Duplication of synthetic rutile capacity Westralian Sands Capel

Westralian Sands Limited

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
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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 recommendations.

After the appeal period, and determination of any appeal(s), 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 assessment report 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
18th Floor, Allendale Square
77 St George's Terrace
PERTH WA 6000

CLOSING DATE

Your appeal (with the $10 fee) must reach the Minister's office no later than 5.00 pm on 16 October 1992.

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Summary and recommendations

Westralian Sands Limited (the proponent) is a mineral sands mining and processing company based at Capel, Western Australia. The proponent proposes to duplicate its North Capel synthetic rutile plant next to the existing plant located 4.5 kilometres north of the town of Capel. Nominal capacity will be increased from 100,000 to 230,000 tonnes per annum.

The existing synthetic rutile plant utilises the traditional Becher process for converting ilmenite to synthetic rutile. The duplicate plant would use either the Becher process or a modified Becher process, currently the subject of a research and development programme at Westralian Sands Limited. The alternative technology applies to the stage of the process that removes iron and manganese from the reduced ilmenite. A pressure oxidation process replaces aeration, acid leaching and significantly reduces the need for neutralisation. The company has yet to decide which technology it will use. However the final choice of technology would not significantly change potential environmental impacts addressed in this report.

The proposal was referred to the Environmental Protection Authority (EPA) in October 1991 and the level of assessment was set at Consultative Environmental Review. The proponent prepared a Consultative Environmental Review which was released over a four week period which commenced 28 July and closed on 25 August, 1992. During this time eight Government and public submissions were received by the EPA.

The EPA 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. Senior Officers of the EPA carried out site inspections and discussed environmental issues with members of the public and relevant government authorities.

In reaching its conclusion, the EPA identified the main environmental issues as sulphur dioxide emissions, particulate, dust and noise emissions. Other issues identified included liquid and solid waste management, groundwater and surface water management, odour, potential impact on the Capel River, vegetation damage within the plant site, and transportation.

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 EPA makes the following recommendations:

Recommendation 1

The Environmental Protection Authority concludes that the proposal by Westralian Sands Limited to expand its North Capel operations by duplicating its synthetic rutile plant, as outlined in the Consultative Environmental Review, is environmentally acceptable.

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

- **sulphur dioxide emissions;**
- **noise emissions;**
- **particulate and dust emissions;**
- **liquid effluent and solid waste disposal;**
- **groundwater and surface water management; and**
- **odorous 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.

Sulphur dioxide

The EPA has indicated that the proponent needs to meet an ambient ground level concentration of 350 micrograms per cubic metre at the nearest residence. This is consistent with the level generally set throughout Western Australia. As there is no buffer zone around the plant which could limit the distance to existing or future residences, the proponent has addressed the issue by making a commitment to meet the EPA's requirements on sulphur dioxide emissions at the plant boundary.

Recommendation 2

The Environmental Protection Authority recommends that Westralian Sands Limited should conform to the sulphur dioxide level of 350 micrograms per cubic metre for 99.9% of the time, and should never exceed the sulphur dioxide level of 700 micrograms per cubic metre, as measured at the site boundary.

Particulate and dust emissions

The company has given various commitments to ensure that particulate emissions comply with EPA licence conditions. The EPA is satisfied that, with the commitments made by the company and the requirements of the EPA licence, the issue of particulate and dust emissions will be managed in an acceptable manner.

Noise

The proponent has predicted sound level contours for the existing plant, extension alone and the combined plants. Predictions have also been made for the expanded plant under adverse wind conditions and indicate that the generated noise may marginally exceed the 45 dBA criterion for a residential property at a nearby residence.

The proponent has indicated its willingness to undertake a programme to ensure that acceptable neighbourhood noise levels are achieved within two years. The EPA considers that the company should meet the EPA's noise requirements from the time of commissioning the new plant.

