximity.
- 10.99 In relation to any future expansion of Alcoa's refinery at Wagerup, the Committee notes Alcoa's commitment that the current noise emissions will not increase with any future modification, upgrade or expansion of the refinery.¹⁴⁸⁶ However Alcoa failed to provide certain specific important information sought by the Committee regarding its noise emissions to substantiate its commitment (refer to paragraphs 8.186 to 8.190 of this report and refer to Recommendation 18 of this report).



Hon Christine Sharp MLC
Chair

Date: October 28 2004

¹⁴⁸⁵ The majority of the Committee comprised Hons Bruce Donaldson, Robyn McSweeney, Kate Doust, Louise Pratt and Frank Hough MLCs. Hons Christine Sharp and Jim Scott MLCs dissented - refer to the minority report.

¹⁴⁸⁶ *Review of Environmental Noise Emissions from Alcoa Wagerup Refinery for Department of Environmental Protection*, February 2003, p8.