Additional tunnel kiln - Whitemans Brick

Midland Brick Company Pty Ltd

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 691
July 1993

THE PURPOSE OF THIS REPORT

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's report.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then issues his decision about whether the proposal may or may not proceed. The Minister also announces the legally binding environmental conditions which might apply to any approval.

APPEALS

If you disagree with any of the contents of the assessment report or recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of $10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

ADDRESS

Hon Minister for the Environment
12th Floor, Dumas House
2 Havelock Street
WEST PERTH WA 6005

CLOSING DATE

Your appeal (with the $10 fee) must reach the Minister's office no later than 5.00 pm on 20 August 1993.

Environmental Impact Assessment (EIA)

Process Timelines in weeks

Date	EIA commences from receipt of full details of proposal by proponent	Time (weeks)
29 April 1993	Proponent Document Released for Public Comment	4
27 May 1993	Public Comment Period Closed	
8 June 1993	Issues Raised During Public Comment Period Summarised by EPA and Forwarded to the Proponent	1.7
1 July 1993	Proponent response to the issues raised received	3.5
30 July 1993	EPA reported to the Minister for the Environment	4

ISBN. 0 7309 5617 2
ISSN. 1030 - 0120
ASSESSMENT NO. 665

Contents

Figure

Appendices

Summary and recommendations

Midland Brick Company Pty Ltd, a wholly owned subsidiary of Boral Limited, manufactures clay bricks and pavers at two separate factories located in Middle Swan.

Midland Brick Company Pty Ltd, proposes to expand the capacity of one of these factories, the Whitemans Brick plant, located on the corner of Great Northern Highway and Middle Swan Road (Figure 1). The proponent seeks approval for the second stage of the plant modernisation and expansion, which requires the addition of a second tunnel kiln.

The proposal was referred to the Environmental Protection Authority in October 1991 and the level of assessment was set at Consultative Environmental Review. The proponent prepared a Consultative Environmental Review which was released for a four week period which commenced 29 April and closed on 27 May, 1993. During this time 53 Government and public submissions were received by the Environmental Protection Authority. Of these public submissions, 42 were of a standard "prepared form" only requiring a signature. A petition prepared by the Swan Waste Action Group was also submitted as an expression of "community concern to this proposal." This petition had 89 signatures recorded.

One issue which was raised during the public review period was the closure of the Middle Swan Primary School. It was suggested in some submissions that the closure of this school was testimony to the adverse health effects of brickwork emissions in the area. Some staff and students at the school in 1988, 1989 and early 1990 claimed that irritants emitted from Midland Brick Company were affecting them, and causing headaches, nausea, sore eyes and sore throats.

Investigations by the WA Department of Health, the Environmental Protection Authority, the Department of Occupational Health Welfare and Safety, the Chemistry Centre of WA, and the Department of Minerals and Energy did not find any relationship between emissions from Midland Brick Company and the reported symptoms. No airborne irritant was found in concentrations sufficient to account for the extent and severity of the symptoms reported, and a similar range of symptoms was experienced at other schools well removed from the Midland area. The Minister for Education closed the school on 9 March 1990, on the basis that it was not possible to maintain an adequate education programme at the school.

The Environmental Protection Authority has assessed the potential environmental impacts of the proposal, as described in the Consultative Environmental Review, and utilised additional information supplied by other government agencies, the public and the proponent. Officers of the Environmental Protection Authority carried out site inspections and discussed environmental issues with members of the public and relevant government authorities.

In reaching its conclusion, the Environmental Protection Authority identified the main environmental issues as:

- potential for impacts from gaseous fluoride emissions;
- potential for annoyance from acid gas emissions;
- potential for noise to upset nearby residents; and
- potential for annoyance from smoke and dust emissions.

The Authority is confident that the environmental issues can be managed through good plant practices. This proposal will require Works approval and Licence approval under Part V of the Environmental Protection Act, 1986. Based on its assessment of the proposal and additional information provided by the proponent in response to questions raised as a result of the assessment process, the Environmental Protection Authority makes the following recommendations:

Recommendation 1

The Environmental Protection Authority concludes that the proposal by Midland Brick Company to build an additional kiln at its Whitemans Brick operations, as outlined in the Consultative Environmental Review, is environmentally acceptable.

In reaching this conclusion, the Authority identified the main issues requiring detailed consideration as:

- **gaseous fluoride emissions;**
- **acid gas emissions;**
- **noise emissions; and**
- **smoke, particulate and dust emissions.**

The Environmental Protection Authority considers that these, and other issues, have been addressed and are manageable, either by the environmental management commitments given by the proponent, or by the Environmental Protection Authority's recommendations in this report.

The environmental issues considered during the assessment of the proposal have been addressed as follows:

Gaseous fluoride emissions

Fluoride is a naturally occurring mineral in all clays. Its concentration can vary typically from 50ppm to 700ppm. Chemical analysis of clays used by Midland Brick Company indicates that the typical concentration is in the order of 200ppm of which 15% is retained in the product after firing.

In the existing plant the fluoride is captured using a lime scrubber before venting exhaust gases to atmosphere. The typical removal efficiency for fluoride using this dry scrubbing technique is better than 90%.

The local environment has been the subject of many studies, the most recent and comprehensive being the Swan Valley Fluoride Programme undertaken by the Environmental Protection Authority. The Swan Valley Fluoride Programme was carried out over a period of two years from July 1988 to August 1990, in association with the clay product manufacturers in the Midland area.

The atmospheric hydrogen fluoride emissions currently emanating from the Midland Brick/Whitemans Brick complex are within their Environmental Protection Authority licence requirements. The commitment given by the company (number 3.1) indicates that, with the proposed expansion of Whitemans Brick and associated improvements at the Midland Brick site, a small reduction in emissions under normal operating conditions, and a significant reduction in emissions with both plants operating at full capacity will result. The commitments will be reflected in amended licence conditions for the complex.

Accordingly, the Authority makes the following recommendations:

Recommendation 2

The Environmental Protection Authority recommends that the total mass hydrogen fluoride emitted from the Midland Brick Company complex should:

- **during typical operation, not exceed 0.7g per second;**
- **with the plant at full capacity, maintain levels less than 0.8g per second for 80% of the time; and**
- **never exceed 1.0g per second.**

Recommendation 3

The Environmental Protection Authority recommends that emissions and impact of fluoride be monitored and reported in accordance with the requirements of the Environmental Protection Authority.

Acid gas emissions

During the combustion process, low concentrations of acid gases (mainly hydrogen chloride) are also emitted via the stack.

Currently there are no environmental standards in Western Australia for the emission of acid gases, however, the Victorian EPA has established a design criterion as a guideline for acceptable ground level concentrations. This criterion for hydrogen chloride is 320µg/m^3 for 3 minute concentrations. Modelling undertaken by the proponent indicated that the Victorian design guideline will not be exceeded, even with the addition of a new kiln.

There is some uncertainty in determining whether or not acid gas emissions from the future operations will have unacceptable environmental impacts. To check predictions that cumulative impacts will be acceptable from existing plus proposed operations the Authority recommends that a monitoring programme be developed and implemented.

Recommendation 4

The Environmental Protection Authority recommends that Midland Brick Company develop and implement an acid gas emission monitoring programme, in accordance with the requirements of the Environmental Protection Authority, to determine the extent of any impacts from acid gas emissions from their combined operations.

Noise emissions

The monitoring of the current plant noise indicated that emissions are below ambient levels. It is anticipated that the second kiln is unlikely to cause any change to current noise emissions.

Midland Brick Company has made a commitment (number 2) that it will comply with the Environmental Protection Authority noise regulations and will carry out further noise reduction measures if necessary. The Environmental Protection Authority is satisfied that, with the commitments given by the proponent, the issue of noise emissions will be managed in an environmentally acceptable manner.

Smoke, particulate and dust emissions

The current operating licences for the Midland Brick and Whitemans Brick sites contain limits for the emissions of these materials. Periodic monitoring has shown that both sites operate within current licence conditions. The licence limit for the concentration of airborne dust from the premises is 1000 micrograms per cubic metre of air. This licence limit will continue to apply to the cumulative dust levels emanating from the existing and proposed facilities at the Midland Brick Complex which includes the Whitemans Brick site.

The Company has committed (number 3.5) to meeting all of its existing licence requirements for dark smoke and dust emissions. The Environmental Protection Authority is satisfied that the issues of smoke, particulate and dust emissions will be managed in an environmentally acceptable manner.

Finally, based on its assessment of this proposal and recommendations above, the Environmental Protection Authority has developed a list of 'Recommended Environmental Conditions' (see Section 7 of this report) to the Minister for the Environment. The Authority considers that by setting these conditions, the Whitemans Brick proposal, with the additional tunnel kiln, can operate in an environmentally acceptable manner.