Recommendation 3

The Environmental Protection Authority recommends that the proponent should construct and operate the proposal so that combined noise emissions from the site do not unreasonably impact on the surroundings.

The Environmental Protection Authority recommends that the proponent should ensure that noise emissions do not exceed:

(1) the ambient noise level present at any time by more than 5 dB L_A slow; and

(2)
- **40 dB $L_{A10,\ 1\ hour}$ slow and 50 dB $L_{A\ max}$ slow between 2200 hours and 0700 hours on any day when measured on any noise sensitive premises;**
- **45 dB $L_{A10,\ 1\ hour}$ slow and 55 dB $L_{A\ max}$ slow between 1900 hours and 2200 hours on any day, and between 0700 hours and 1900 hours on Sundays and gazetted public holidays, when measured on any noise sensitive premises;**
- **50 dB $L_{A10,\ 1\ hour}$ slow and 70 dB $L_{A\ max}$ slow between 0700 hours and 1900 hours on Monday to Saturday inclusive, when measured on any noise sensitive premises; and**
- **65 dB L_A slow when measured at or near the boundary of premises that are not noise sensitive premises (other industries).**

The Environmental Protection Authority recommends that the proponent should ensure that noise emissions from those activities which are of concern to

occupiers of noise sensitive premises do not exhibit tones, amplitude and frequency modulation, and impulsiveness of a nature which increases the intrusiveness of the noise.

Odorous emissions.

The company has given several commitments to employ strategies in an attempt to prevent the generation of unacceptable odours. Water is to be treated to remove bacteria and algae. Combustion systems burning coal are to be maintained in order to ensure complete combustion. Hydrogen sulphide is to be collected and destroyed by combustion with air. Should odorous emissions occur the company has given a commitment to investigate and take appropriate action to manage the creation of odorous materials. The EPA is satisfied that with the approach taken by the proponent the issue of odour will be managed in an acceptable manner.

Capel River

The Water Authority of Western Australia has raised a concern with regard the need to improve the health and well being of the Capel River. The Water Authority of Western Australia has suggested, and the EPA concurs, that issues associated with discharges can be addressed through licensing under Part V of the Environmental Protection Act, 1986, in the form of appropriate conditions and the EMP.

Alternative technology.

Should the proponent decide to utilise the alternative technology for the proposal, it has committed to commissioning a risk analysis for the new technology.

Recommendation 4

The Environmental Protection Authority recommends that should the proponent decide to employ the modified Becher technology in the proposal, then a quantified risk analysis should be done to meet the requirements of the EPA before construction commences.

EPA pollution control licence.

The existing synthetic rutile plant is a prescribed premise under Part V of the Environmental Protection Act , 1986. It is subject to licence conditions designed to ensure that the plant operates in an environmentally acceptable manner. The proposed duplicate plant will be required to obtain a works approval prior to construction and a licence prior to operation.

Time limit for approval.

The EPA believes that any approval for the proposal based on this assessment should be limited to five years. Accordingly, if the proposal has not been substantially commenced within five years of the date of this report, then such approval should lapse. After that time, further consideration of the proposal should occur only following a new referral to the EPA.

The EPA notes that during the detailed implementation of proposals, it is often necessary to make minor and non-substantial changes to the designs and specification which have been examined as part of the EPA's assessment. The EPA considers that subsequent statutory approvals for this proposal could make provision for such changes, where it can be shown that the changes are not likely to have a significant effect on the environment.

1. Introduction

Westralian Sands Limited (the proponent) is a mineral sands mining and processing company based at Capel, Western Australia. The company was first incorporated in 1954. Ownership of the company is currently:

- Tioxide Australia Pty Ltd;
- Public investors on the Australian Stock Exchange; and
- Ishihara Sangyo Kaisha.

Westralian Sands is one of the world's major producers of titanium bearing minerals used for pigments and high technology products. Approximately 90 percent of Westralian Sands' titaniferous minerals are used in titanium dioxide pigment production.