1. Introduction

Midland Brick Company Pty Ltd, a wholly owned subsidiary of Boral Limited, manufactures clay bricks and pavers from two separate factories located north east of Perth, in Middle Swan (figure 1). Midland Brick Company Pty Ltd proposes to expand the capacity of the Whitemans Brick factory located on the corner of Great Northern Highway and Middle Swan Road.

Brick production has occurred on this site continually for the past 100 years. The first stage of a modern fully automated brick and paver manufacturing plant was built on the site in 1982, replacing the old up-draft kilns. The proponent has now sought approval for the second stage of the plant modernisation and expansion, which requires the addition of a second tunnel kiln. The current plant has a licence capacity of 160,000 tonnes per annum and it is proposed to commence construction of the second stage in early 1994 in order to increase the capacity to 330,000 tonnes per annum.

The proposal was referred to the Environmental Protection Authority in October 1991 and the level of assessment was set at Consultative Environmental Review. The proponent prepared a Consultative Environmental Review which was released for a four week period which commenced 29 April and closed on 27 May, 1993.

2. The proposal

2.1 Objective of the proposal

The proposed expansion will increase the capacity of the Whitemans Brick plant, which is part of the Midland Brick Company's Middle Swan complex, to 330,000 tonnes per annum and enable the Company to manufacture an additional 80,000,000 Standard bricks per year.

2.2 Need for the proposal

The need for this proposal is based upon market forecasts, both of the domestic market and of the Company's export markets. The growth in export sales, mainly to Japan, is forecast to increase at the rate of 35% compounding for at least the next three years.

2.3 Proposed location

It is proposed to site the new kiln adjacent to the existing kiln in the Whitemans Brick factory. The new kiln will be housed in an extension on the eastern side of the existing shed. A new scrubber and stack are proposed for a location 50 metres to the west of the existing scrubber. Once built, these will replace the existing stack. The location of the Whitemans factory in relation to the surrounding environment can be seen in Figure 1.

2.4 Process description

2.4.1 Clay preparation

No changes are proposed to the current method of clay preparation. The additional crushed clay requirement for the plant will be provided via a covered conveyor connecting the Midland Brick clay preparation plant with the Whitemans plant.

2.4.2 Brick manufacture

Clay bricks and pavers are currently manufactured using a stiff extrusion process. The proposal does not include significant changes to the brick forming process.

2.4.3 Firing practice

After forming, the product is dried, utilising waste heat from the kiln, prior to firing. The proposal includes provision for the additional dryers as well as the new tunnel kiln. These will be located adjacent to the existing kiln and dryers on the eastern side of the plant.

The proposed kiln will be similar though larger than the existing kiln. It will be fired using natural gas. Once completed the plant will have a capacity to produce 330,000 fired tonnes of product per year.

Exhaust emissions from the existing and proposed kilns are to be ducted to a new fluoride scrubber and vented to atmosphere via a new 35 metre high stack.

3. Existing environment

The area currently occupied by Whitemans Brick and Midland Brick Company is zoned General Industrial. The total combined area of both sites is 100 hectares of which the Whitemans factory occupies 30 hectares. This includes buildings, clay and brick storage areas.

The site comprises the area bounded by Middle Swan Road to the north, Great Northern Highway to the east, the Swan Districts Hospital and Reg Bond Park to the south, and the Swan River to the west (figure 1).

Neighbouring land use includes grazing pastures on the Swan River flood plain to the north and west of the site, the Midland Brick plant one kilometre to the south, with the Swan Shire offices, Jack Mann oval and sports field to the east. The nearest residence is more than 300 metres from the southern boundary of the proposed plant. Due to the existing zoning there is no likelihood of residential housing encroaching any nearer to the southern boundary.

The area to the east of the proposed extension is a public reserve.

4. Public consultation and submissions

The Environmental Protection Authority received 53 submissions on the proposal. Of these public submissions, 42 were of a standard prepared form only requiring a signature. A petition prepared by the Swan Waste Action Group was also submitted as an expression of "community concern to this proposal." This petition had 89 signatures recorded.

Issues raised in the submissions included:

- solid waste disposal;
- effects of ozone and photochemical smog;
- social impacts of additional truck movements;
- dust spillages from truck movements;
- impacts associated with the proposed conveyor;
- negative effects upon the lifestyles within the surrounding areas; and
- closure of Middle Swan Primary School.

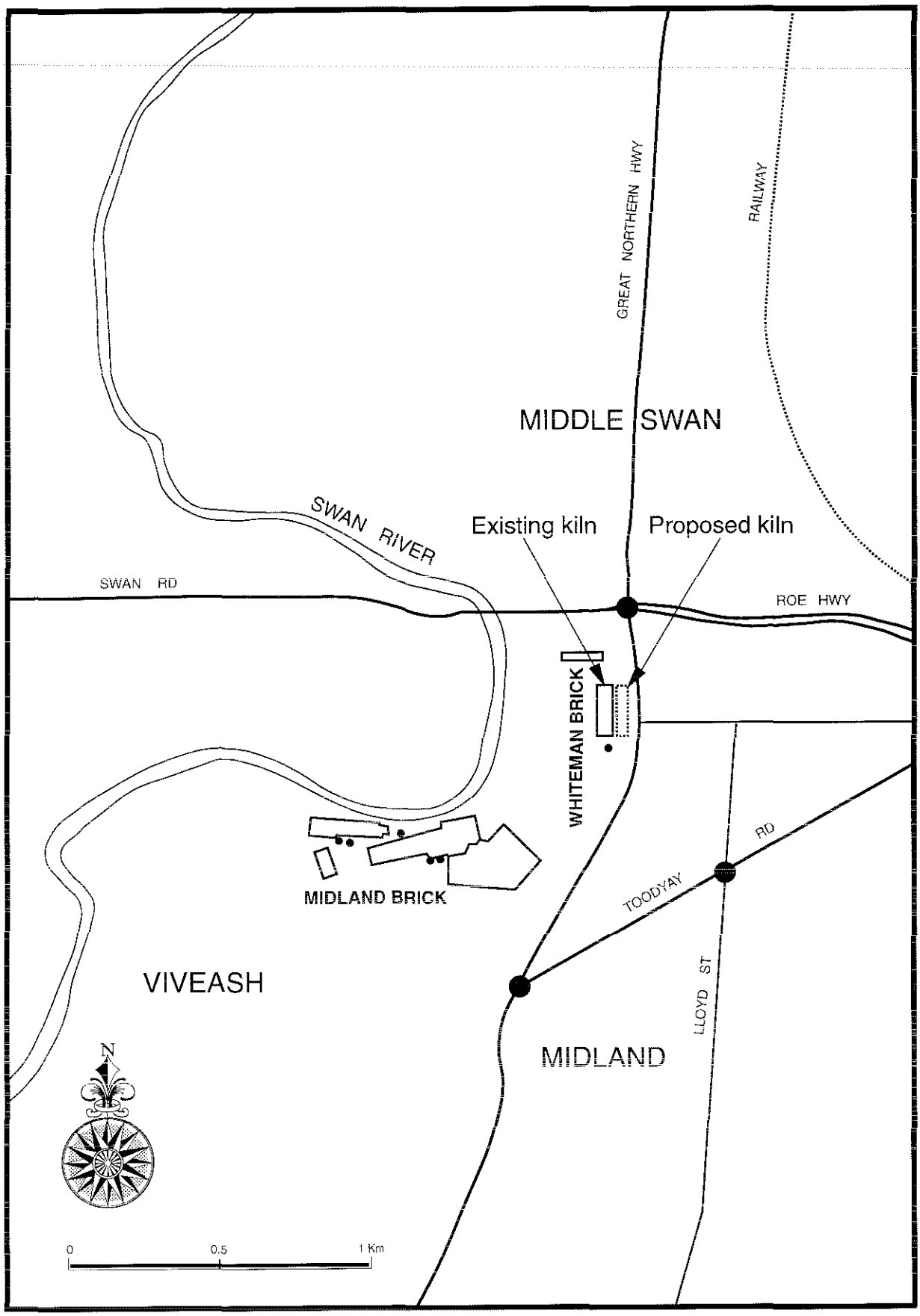


Figure 1: Whiteman Brick - Location

In relation to the closure of the Middle Swan Primary School, it was suggested in some submissions that the closure of this school was testimony to the adverse health effects of brickwork emissions in the area. Some staff and students at the school in 1988, 1989 and early 1990 claimed that irritants from Midland Brick Company were affecting them, and causing headaches, nausea, sore eyes and sore throats.

Investigations by the WA Department of Health, the Environmental Protection Authority, the Department of Occupational Health Welfare and Safety, the Chemistry Centre of WA, and the Department of Minerals and Energy did not find any relationship between emissions from Midland Brick Company and the reported symptoms. No airborne irritant was found in concentrations sufficient to account for the extent and severity of the symptoms reported, and a similar range of symptoms was experienced at other schools well removed from the Midland area. The Minister for Education closed the school on 9 March 1990, on the basis that it was not possible to maintain an adequate education programme at the school.

The school was subsequently sold to a Church group, and for several years now has been used extensively for a wide range of Church activities. The Environmental Protection Authority has maintained contact with the Church group, and, according to Church staff and congregation members who either work on the site or visit there for Church activities, no problems have been experienced since.

The questions asked of the proponent, and the proponent's responses are given in Appendix 1.

5. Environmental impacts and their management

Following a review of the environmental aspects of the proposal and taking into account submissions from the public and Government agencies, the Environmental Protection Authority concludes that the proposal would be environmentally acceptable subject to a number of recommended environmental conditions as discussed in the following sections of this report.

In reaching its conclusion, the Environmental Protection Authority identified the main environmental issues as:

- potential for impacts from gaseous fluoride emissions;
- potential for annoyance from acid gas emissions;
- potential for noise to upset nearby residents; and
- potential for annoyance from smoke and dust emissions.

The Authority is confident that the environmental issues can be managed through good plant practices. Based on available evidence, gaseous fluoride emissions should be manageable to acceptable levels at nearby residential areas.

As a consequence of its assessment of the proposal and additional information provided by the proponent in response to questions raised during the assessment process, the Environmental Protection Authority makes the following recommendations.

Recommendation 1

The Environmental Protection Authority concludes that the proposal by Midland Brick Company to build an additional kiln at its Whitemans Brick operations, as outlined in the Consultative Environmental Review, is environmentally acceptable.

In reaching this conclusion, the Authority identified the main issues requiring detailed consideration as:

- **gaseous fluoride emissions;**
- **acid gas emissions;**
- **noise emissions; and**
- **smoke, particulate and dust emissions.**

The Environmental Protection Authority considers that these, and other issues, have been addressed and are manageable, either by the environmental management commitments given by the proponent, or by the Environmental Protection Authority's recommendations in this report.

5.1 Emissions

The brickmaking process involves the heating up of complex clay minerals with the subsequent liberation of water from the crystal structure and the formation of ceramic bonds or a glass phase which gives clay products their strength and durability.

During this process, water from the clay and the products of combustion, predominantly carbon dioxide and water vapour, are vented to atmosphere. The heating process also liberates small quantities of fluoride and chloride which are naturally occurring in the clay minerals. Of these, fluoride produces the only environmental emission of concern. This is due to the extremely high sensitivity of some plant species to gaseous fluoride.

5.2 Gaseous fluoride emissions

Fluoride is a naturally occurring mineral in all clays. Its concentration can vary typically from 50ppm to 700ppm. Chemical analysis of clays used by Midland Brick Company indicates that the typical concentration is in the order of 200ppm of which 15% is retained in the product after firing.

Hydrogen fluoride is liberated by the high temperature reaction of water vapour with fluoride containing minerals. This fluoride is contained in the exhaust gases which are vented through gas scrubbers. In the existing Whitemans plant, the fluoride is captured using a lime scrubber before exhaust gases are vented to atmosphere. The typical removal efficiency for fluoride using this dry scrubbing technique is better than 90%.

The proponent has indicated that one of the major advantages of this type of scrubber is that it provides a fail safe method of preventing so called "bursts" of fluoride from escaping the brickworks.

In order to ensure there is no increase in fluoride emissions as a result of the new kiln at Whitemans Brick, Midland Brick Company has made a commitment to the construction of an additional fluoride scrubber to the existing operations at the Midland Brick factory, as well as a scrubber for the proposed kiln.

The atmospheric hydrogen fluoride emissions currently emanating from the Midland Brick/Whitemans Brick complex are within their Environmental Protection Authority licence requirements. The commitment given by the company (number 3.1) indicates that, with the proposed expansion of Whitemans Brick and associated improvements at the Midland Brick site, a small reduction in emissions under normal operating conditions, and a significant reduction in emissions with both plants operating at full capacity will result. The commitments will be reflected in amended licence conditions for the complex.

Accordingly, the Authority makes the following recommendations.

Recommendation 2

The Environmental Protection Authority recommends that the total mass hydrogen fluoride emitted from the Midland Brick Company complex should:

- **during typical operation, not exceed 0.7g per second;**
- **with the plant at full capacity, maintain levels less than 0.8g per second for 80% of the time; and**
- **never exceed 1.0g per second.**

Recommendation 3

The Environmental Protection Authority recommends that emissions and impact of fluoride be monitored and reported in accordance with the requirements of the Environmental Protection Authority.

5.2.1 Swan Valley fluoride programme

The local environment has been the subject of many studies, the most recent and comprehensive being the Swan Valley Fluoride Programme undertaken by the Environmental Protection Authority. The Swan Valley Fluoride Programme was carried out over a period of two years from July 1988 to August 1990, in association with the clay product manufacturers in the Midland area.

The objectives of the programme were:

- to determine the magnitude and spatial distribution of ambient airborne fluoride concentrations in the Midland, Guildford and Swan Valley regions;
- to produce an information source from a combination of monitoring and computer modelling studies to improve knowledge of the fluoride dispersion process and characteristics in the Midland, Guildford and Swan Valley regions; and
- to conduct a biological survey to determine the extent to which fluoride contributes to floral stress and/or damage within the Midland, Guildford and Swan Valley regions.

The programme identified one area of concern at Caversham where, during October through January each year, ambient air concentrations of fluoride were occasionally in excess of the Australian and New Zealand Environment and Conservation Council (ANZECC, previously known as the Australian and New Zealand Environment Council (ANZEC)) national goals for averaging times of seven and ninety days in specialised land use areas, and were causing necrosis (death) of grape vine leaves. Following an Environmental Protection Authority directive, the clay product manufacturer concerned raised the height of its emission stack. Ground level concentrations of airborne fluoride dropped significantly and damage to the vine leaves was reduced.

The intensive monitoring work undertaken from July 1988 to August 1990, revealed ambient fluoride levels in the vicinity of Bristile Clay Tiles and Midland Brick Company which exceeded standards established for the protection of vegetation in both general and specialised land uses. More recent monitoring data indicate that the 7-day and 90-day ANZECC guidelines are being complied with throughout the region.

The general conclusion drawn from the monitoring and computer modelling work is that the ANZECC guidelines are being met and ambient concentrations are certainly well below levels which could be expected to cause significant environmental degradation and of the order of at least 1000 times less than the "level of concern" for human health. In the areas around the Bristile Clay Tiles and Midland Brick premises, fluoride emissions have reached or are close to the assimilative capacity of the environment with respect to effects on the sensitive plant species discussed in this report. It is therefore the Environmental Protection Authority's intention to ensure that fluoride emissions are not further increased from Bristile Clay Tiles and Midland Brick Company (including Whitemans Brick).

The report has made several recommendations which are supported by Midland Brick Company. The Company has made a commitment to follow these recommendations if they proceed with this proposal.

5.2.2 Fluoride monitoring

Existing licence conditions for the operation of the Midland Brick and Whiteman's plant require that both stack emissions and ambient levels of fluoride be monitored by the licensee and reported to the Environmental Protection Authority on a quarterly basis. It is proposed that the new kiln will be monitored in a similar manner. The existing network of ambient monitors appears adequate and should also provide a suitable basis for monitoring possible changes to

concentrations of atmospheric fluoride. This will be confirmed through a continuation of biological surveys of the neighbouring vegetation. Should these reveal a need to extend the network of ambient monitors the necessary work will be carried out by the proponent.

This approach is justified on the basis of the air dispersion modelling carried out by an environmental consultant, which shows that there will be negligible change in the spatial distribution of ambient fluoride levels. Their conclusion is reasonable since there will be no increase in fluoride emissions.

5.3 Acid gas emissions (hydrogen chloride)

During the combustion process, low concentrations of acid gases are also emitted via the stack. Acid gases are defined as being any substance which, when absorbed in distilled water, is capable of lowering its pH (that is increase its acidity). The major component of acid gas emissions from brick kilns in Western Australia is hydrogen chloride. For this reason, acid gas emissions are often expressed as hydrogen chloride emissions.

Currently there are no environmental standards for the emission of acid gases, however, the Victorian EPA has established a design criterion as a guideline for acceptable ground level concentrations.

The Victorian EPA design criteria for hydrogen chloride is $320\mu g/m^3$ for 3 minute concentrations.

The proponent commissioned modelling work on the Hydrogen Chloride emission data in order to predict the three minute ground level concentration. The modelling results indicate that the Victorian design guideline will not be exceeded, even with the addition of a new kiln.

The Victorian EPA guideline is for new plants.

Evidence to date has been inconclusive in determining whether or not acid gas emissions from existing operations are having unacceptable environmental impacts. There is some uncertainty in determining whether or not acid gas emissions from the future operations will have unacceptable environmental impacts. To check predictions that cumulative impacts will be acceptable from existing plus proposed operations the Authority recommends that a monitoring programme be developed and implemented.