The proponent proposes to duplicate its North Capel synthetic rutile plant next to the existing plant 4.5 kilometres north of the town of Capel (figure 1). Nominal capacity will be increased from 100,000 to 230,000 tonnes per annum.

The proposal was referred to the Environmental Protection Authority (EPA) in October 1991 and the level of assessment was set at Consultative Environmental Review. The proponent prepared a Consultative Environmental Review which was released over a four week period which commenced 28 July and closed on 25 August, 1992. During this time eight public submissions were received by the EPA.

During the environmental assessment of the proposal the EPA utilised information supplied by other government agencies, the public and the proponent. Additionally, officers of the EPA carried out site inspections and discussed environmental issues with interested members of the local community. The principal environmental issues associated with the proposal are sulphur dioxide emissions, particulate, dust and noise emissions. Other issues identified included liquid and solid waste management, groundwater and surface water management, odour, potential impact on the Capel River, vegetation damage within the plant site and transportation.

2. The proposal

The proposed synthetic rutile plant is based on the existing plant commissioned in 1986 and pilot scale work undertaken since 1991. The proposal involves the construction of a second kiln and supporting plant, a wet processing section of conventional design or new technology, a liquor containment and waste handling system and a relocated and expanded artificial wetland.

Engineering design and process improvements would be incorporated into the project utilising experience and expertise gained from the original operation and technological developments in industry generally.

2.1 Need for the proposal

Material requirements for the titanium dioxide pigment markets are determined by the two main process technologies, the older sulphate process and the newer chloride process.

Approximately 90 per cent of Westralian Sands' titaniferous minerals are used in the production of titanium dioxide pigment. Restructuring of the pigment industry has meant a preference for the newer chloride technology over the older sulphate process. The chloride process uses high quality titanium dioxide feed stocks such as synthetic rutile.

Operators are using an increasing amount of synthetic rutile in preference to natural rutile due to the higher cost and reduced supply of natural rutile. Synthetic rutile production stands out as a major growth area for titaniferous minerals.