Recommendation 4

The Environmental Protection Authority recommends that Midland Brick Company develop and implement an acid gas emission monitoring programme, in accordance with the requirements of the Environmental Protection Authority, to determine the extent of any impacts from acid gas emissions from their combined operations.

5.4 Noise emissions

The monitoring of the current plant noise indicates that emissions are below ambient levels. It is anticipated that the second kiln is unlikely to cause any change to current noise emissions.

The relocation of the scrubber and installation of a new larger exhaust fan has been identified by Herring Storer Acoustics as a possible source of increased noise. The proponent has provided a commitment that should further noise emissions occur appropriate action will be taken to ensure compliance with Environmental Protection Authority requirements. The Environmental Protection Authority has established noise levels that should be applied to residences throughout Western Australia. These noise levels at residences should not exceed:

- 40 dB(A) from 10pm to 7am, every day
- 45 dB(A) from 7pm and 10pm every day and on Sunday and public holidays; and
- 50 dB(A) from 7am and 7pm on Monday to Saturday.

Midland Brick Company has made a commitment (number 2) that it will comply with the Environmental Protection Authority noise regulations and will carry out further noise reduction measures if necessary. The Environmental Protection Authority is satisfied that, with the commitments given by the proponent, the issue of noise emissions will be managed in an environmentally acceptable manner.

5.5 Smoke, dust and particulate emissions

The current situation with these materials is that they do not appear to be generated in sufficient quantities in either the Midland Brick or the Whitemans' factories to cause concern to the surrounding environment.

The current operating licences for both sites contain limits for the emissions of these materials. The proponent is required to take all reasonable and practicable measures to prevent or minimise the generation of dust from all materials handling operations, stockpiles, open areas and transport activities. The licence limit for the concentration of airborne dust from the premises is 1000 micrograms per cubic metre of air. This licence limit will continue to apply to the cumulative dust levels emanating from the existing and proposed facilities at the Midland Brick Complex which includes the Whitemans Brick site.

Periodic monitoring has shown that both operations are well within current licence conditions. Since both the construction and operation of the new kiln will be similar to the existing kiln, it is unlikely there will be any significant change in these emissions.

The Company has committed (number 3.5) to meeting all of its existing licence requirements for dark smoke and dust emissions. The Environmental Protection Authority is satisfied that the issues of smoke, particulate and dust emissions will be managed in an environmentally acceptable manner.

6. Conclusion

Based upon the information supplied in the CER and additional information supplied by the proponent during the assessment, the Environmental Protection Authority has concluded that the proposal to build and operate an additional tunnel kiln at the premise of Whitemans Brick, is environmentally acceptable.

In reaching its conclusion, the Environmental Protection Authority identified the main environmental issues as gaseous fluoride emissions, acid gas emissions, noise emissions, and smoke, particulate and dust emissions. Other issues identified during the public review period included solid waste disposal, effects of ozone and photochemical smog, social impacts of additional truck movements, dust spillages from truck movements, impacts associated with the proposed conveyor and negative effects upon the lifestyles within the surrounding areas. The Authority is satisfied that those issues which require management will be managed in an environmentally acceptable manner. Any issues with the potential to cause pollution will be addressed by conditions within the Environmental Protection Authority licence. There were many social issues raised during the assessment of this proposal. These largely centred upon public perceptions of issues associated with the controversy and ultimate closure of the nearby Middle Swan Primary School. The Environmental Protection Authority is satisfied that this issue has been adequately dealt with during previous investigations by the Environmental Protection Authority and other government departments.

Accordingly the Environmental Protection Authority recommends that the proposal can proceed subject to the proponent's commitments (Attachment 1) and the Environmental Protection Authority's recommendations in this report.

7. Recommended environmental conditions

Based on its assessment of this proposal and recommendations in this report, the Environmental Protection Authority recommends that the following Environmental Conditions be imposed on the proposal.

1 Proponent Commitments

The proponent has made a number of environmental management commitments in order to protect the environment.

1-1 In implementing the proposal, the proponent shall fulfil the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the Consultative Environmental Review and in response to issues raised following public submissions. These commitments are consolidated in Environmental Protection Authority Bulletin 691 (See attachment 1 to this statement).

2 Gaseous fluoride emissions

2-1 The proponent shall ensure that the total mass hydrogen fluoride emissions from the Midland Brick Company complex;

- do not exceed 0.7 gram per second during typical operations;
- with plant at full capacity, are maintained at levels less than 0.8 gram per second for 80% of the time; and
- never exceed 1.0 grams per second.

2-2 The proponent shall monitor and report on the emissions and environmental impacts of fluoride in accordance with the requirements of the Environmental Protection Authority.

3 Acid gas emissions monitoring

The proponent shall develop and implement an acid gas emission monitoring programme from the proposed combined operations in accordance with the requirements of the Environmental Protection Authority.

3 Implementation

Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

3-1 Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

4 Decommissioning

The satisfactory decommissioning of the project, removal of the plant and installations and rehabilitation of the site and its environs is the responsibility of the proponent.

4-1 At least six months prior to decommissioning, the proponent shall prepare a decommissioning and rehabilitation plan.

4-2 The proponent shall implement the plan required by condition v-1.

5 Proponent

These conditions legally apply to the nominated proponent.

5-1 No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.

6 Time Limit on Approval

The environmental approval for the proposal is limited.

6-1 If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced. Any application to extend the period of five years referred to in this condition shall be made before the expiration of that period, to the Minister for the Environment by way of a request for a change in the condition under Section 46 of the Environmental Protection Act. (On expiration of the five year period, further consideration of the proposal can only occur following a new referral to the Environmental Protection Authority.)

7 Compliance Auditing

In order to ensure that environmental conditions and commitments are met, an audit system is required.

7-1 The proponent shall prepare periodic "Progress and Compliance Reports", to help verify the environmental performance of this project, in consultation with the Environmental Protection Authority.

Procedure

The Environmental Protection Authority is responsible for verifying compliance with the conditions contained in this statement, with the exception of conditions stating that the proponent shall meet the requirements of either the Minister for the Environment or any other government agency.

If the Environmental Protection Authority, other government agency or proponent is in dispute concerning compliance with the conditions contained in this statement, that dispute will be determined by the Minister for the Environment.

Note: The proponent will be required to apply for a Works Approval and Licence for this project under the provisions of Part V of the Environmental Protection Act.

Attachment 1

Midland Brick's consolidated list of environmental management commitments

General Commitments

Midland Brick Company Pty Ltd will adhere to the proposal as assessed by the Environmental Protection Authority and will fulfil the commitments made below.

The increased production capacity in the form of an additional tunnel kiln and dryers will be built according to all relevant Government statutes and requirements and to the satisfaction of the Environmental Protection Authority.

1. Waste Management Commitments

All waste generated on the site will be disposed of by licensed disposal companies.

i) waste machinery oil from plant and vehicles will be recycled

ii) solid waste will be disposed of at approved sites by licensed contractors

iii) rain water from the site will be discharged in to the Swan River via an existing settlement pond.

2. Noise

The proponent will comply with Environmental Protection Authority noise regulations and will carry out further noise reduction measures if necessary to ensure compliance with Environmental Protection Authority requirements.

3. Stack Emissions

Hydrogen Fluoride

3.1 In order to ensure there is no increase in total fluoride emissions as a result of the new kiln at Whitemans Brick, Midland Brick Company will commit to the construction of an additional fluoride scrubber at the Midland Brick factory as well as a scrubber for the proposed kiln. As a result of this commitment, once these changes are implemented, the Company will operate its plants with the following hydrogen fluoride mass emission:

- during typical operation not exceed 0.7 gram per second;
- with plant at full capacity maintain levels less than 0.8 gram per second for 80% of the time; and
- never exceed 1.0 grams per second.

3.2 Quarterly reports of both source emissions from stacks as well as ambient fluoride concentrations will be produced and made available to the Environmental Protection Authority.

3.3 Should the current level of hydrogen fluoride emissions cause an unacceptable impact in the receiving environment the Company will co-operate with the Environmental Protection Authority in order to ensure that the required corrective action is undertaken.

3.4 Once the new kiln is operational the proponent will commit to a reduction in the current level of fluoride emissions during periods when the plant is not being operated at full capacity.

3.5 Smoke and Dust Emissions

The Company will commit to meeting all its existing licence requirements for dark smoke and dust emissions.

4. Biological Surveys

The Company will continue to engage a consultant acceptable to the Environmental Protection Authority to assess the impact of fluorides on vegetation in the vicinity of the brickworks.

5. Swan Valley Fluoride Programme

The Company further commits to accepting the recommendations of the Swan Valley Fluoride Programme.

"Summary of Recommendations of the Swan Valley Fluoride Programme

1. That the clay product manufacturers in the vicinity of Midland, Caversham and Hazelmere conduct ongoing fluoride monitoring programmes, as required by the Environmental Protection Authority, which will provide an estimate of fluoride emissions into the atmosphere and measures of ambient concentrations at selected locations.

2. That the clay product manufacturers in the vicinity of Midland, Caversham and Hazelmere conduct occasional biological surveys to assess fluoride induced stress on vegetation in the vicinity of their operations.

3. That clay product manufacturers located in the vicinity of Midland, Caversham and Hazelmere maintain their pollution control equipment to a standard which ensures airborne fluoride levels are kept below acceptable air quality standards adopted by the Environmental Protection Authority".

6. Technological Change

The Company will further commit to keep up to date with emission control technology. Where practical improvements in emission control technology occur these will be implemented.

8. References

Midland Brick Company,1993. Additional tunnel kiln at Whitemans Brick.- Consultative Environmental Review

Environmental Protection Authority, 1993 Technical series.- Swan Valley Fluoride (Unpublished)

Appendix 1

Responses by Midland Brick to issues raised in public submissions on the Consultative Environmental Review

ENVIRONMENTAL ISSUES ARISING FROM PUBLIC SUBMISSIONS DURING THE ASSESSMENT OF THE ADDITIONAL TUNNEL KILN - WHITEMANS BRICK (27 May 1993)

1. DEFICIENCIES WITHIN THE CER

1.1 The CER does not contain information on any gases besides HF and HCl. Possible synergistic effects are not discussed either.

A1.1 The CER contains information on emissions from brick kilns which have been either directly measured from the existing operation or are known to occur from brick kilns.

In Section 6.4 of the CER acid gas emissions for both the existing plant and the increase from the proposed kiln are compared to the Victorian EPA design criteria for these emissions with a favourable result. The Victorian EPA is the only authority to have published a guideline for these emissions. Given that there will only be a very small increase in source emissions compared with the current situation and that currently these emissions have not been identified as causing an adverse environmental impact, it is reasonable to assume as far as acid gas emissions are concerned the situation will remain the same.

In relation to other substances or gaseous emissions from the existing kilns, an unpublished study carried out by the Chemistry Centre on behalf of the EPA failed to identify any other emission of concern.

Carbon dioxide emission has not been considered since currently it is not a licence condition. It is worth noting that with the use of natural gas, carbon dioxide emissions will be kept to a minimum.

Synergistic effects have not been discussed since at the concentrations in question, there is little information available. This should be regarded as a positive sign since the lack of research indicates synergistic effects are not of concern.

Additional information on gaseous emissions is contained in Answers to Questions 1.7, 7.1, 7.2, 7.3 and 7.4.

1.2 The CER does not provide details of monitoring systems.

A1.2 The CER states that the monitoring system is set in the Licence Conditions for the existing operation. Section 8.1 of the CER contains additional information on the monitoring system to be employed.

Further in commitment 5 the proponent will commit to undertake any additional monitoring requested by the EPA. However at this time both current monitoring and the modelling study of the proposed changes indicate this is unnecessary.

1.3 The CER does not provide details of decommissioning of the plant.

A1.3 In relation to decommissioning of the plant the proponent will make the following additional commitment:

i. the satisfactory decommissioning of the project, removal of the plant and installations and rehabilitation of the site and its environs is the responsibility of the proponent.
ii. at least six months prior to decommissioning, the proponent shall prepare a decommissioning and rehabilitation plan.
iii. the proponent shall implement the plan shown in ii.

1.4 The CER does not mention previous history including severe health problems which resulted in the closure of the Middle Swan Primary School, and which have not been adequately explained.

A1.4 In relation to this proposal the closure of Middle Swan Primary School is not relevant. Although at the time it was suggested that emissions from the brickworks may have been causing problems at the School, extensive monitoring by the EPA, Public Health Department, Department of Occupational Health, Safety and Welfare, WA Chemistry Centre and the proponent failed to find a link between the brickworks and the closure of the School.

It should be also noted that enquires by the EPA with the current occupiers of the School indicate they have not experienced any problems.

1.5 The CER does not discuss fugitive emissions.

A1.5 Fugitive emissions can be defined as any uncontrolled emissions leaving the site. They can therefore be either solid or particulate (dust), liquid or gaseous emissions. The control of each of these emissions is discussed in the CER.

In summary it is proposed that dust will be controlled with the use of covered clay storage areas and operating on sealed surfaces. Fugitive liquid emissions will be controlled with the use of interceptor pits and in the case of fuel and oil with the provisions of adequate bunds. Fugitive gaseous emissions will be prevented by the kiln design which requires stringent control of air flows in order to

achieve efficient combustion. There is no possibility in normal operation for fugitive emissions from the kiln.

1.6 *Why is this proposal being approved now before the effect of brickwork emissions on the ozone levels has been determined. The recent use of the NHMRC guidelines by the EPA does not address the problem.*

A1.6 There is no evidence to suggest that any of the brickwork emissions would impact on the ozone layer, however, it may be more appropriate for the EPA to respond to this issue.

1.7 *The CER only mentions HCl acid gas, and does not include sulphur dioxide, nitrogen dioxide, carbon dioxide and hydrocarbons.*

A1.7 The CER has only considered emissions which occur in significant concentrations. Others have been grouped together as acid gases and expressed as HCl..

Carbon dioxide will be produced as a by-product of the natural gas combustion process, the use of natural gas will ensure that the concentration is kept to a minimum for the energy requirements of the project.

Hydrocarbons are not expected to be present due to the supply of oxygen and the high combustion temperature.

Also refer to the Answers to Questions 1.1, 7.1, 7.2, 7.3 and 7.4.

1.8 *The greenfields issue was not considered seriously by the proponent despite major air pollution problems in the immediate vicinity which caused the closure of a School and disruption to the local community.*

A1.8 This is a statement and represents an opinion which cannot be supported by facts.

The statement that the brickworks caused the closure of the School is totally incorrect and misleading, and as explained in 1.4 above there is no link between the brickworks and the closure of the School. Information received by the proponent from the Ministry of Education confirms that the closure of the School was due to the inability of the Education Department to conduct a viable education programme at Middle Swan. It was not closed for any environmental reason in anyway connected with the brickworks.

A summary of the reasons for remaining at the existing site at Whitemans are given in Section 2.1 of the CER and cannot be dismissed as not considering the issue seriously. The financial difficulties experienced by Prestige Brick and the failure of International Brick and Tile in Malaga, highlight the competitive nature of the market and the importance of the existing infrastructure at the Whitemans plant.

1.9 What is the quantitative analysis of emissions from the top of each of the existing chimney stacks for the site?

A1.9 The quantitive analysis from each stack from the existing site is contained in Table 6.1 of the CER.

1.10 The analysis of the solid waste disposal is not known and where is it disposed of under licence? Will there be wastes discharged into the river? Will the Red Hill tip have the capacity to deal with the solid waste from the project?

A1.10 The CER does not contain an analysis of solid waste disposal since the addition of a new kiln at Whitemans is not likely to alter the nature or quantity of solid waste from the site which currently consists of a small quantity of material described below.

In general terms the current composition of solid waste can be defined as follows:

i. scrap clay, damaged fired bricks etc., which cannot be recycled in the brickmaking process. The small quantities of this type of material are reused by the proponent as back fill in clay pits;
ii. small quantities of limestone fines from the scrubbers;
iii. scrap metal;
iv. used tyres and batteries;
v. waste paper and general waste from staff rooms canteen, offices and workshops.

Licensed contractors are required to dispose of certain waste products, such as sanitary waste, tyres, batteries and liquid waste, namely used oils. The destination of these materials is either recycling or the Red Hill and Forrestfield waste disposal site as appropriate.

It is important to stress that the volume of material is very small and certainly not likely to cause a capacity problem at Red Hill. Also the brickmaking process, unlike many mineral processing operations, does not generate any unique solid wastes requiring specialised disposal.

It is not intended to discharge any waste material into the river and measures such as interceptor pits and bunding around storage tanks are currently in place to prevent accidental spillage.

The disposal of solid wastes is addressed in Commitment 1 part ii of the CER.

1.11 Is the rain water runoff from settlement ponds to the Swan River monitored? If so what is the analysis?

A1.11 Rain water runoff is only monitored by visual inspection. The settlement pond or interceptor pit provides an extra safeguard, however, since there is no discharge of process water or wash down water, monitoring is not required.

1.12 It is inappropriate to double the capacity of the Midland Brickworks before the planned Perth Airshed Study is conducted.

A1.12 It is not planned to double the capacity of Midland Brick. Whitemans Brick will double its capacity this will result in an increased capacity for the entire plant (Midland & Whitemans) of 12%, when both plants are at full capacity. It is unlikely that a change of this minor nature will be significant in the context of the Perth Airshed Study.