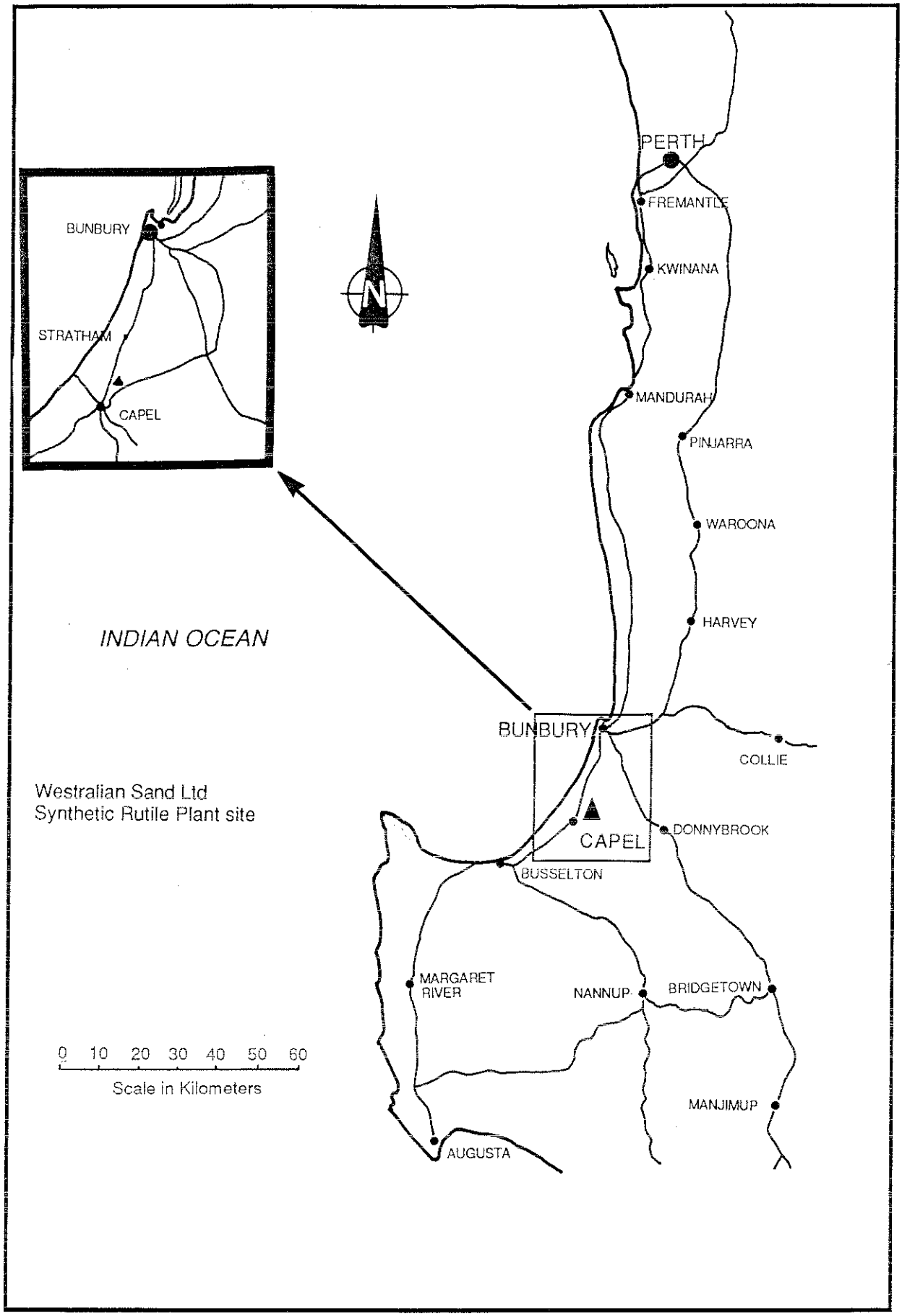

Figure 1: Location of proposed project.

2.2 Process description

2.2.1 The Becher process

The Becher process converts ilmenite feedstock to 90 - 95% titanium dioxide, called synthetic rutile or upgraded ilmenite (figure 2). Main stages of the process are as follows:

- reduction of iron oxide in ilmenite to metallic iron;
- treatment of waste gases from the kiln;
- separation of kiln discharge material;
- oxidation of the metallic iron to form new but physically separate iron oxide particles;
- acid leaching of the upgraded ilmenite to remove manganese and any residual iron;
- synthetic rutile product drying; and
- acidic waste neutralisation.

2.2.2 Alternative process

The alternative technology under development by Westralian Sands is related only to the portion of the process that removes iron and manganese from the reduced ilmenite and subsequent handling of altered waste stream. It replaces the oxidation and acid leach steps with a single leach step.

Main stages of the alternative process are as follows:

- reduction of iron oxide in ilmenite to metallic iron;
- treatment of waste gases from the kiln;
- separation of kiln discharge materials;
- oxidation of the iron to form new but physically separate iron oxide particles;
- synthetic rutile product drying; and
- acidic waste neutralisation.

The new technology would produce a synthetic rutile suitable for washing and final drying and an iron oxide filter cake containing low levels of dilute sulphuric acid. The iron oxide filter cake would be blended with quicklime to neutralise any residual acidification prior to disposal as land fill with the existing plant solid residues.

3. Public consultation and submissions

The EPA received eight submissions on the proposal.

A community consultation programme was set up by the proponent in the Capel region to encourage the community to understand and contribute to the planning and decision making processes relating to this project. The programme also identified areas of concern which the proponent addressed in the CER.