1.13 The CER states that the plant will operate at full capacity for only 25% of the time. Will the plant be operating at full capacity to fulfil overseas demands? Why is the expansion occurring if the company only want to operate it at full capacity for 25% of the time?

A1.13 The CER actually states that it is envisaged the entire plant of Midland Brick and Whitemans will only be at full capacity 25% of the time. Older sections of the Midland plant will be switched off when they are not required. As explained in Section 3.4 of the CER because the local housing industry is of cyclical nature the additional kiln will enable the proponent to meet the increasing demand for export product as well as service the local market at times of peak demand.

1.14 The increase in stack height is unclear. The stack height is reported on Page 16 as 28m whilst in Appendix 2 it is reported as being 35m.

A1.14 An error was made in Table 6.2 on Page 16 of the CER in relation to changes in stack height at the Midland plant. The information in relation to the proposed kiln is correctly reported on both Pages as 22M for the existing stack and 35M for the proposed stack at Whitemans. The information contained in Table 2, Appendix 3 is correct and should be referred to in place of Table 6.2 for the proposed emissions due to the error in reporting proposed Midland stack heights.

1.15 If the EPA does not approve this project will the old baghouse filters remain instead of new scrubbers being installed?

A1.15 Yes, while the existing baghouse filters provide reliable operation and efficient fluoride removal they will remain. The need for new scrubbers or scrubber upgrades is constantly monitored by the proponent.

2. SWAN VALLEY FLUORIDE PROGRAMME

2.1 The Swan Valley fluoride programme lists exceedences of the seasonal 90 day average for fluoride emissions (Page 15). Why hasn't immediate action been taken to reduce emissions from the existing plant as it is already operating over limits? The Final Report indicates that the fluoride levels exceed the 90 day and 7 day ANZEC standards.

A2.1 The Swan Valley fluoride monitoring programme was commenced in July 1988 and completed in August 1990. The report referred to above clearly states that during the monitoring programme a major upgrade of the fluoride emission control system was undertaken by Midland Brick Company.

In relation to this question the following additional points can be made.

i. Immediate action was taken to reduce emissions from the Midland plant. This action was initiated due to the need to replace existing scrubbers on some kilns.

ii. Prior to responding to the second part of this question some background information is required in relation to the ANZEC Guidelines for fluoride. Firstly it is not a standard but a goal to be aimed for. The second point is that this goal clearly sets out two ambient fluoride objectives; the first for the protection of commercially important or environmentally significant plant species such as grape vines or native forests; the second objective is for general land use which allows a much higher level of ambient fluoride.

The report referred to in the question above makes no attempt to apply the two objectives to the relevant areas. Once this is done the number of exceedences is reduced dramatically.

The ANZEC Guideline has been applied in the CER as it was intended to be used and both on the basis of Model results and current monitoring the guideline is NOT exceeded, and will not be exceeded if the proposed kiln is approved.

3. FLUORIDE EMISSIONS

3.1 Midland Brick does not commit to reducing emission limits when the plant is operating at full capacity (Page 27), which is more than double the present capacity (from 160,000 to 330,000 tonnes per annum). As the standards are already being exceeded doubling the output will not reduce level of pollutants.

A3.1 It is implied in this question that the entire plant will double its capacity. It must be kept in mind that the proponent is seeking approval for an

additional kiln at Whitemans. Currently nine tunnel kilns are in operation the additional kiln represents an increase in total capacity of only 12%.

Further, there is a clear commitment for the reduction of fluoride. The total commitment on Page 26 and 27 of the CER needs to be considered rather than one phrase in isolation. There is a commitment to a reduction 0.7g per second for the entire plant at full capacity. This mass emission can be compared with the figure quoted in EPA Bulletin 289 referred to in Question 3.12 where a mass emission of 1g per second for the Prestige kiln is permissible.

In this context it can be seen that the additional kiln, and new control measures will result in a reduction of fluoride emissions.

3.2 *Shorter term averaging times of fluoride monitoring should be carried out in order to measure possible bursts of fluoride which may occur.*

A3.2 Page 15 of the CER deals with the issue of short bursts of fluoride. It is explained that with current kiln and scrubber design bursts are not possible.

3.3 *Modelling data for 24 hour average concentrations of fluoride under the proposed development scenario was not included in the CER. Should not this data be included in order to assess the predicted levels against the ANZEC Ambient Fluoride Goals and existing levels?*

A3.3 Page 10 of Appendix 2 states that modelling of proposed 24hour fluoride emission senario predicts a reduction of the 24hour ground level fluoride concentration. The attached model result by Dames and Moore confirms this.

3.4 *With respect to the modelling prepared for the CER, no mention is made of any attempt to validate the modelled data by collecting actual data.*

A3.4 Section 2.4 of Appendix 2 sets out the reasons for selecting this model and how it was validated. It is worthwhile noting that the Swan Valley Monitoring study concluded that Ausplume, the model for this study tended to overestimate the fluoride level when compared to ambient results.

3.5 *The average predicted fluoride levels in the vicinity of Midland Brick which were predicted in the Swan Valley Fluoride Programme were well above the levels predicted for 90 day averages in the CER. These differences should be explained and verified in the field.*

A3.5 The Swan Valley Fluoride Programme emission data is not up to date. It refers to emission levels relevant at the time of monitoring in 1988-1990.

Refer to Answers 2.1, 3.6 and 3.7.

3.6 *Why is the 90 day standard for fluoride emissions being regularly exceeded?*

A3.6 Refer Answer 2.1 and 3.5 above. Based on current emission data and the correct use of the ANZEC guidelines this is not the case. The relevant guidelines will not be exceeded.

3.7 *Present fluoride monitoring indicates the 90-day standard is not being met, and the proponent only commits to lowering fluoride levels when not operating at full capacity. What assurances are there that this will only be 25% of the time?*

A3.7 i. If the 90-day ANZEC Guideline is applied correctly it will not be exceeded even with the plant at full capacity. This also includes the proposed kiln.

ii. As explained in A3.1 above there is a clear commitment to lower fluoride emissions all the time. This is based on current allowable licence limits.

iii. The proponent only indicates that the brick market is cyclical (Refer A1.13) and on current trend older less efficient parts of the Midland plant will only be required 25% of the time.

3.8 *Why wasn't the synergistic effects on the local grape crops of ozone (photochemical smog) and fluoride and acid gas emissions from the brickworks considered?*

A3.8 Biological monitoring by Dr David Doley (Appendix 3) with the current level of emissions has failed to detect significant effects on grapevines from any of these substances acting alone. Since synergistic effects of the emissions referred to are not documented as occurring anywhere else, it is not possible to consider them in any further detail.

3.9 *The Biological Survey conducted by Dr Doley indicates plant damage in areas that the Ausplume model (used to predict fallout) indicates negligible fluoride levels. The model is not reliable, especially in a situation where no buffer zone exists. There is no room for error.*

A3.9 In general terms the agreement between the two studies is very good. There will always be minor discrepancies in studies of this nature since the model cannot take into account the sensitivity of different plant species.

It is quite feasible for different plants of the same species to show different sensitivity to fluoride since environmental factors such as nutrient levels moisture etc., vary from location to location. Further it must be remembered that the model relies on meteorological data collected over previous years, whereas biological monitoring shows current effects,

therefore small differences can be due to this timing effect. This model has been found very reliable by authorities around Australia.

3.10 The low fluoride content of clays quoted in the CER is unrealistic and the real situation could result in emissions over three times the estimates.

A3.10 The fluoride content reported in the CER is based on the results of many years of analysis. It is representative of the typical clay blends used in brick manufacture by the proponent, and therefore the notion that levels could be at 3 times the figure quoted is totally unrealistic and cannot be supported by any analysis results. For further discussion refer A3.12.

3.11 Information from the Environmental Resources of Australia report indicates that:

- *fluoride damage was observed to cause decreasing yields at Lane's vineyard, near Midland Brick (Page 24),*
- *the effects of fluoride are unpredictable even in low dosages and may lead to more widespread economic disability to agriculture, and*
- *an elevated chimney height will increase the zone of fluoride contamination.*

A3.11 The Environmental Resources of Australia (ERA) report was referred to in the CER as a historical document. It highlights the fact that emissions from the Midland brickworks have been studied over a long period and even unscrubbed emissions were not a major environmental concern.

In relation to the specific comments made above from the ERA report the following comments can be made:

i. a direct link between fluoride and decreasing yields was not made, in fact the report attributed other factors such as soil condition, age of vines, root disease to the reduced yields,

ii. before responding to this statement the term 'low dosage' must be quantified. This report was prepared in 1972 prior to the installation of any scrubbers, therefore in the context of ambient levels today it is quite feasible that the low dosage referred to in 1972 was over 20-30 times higher than current levels. In this context the statement is irrelevant. Further research has shown that low levels of fluoride do in fact act in a predictable manner which is why the ANZEC guidelines have been set so low.

iii. In a similar manner the authors of the report were suggesting that containment of unscrubbed emissions with short stacks would be a preferable method for the control of fluorides. They preferred this to elevated chimneys which would spread unscrubbed fluoride into the neighbouring vines. With scrubbers this argument is no longer valid.