A Capel Industry Liaison Committee was formed to promote and improve communication between local industries and the community. This committee was briefed on and provided with a draft project summary. This liaison committee provided a forum to canvas and discuss potential community concerns and queries regarding the proposal so that they may be adequately addressed through the EPA Environmental Impact Assessment procedure. The Capel Shire Communities Association has also been provided with details of the project. A meeting in February 1992 was addressed at which members of the group were given the commitment by the proponent that they will be kept informed and included in the consultation process. Further meetings have been attended by Westralian Sands Limited staff where concerns of the association were discussed.

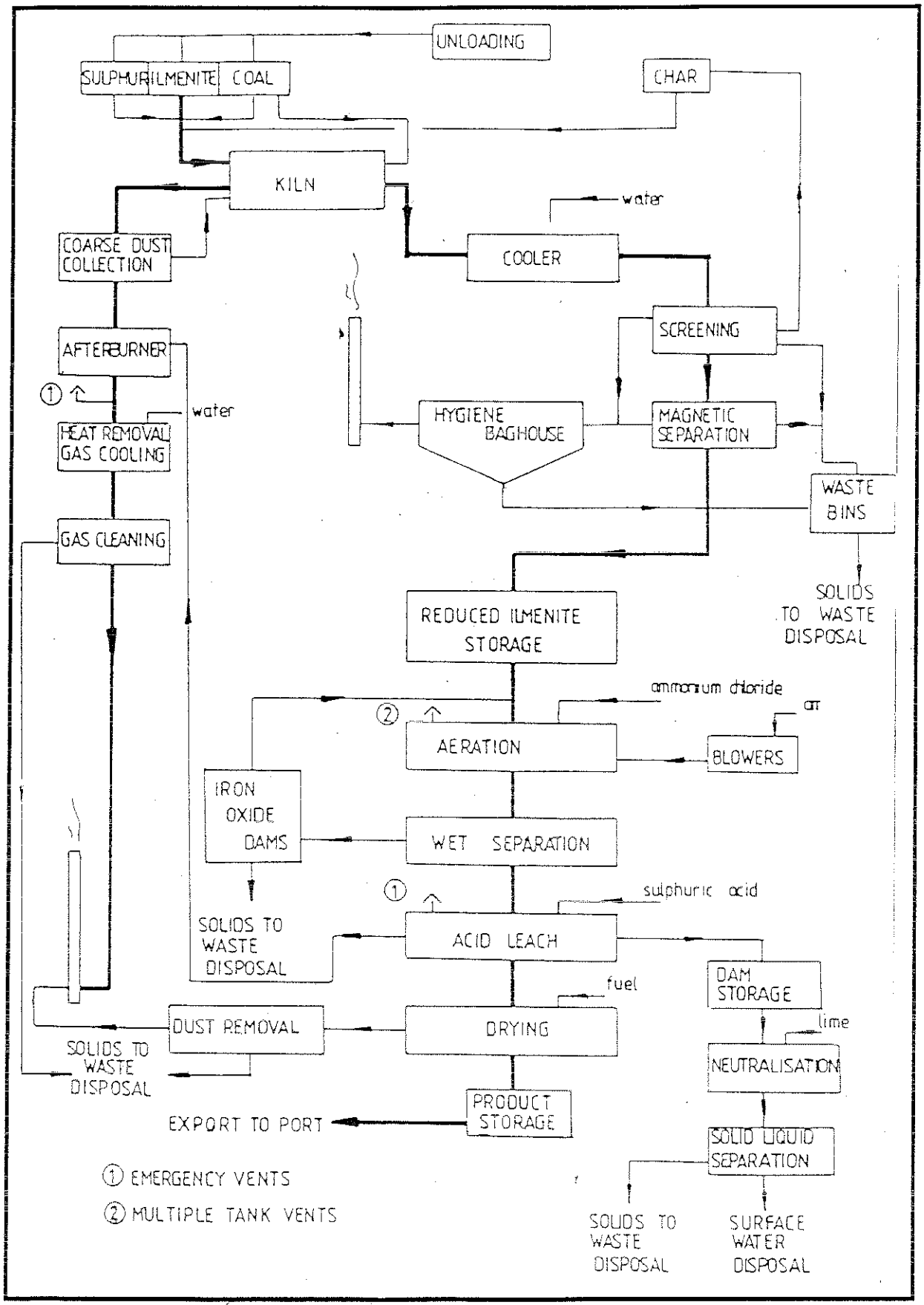

Figure 2: Synthetic rutile expansion process flow diagram.