3.12 The predicted levels of HF makes no allowance for the fluoride content of clays which may be over three times the 'average' used of 200ppm, which in 1987 the EPA (Bulletin 289) stated was "at the lower end of the range of fluoride content".

A3.12 Bulletin 289 is the EPA assessment report for Prestige Brick in which it attempts to give a range of values for the fluoride content of clays in the absence of actual results from chemical analysis by that Company.

This line of argument maybe relevant when dealing with a new proposal which does not have the benefit of historical analysis results. In the case of Midland Brick Company and Whitemans Brick it is possible to refer to actual analysis results and quote a precise figure with reasonable certainty. The figure quoted is typical of many years of production and a figure 3 times higher is totally unrealistic.

It can be further stated that Bulletin 289 Page 17 gives the maximum fluoride content of clays for use by Prestige Brick is 230ppm. This compares favourably with the figure in the CER of 200ppm. The CER does not exclude the possibility of certain individual clays having a fluoride content of up to 700ppm, however, the clay blends used by the proponent have fluoride contents in the order of 200ppm as stated. The blending process has an averaging effect on the clay fluoride content, refer A3.10.

3.13 Recent EPA modelling of the photochemical smog problem in Caversham indicates that levels exceed WHO levels during the summer months. Has any assessment of the airshed been made with the doubling of capacity at Midland Brick included? Has there been any investigation into the synergistic effects of photochemical smog and fluoride point source emissions for grape crops?

A3.13 Since it is not intended to double the capacity of Midland Brick but only to increase the number of kilns from 9 to 10, it is unlikely that this would alter the current situation in relation to the airshed study. It must also be emphasised that the both plants will only be at full capacity 25% of the time. Since it is proposed to turn off older less efficient sections of the Midland during periods of low demand, emissions will be reduced.

The proponent is unaware of the existence of the EPA modelling referred to above, however, in relation to fluoride it can be stated that there is no link with photochemical smog. This issue has also been discussed in A3.8 above.

4. SOCIAL IMPACT OF PROPOSAL

4.1 There are no details of the social impact of the proposed doubling of capacity on local residents, hospitals and schools.

A4.1 As stated in earlier answers we are only proposing a small increase in capacity using the latest technology and not a doubling of the capacity of the entire plant, hence, this issue was not given prominence. It is difficult to identify adverse social impacts from this proposal for a 12% increase in capacity. The majority of the time there will be a scaling down of activity in the Midland factory which is closer to local residents, the school and hospital.

4.2 The effects of emissions on human health is dismissed completely despite a long history of complaints by the public to the EPA.

A4.2 The proponent is aware and concerned by these reports. The CER contains what is considered to be the most up to date opinion on this issue. It is not intended to convey an attitude that complaints are dismissed or that they will be dismissed. The proponent has always indicated a willingness to work with community groups and relevant authorities in order to thoroughly investigate complaints. To date these investigations have shown that there is no link between emissions and human health. Section 6.5 of the CER on odour emissions deals further with this issue.

4.3 A new residential development is occurring in the Viveash area very close to the present brickworks. Residential and industrial land users are incompatible without appropriate buffer zones. People are not prepared to accept the "we were here first" argument for further expansion of an industry which is already causing concern.

A4.3 The above question can be divided into two parts. The first part contains two statements which are not correct. The residential development referred to is located 1.5Kms from the existing brickworks and at least 3Kms from the proposed kiln at Whitemans. It is therefore totally incorrect to say it is occurring very close to the present brickworks. The second statement refers to the need for buffer zones to separate residential form industrial areas. In certain circumstances a buffer may be required, however, in relation to the proposed kiln a buffer zone is not required since it is proposed to control or limit all emissions so as not to impact on nearby residents.

The second part of the question suggests that the proponent is using the argument "we were here first" to justify further expansion of the brickworks. This idea is totally incorrect, the CER contains a summary of all the controls which are in place or will be implemented if the new kiln is approved in order to ensure that the brick plant and local residents can co-exist without adversely impacting on each other.

4.4 Social impacts of noise and extra truck movements and the history of the dislocation of the Middle Swan Primary School have not been discussed in the CER.

A4.4 The issue of noise is addressed in the CER with additional comments made in A5.1 to 5.5 below. In summary there are no foreseeable social impact from noise due to the additional kiln and further the Company will commit to meeting any EPA requirements in relation to noise (Commitment 2).

The closure of Middle Swan Primary School has been discussed in A1.4 and A1.8. In summary, since the closure of the School was not related to the operation of the brickworks, it was not addressed in the CER.

5. NOISE EMISSIONS

5.1 Noise levels are calculated to be in excess of stated criteria and likely to cause complaints unless a different acoustic cladding is effective. What if it isn't?

A5.1 This question refers to a comment made in Appendix 4. Here Herring Storer Acoustics were commenting on the **possibility** that the new scrubber exhaust fan system could exceed noise levels. Their report actually states: "It is therefore recommended that a quieter fan than nominated be sought or allowance for acoustic cladding and a discharge silencer be made". Since the fan system for the new scrubber is yet to be specified noise emission control will be major consideration for the new system. Further, the second commitment on Page 26 deals with noise problems should they eventuate. The proponent has made a general commitment to correct any unforeseen noise problems which might occur. In engineering terms it is not difficult to control noise emissions from a single fan.

5.2 The Environmental Noise Report states that all other sounds would remain as per the existing operations. This statement ignores the extra truck, forklift and loader movements to deliver and move the extra 170,000 tonnes of clay per annum.

A5.2 The noise report does not ignore these issues, a statement is made that the noise will be as per the existing operation (Page 17 of CER and Page 5 Appendix 4) that is impact from trucks and forklifts will not be heard above background. This comment was made due to the high level of noise coming from the adjacent

intersection of Middle Swan Road, Great Northern Highway and Roe Highway. A traffic count conducted by the Shire of Swan on Great Northern Highway, south of Bishop Road indicate that up to 1,700 vehicles use this road each week day. Given this volume of traffic plus vehicles on Roe Highway stopping and accelerating at the intersection, the conclusion reached by Herring Storer Acoustics is reasonable and justifiable.

5.3 *Noise from existing and future forklift movements has not been considered. These noises can be heard at nearby residences.*

A5.3 This statement has been discussed in 5.2 above. The following additional comments may help clarify this point further. The proponent has had reports of forklift noise being heard by residents close to the Midland plant. These reports are not recent and the cause of the noise problem was identified and action taken in the Midland plant to correct or eliminate the cause.

In relation to the Whitemans plant, the proponent is unaware of noise from forklift movements being a concern to nearby residents. As reported in the monitoring report the existing plant in normal operation cannot be heard above the surrounding background noise. An additional kiln will not adversely change the noise characteristics of the plant or its forklift operation.

5.4 *Noise from raw materials conveyor that will be constructed has not been assessed in this study. This potential source of noise should be modelled and the results included in the overall noise emissions expected from the site.*

A5.4 Experience with conveyors on the existing plant and with similar conveyors elsewhere confirms the silent operation of these systems and explains the reason for not specifically referring to them in the noise monitoring survey. The proponent has made a general commitment on noise stating that they will comply with EPA noise regulations.

The use of a covered conveyor to transport prepared raw material to the Whitemans plant from the existing clay preparation area in the Midland Brick factory is seen as the least intrusive way of providing the necessary clay to Whitemans. This option was preferred rather than an increase in the current open stockpiles at Whitemans.

5.5 *Noise is identified as being a problem, especially from the fan and scrubber system, but no mention is made of noise from the new covered conveyor or truck and forklift operations associated with the movement of twice as much clay and bricks.*

A5.5 The comments made in this statement have been responded to in 5.1 - 5.4 above.

6. CONVEYOR SYSTEM

6.1 No specific mention is made of the noise and dust pollution from the new proposed conveyor from Midland clay shed to the clay preparation area.

A6.1 As previously stated (A5.4), noise emissions are not expected from the conveyor. This statement is based on the extensive experience of the proponent in the use of these systems. In relation to dust emissions two safeguards are in place. The first, which is referred to in the CER, is the covering to be used which while providing a safeguard against dust is mainly there as a safety feature to bar access to the system and to protect the raw material from weather. The second safeguard is the nature of the raw material being transported, at an average moisture content of 17% dust emissions even with an uncovered system are unlikely.

7. ACID GAS EMISSIONS

7.1 Predicted ground level hydrogen chloride levels reported in the CER should be compared with actual measured levels in order to verify the predicted results.