The Bunbury City Council Planning Committee was briefed on the proposal in January 1992. The Collie Shire Council was also approached early in the process of the project development. The proposal means coal requirements and associated truck movements through the town of Collie would double. Management of this issue would be resolved in close consultation with the Collie Shire Council. Matters raised in the course of the early consultation process were given particular attention in the preparation of the CER document. Following the release of the CER the public consultation programme incorporated the following key elements:

- regular media release and advertising information directed to local newspapers;
- public and private speaking engagements;
- information display to be located at local libraries; and
- consultation and negotiation with local shires.

At the release of the CER a press statement was released covering the key findings of the review. A summary of the CER was also distributed as a separate document.

Residents in the near vicinity of the plant site were visited by representatives of the company during the public review period to inform them of the expansion proposal and the CER.

Environmental issues raised in public submissions related to increased trucking of coal, sulphur dioxide emissions, unacceptable noise emissions and risks associated with the alternative technology and storage and usage of LPG on site. Concerns were raised about the potential impacts of liquid and solid waste discharge and the deterioration of water quality of the Capel River. Concern was also raised about the company's commitment to the employment of local operational, constructional and contractual labour.

The questions asked of the proponent, and the proponent's responses are given in Appendix 2.

4. The existing environment

The area has a Mediterranean climate of wet, cool winters and dry, warm to hot summers. Strong winds of 30 - 50km/hour are experienced from the north, northwest and west quadrants during winter, whilst summer conditions are dominated by easterly winds in the morning and by south-westerly winds in the afternoon. These climatic features have been considered when modelling predicted ground level concentrations of sulphur dioxide emissions.

Currently four inhabited dwellings exist within a 2km radius of the site. A rabbit farm is located 2km to the north. In summary, adjacent land status and uses include mining and mineral processing, natural vegetation, mixed pasture and native vegetation, pasture, and crop.

Immediately to the south east of the site, the Elgin Drain receives the treated wastewater from the man made wetland, the upper reaches of the Gynudup Brook and water from low-lying areas immediately north and south of the drain. The Elgin Drain ultimately flows into the Capel River.

The proponent is licensed by the Water Authority to draw up to 2.7 million kL of ground water per annum. Ground water level monitoring suggest there has been a local net decline in water levels in the Yarragadee Formation aquifer of perhaps 2 to 3m during the past 10 to 12 years at Capel. This suggests that at least a small decline in water levels at the plant site is likely to have occurred over the last 10 to 12 years.

5. Environmental issues

5.1 Construction stage environmental issues

The environmental impacts associated with the construction of the duplicate synthetic rutile plant on the existing plant site are not considered by the EPA to be significant. The issue of dust generation needs to be managed properly. The EPA is satisfied that the commitment

provided by the proponent on dust control is adequate to ensure good management. Additionally, the issue of dust control will be addressed in the EPA works approval.

5.2 Operational stage environmental issues

The principal environmental issues associated with the proposal are sulphur dioxide, particulate and dust and noise emissions. Other issues identified included liquid and solid waste disposal, groundwater and surface water management, odour, potential impact on the Capel River, vegetation damage within the plant site, and transportation.

Recommendation 1

The Environmental Protection Authority concludes that the proposal by Westralian Sands Limited to expand its North Capel operations by duplicating its synthetic rutile plant, as outlined in the Consultative Environmental Review, is environmentally acceptable.

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

- **sulphur dioxide emissions;**
- **noise emissions;**
- **particulate and dust emissions;**
- **liquid effluent and solid waste disposal;**
- **groundwater and surface water management; and**
- **odorous 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.

5.2.1 Sulphur Dioxide

Currently the proponent emits sulphur dioxide to the atmosphere via its main stack with an emission rate of approximately 217 g s^{-1}. This emission rate is higher than other synthetic rutile plants throughout the State because there is no scrubbing system employed.

The company has given a commitment to limit the sulphur dioxide emission rate to a maximum of 215 g s^{-1}, through its proposed main stack, for both the existing and proposed plants. This reduction has been made possible by the proponent's intention to employ new methods of sulphur addition to the process. The proposed combined emission rate of 215 g s^{-1} is therefore a net improvement in terms of existing mass sulphur dioxide loading to the ambient environment. Notwithstanding that, however, the proponent should be required to meet the EPA's standards for sulphur dioxide emissions at the nearest residence. This standard is used generally throughout the State.

Recommendation 2

The Environmental Protection Authority recommends that Westralian Sands Limited should conform to the sulphur dioxide level of 350 micrograms per cubic metre for 99.9% of the time, and should never exceed the sulphur dioxide level of 700 micrograms per cubic metre, as measured at the site boundary.

5.2.2 Particulate and dust emissions.

Fugitive dust emissions may be generated by a variety of processes in and around the plant, eg stockpiles, transportation of raw materials and waste disposal. The company presently employs electrostatic precipitators and bag house filters in accordance with good dust management practices to control dust in the process. The proponent has given various commitments designed to ensure that particulate emissions comply with EPA licence conditions. The EPA is satisfied that with the approach taken by the company and the requirements of the EPA licence, the issue of particulate and dust emissions will be managed in an acceptable manner.

5.2.3 Noise emissions

The proponent has predicted sound level contours for the existing plant, the duplicate plant and the combination of plants. The proponent has shown, in the CER, that the duplicate plant will be quieter than the existing installation.

Predictions have been made for the expanded plant under adverse wind conditions. Results indicate the noise may marginally exceed the 45 dBA criterion for a residential property. The proponent has indicated its willingness to undertake a programme to ensure that acceptable neighbourhood noise levels are achieved within two years. The EPA considers that the company should meet the EPA's noise requirements from the time of commissioning the new plant.

Recommendation 3

The Environmental Protection Authority recommends that the proponent should construct and operate the proposal so that combined noise emissions from the site do not unreasonably impact on the surroundings.

The Environmental Protection Authority recommends that the proponent should ensure that noise emissions do not exceed:

(1) the ambient noise level present at any time by more than 5 dB L_A slow; and

(2)
- **40 dB $L_{A10,\ 1\ hour}$ slow and 50 dB $L_{A\ max}$ slow between 2200 hours and 0700 hours on any day when measured on any noise sensitive premises;**
- **45 dB $L_{A10,\ 1\ hour}$ slow and 55 dB $L_{A\ max}$ slow between 1900 hours and 2200 hours on any day, and between 0700 hours and 1900 hours on Sundays and gazetted public holidays, when measured on any noise sensitive premises;**
- **50 dB $L_{A10,\ 1\ hour}$ slow and 70 dB $L_{A\ max}$ slow between 0700 hours and 1900 hours on Monday to Saturday inclusive, when measured on any noise sensitive premises; and**
- **65 dB L_A slow when measured at or near the boundary of premises that are not noise sensitive premises (other industries).**

The Environmental Protection Authority recommends that the proponent should ensure that noise emissions from those activities which are of concern to occupiers of noise sensitive premises do not exhibit tones, amplitude and frequency modulation, and impulsiveness of a nature which increases the intrusiveness of the noise.