A7.1 Currently with existing technology it is impossible in a practical way to measure acid gas concentrations in the same order of magnitude as the levels predicted by the modelling study. Given the difficulty in measuring and the fact that the predicted results for the entire plant are lower than the design guidelines published by the Victoria EPA for new plants, modelling is considered as a satisfactory measure for the proposed increase in capacity.

7.2 Ongoing monitoring of acid gas emissions and ambient levels associated with the plant should be incorporated into the existing fluoride monitoring programme.

A7.2 The difficulty in carrying out this request as explained in A7.1 is that the predicted levels are so low that it would be extremely difficult to measure them.

In terms of the limited information which is likely to be obtained from such a monitoring programme it cannot be justified. Computer modelling is the most effective way of dealing with these low level emissions.

7.3 Although estimates of HCl emissions are calculated (and at very high levels "close to the source") no mention is made of SO2, nitrogen oxides, CO, or hydrocarbons as was requested in the EPA Guidelines. There is no mention of the synergistic effects of acid gases on human health.

A7.3 The CER refers to total acid gases expressed as HCl as the conventional way of reporting acid gases. With the exception of CO and hydrocarbons it can be seen from the model that when the concentration of all the

water soluble acid gases are grouped together the concentrations of these materials is still not high enough to be of concern, (refer A7.1 above).

In relation to CO(carbon monoxide) and hydrocarbons they are not present in the exhaust emissions and since by the nature of the process they cannot be formed, they were not dealt with in the CER.

Synergistic effects of acid gases were not considered. There is no evidence to suggest that any adverse effects would occur especially considering the low concentrations being reported. In fact in relation to occupational environments exposure to significantly higher concentrations (100-1000 times higher) is permissible for long periods.

7.4 *The Ausplume computer model for the emissions indicates high levels of HCl very close to the emission source. Their presence may prove to be a problem at the Swan Shire offices. Other acid gases were not included in the calculations.*

A7.4 It must be kept in mind that we are dealing with a 3 minute exposure time with the figures reported. These are designed specifically to give the worst case result. The concentrations predicted for acid gases as HCl even as a worst case are very low at all locations and of no cause for concern when compared with say ambient standards for sulphur dioxide in the Kwinana area. As defined in earlier answers and in the CER, HCl is the term used for all water soluble acid gases. The HCl figure represents total acid gases.

8. DUST EMISSIONS

8.1 *The issue of dust pollution associated with truck movements as a result of increased clay haulage has not been addressed. Should some form of monitoring be conducted to ensure that levels are within recognised standards?*

A8.1 The additional clay requirements equate to approximately 12% more than the current maximum capacity with 9 kilns operating. This small additional requirement is unlikely to change the current situation significantly.

The current operation has licence conditions dealing with dust emissions. These have been addressed in commitment 3.5.

9. TRANSPORTATION ISSUES

9.1 *Has the proponent considered the safety aspects of increased truck traffic along Great Northern Highway as a result of trucks delivering clay to the site? It is of particular concern before daylight.*

A9.1 The issue of increased clay delivery truck traffic was considered by the proponent and it was concluded that in relation to the volume of traffic currently using

the Highway a 12% increase in all vehicles by the proponent would be negligible. The actual number of loads required to transport the additional clay requirements using the existing fleet or truck and dog trailers would be 14 loads a day.

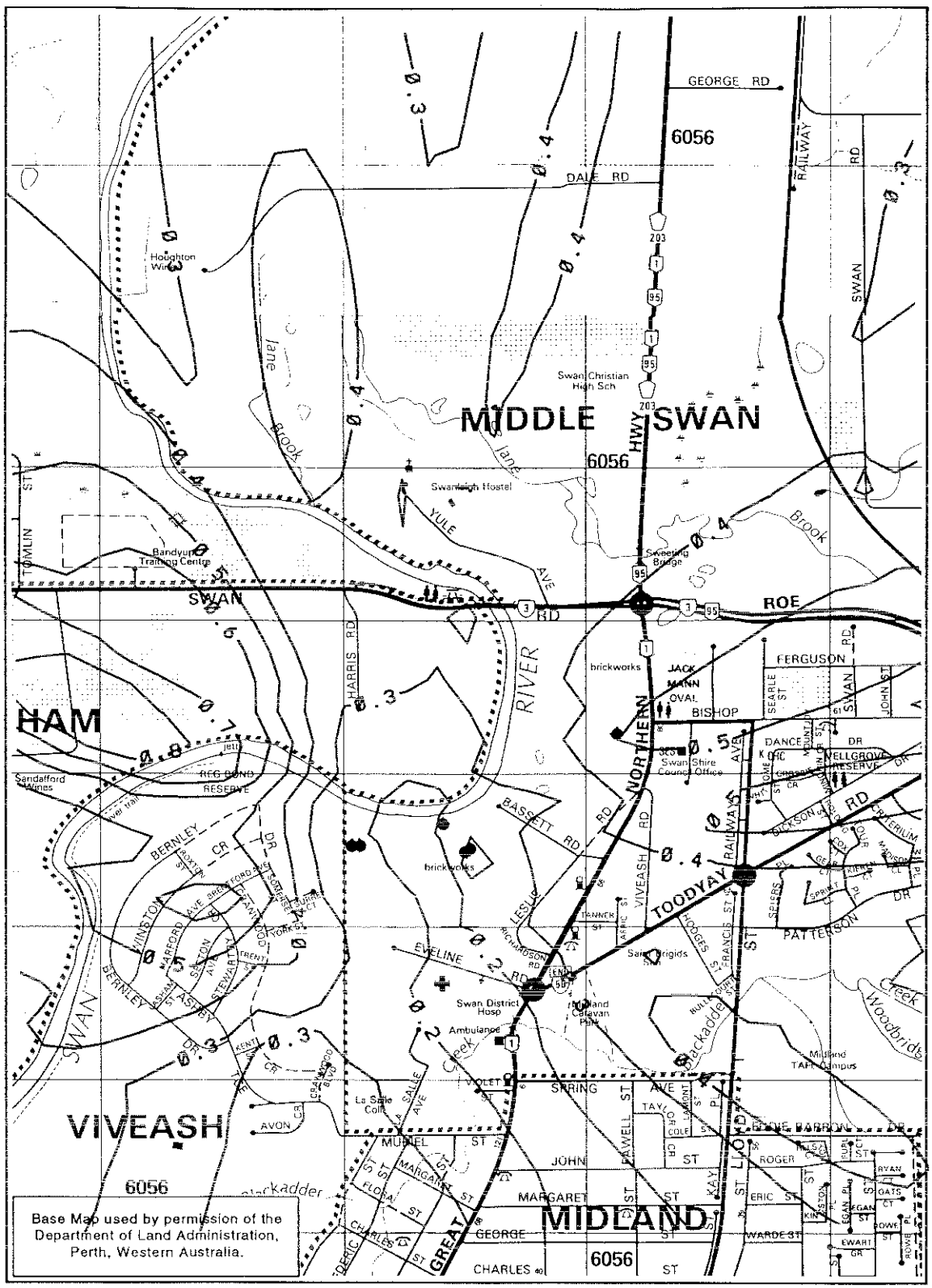
9.2 Has the proponent considered the issues associated with dust spillages from the trucks? Concern has been expressed regarding people travelling behind clay trucks and being subject to dust emissions emanating from the trucks.

A9.2 This concern has not been previously raised with the proponent and it should not be an issue for the following reasons:

i. the transported clay has a moisture content ranging from 15% to 24% which prevents the formation of dust,
ii. clay delivery drivers are instructed to wet down loads if dust is likely to be of concern, for example when carting clay from a stockpile in summer. Water tanks are available at the clay pit for this purpose.

9.3 The present transport of raw materials leaves a dust on the roads and when wet becomes a slippery mud, and additional driving hazard in winter. Will the proponent accept responsibility for this clean up?

A9.3 Should accidental spillages occur or if the problem referred to above becomes evident, the proponent will commit to clean up all spillages and change operating procedures if necessary to prevent this occurrence.



● Stack Locations

0 0.5 1km

SCALE 1 : 20 000

JOB No. 13096-008-071		DATE
PREPARED BY	BB	22/09/92
APPROVED BY		

PROPOSED SCENARIO - FULL LOAD EMISSIONS
PREDICTED MAXIMUM 24-HOUR GROUNDLEVEL CONCENTRATION OF HYDROGEN FLUORIDE (µg/m³)

FIGURE
DAMES & MOORE

Appendix 2

List of government agencies and members of the public who made a submission

Submitters:

1. Shire of Swan.
2. Swan Waste Action Group (SWAG)
3. The Swan Valley Ratepayers and Residents Assoc. Inc.
4. Statewide Network of Action Groups
3. Public submissions (7)
4. Standard format questionnaire submissions(42)
5. Petition (89 signatures)