5.2.4 Odour

The proponent has given several commitments to employ strategies to control odour. Water is to be treated to remove bacteria and algae. Combustion systems burning coal are to be maintained in order to ensure complete combustion. Hydrogen sulphide is to be collected and destroyed by combustion with air. Should odorous emissions occur, the proponent has given a

commitment to investigate and take appropriate action to manage the creation of odorous materials. The EPA is satisfied that with the approach taken by the proponent the issue of odour will be managed in an environmentally acceptable manner.

5.2.5 Groundwater usage and contamination

Upon advice from the Water Authority of Western Australia, the EPA considers that the proposal would not significantly affect groundwater. The EPA is satisfied that with the commitments given by the proponent and the requirements of the proponent's Water Authority of Western Australia licence, issues associated with groundwater will be managed in an environmentally acceptable manner.

5.2.6 Surface water discharge

All surface water discharged from site will be required to meet licence conditions as determined by the Water Authority of Western Australia and the EPA. As a result of the commitments made by the company, the requirements of the proponent's Water Authority of Western Australia licence, and advice from Water Authority of Western Australia, the EPA is satisfied that the issues associated with surface water discharge will be managed in an environmentally acceptable manner.

5.2.7 Liquid wastes

All liquid wastes are disposed to double liner dams for treatment. The treated effluent is discharged to a single liner dam before being discharged to a man made wetland for further treatment before release to the Elgin drain. The EPA is satisfied that with the commitments given by the proponent, issues associated with liquid wastes will be managed in an environmentally acceptable manner.

5.2.8 Solid wastes

Disposal of solid wastes in the North Capel mine pit will follow the EPA approved methods as outlined in the EPA Report and Recommendations, Bulletin 225, for the existing synthetic rutile plant. The EPA considers that current procedures for the management of solid waste disposal coupled with the proponent's commitments and the requirements of Water Authority of Western Australia are sufficient to ensure that impacts upon the environment are kept within acceptable limits.

5.2.9 Capel River

The Water Authority of Western Australia has raised a concern regarding the need to improve the health and well-being of the Capel River. The EPA is confident that issues associated with discharges to Elgin drain and subsequently to the Capel River, can be adequately addressed by the proponent's commitments, and appropriate licence conditions and management plan on the proponent's Water Authority of Western Australia licence.

5.2.10 Alternative technology

Should the proponent decide to utilise the alternative technology for the proposal, it has committed to commissioning a risk analysis for the new technology.

The alternative technology under consideration by virtue of its operation at elevated pressure, contained oxygen and possibility to generate hydrogen gas has a raised risk potential. However, should the proponent select the alternative technology for inclusion into the proposed plant expansion, then that portion of the plant and process not associated with the traditional Becher process will be subjected to a full risk analysis.

The issue of LPG storage has been considered and upon advice from the Department of Minerals and Energy (appendix 4), the EPA is satisfied that a quantified risk assessment is not required. This because there are no residences near the plant site and that the risk levels are acceptably low - less than one order of magnitude - compared with the EPA's risk criteria (Bulletin 611). The proponent is still exploring the possibility of using waste heat from the boilers instead of LPG.

Recommendation 4

The Environmental Protection Authority recommends that should the proponent decide to employ the modified Becher technology in the proposal, then a quantified risk analysis should be done to meet the requirements of the EPA before construction commences.

5.2.11 Vegetation damage

The issue of on site vegetation damage was raised during the public review period. The proponent has responded by committing to analyse vegetation to determine possible adverse impacts. Additionally, the proponent commits to remedial measures if required. The EPA finds this approach satisfactory.

5.2.12 Transportation

The existing synthetic rutile operations involve transportation of various raw materials and finished products by road trucks.

The issue of elevated road deterioration as a result of increased truck movements for the Westralian Sands project was raised during public submissions. Advice from the Main Roads Department indicated that for the Coalfields Highway approximately 2000 vehicles per day were using that area of road. Of this total number of vehicles approximately 12% were heavy vehicles which translates to 240 per day. This means that the extra 10 heavy vehicles per day for this project equals an approximate 4% increase. As a consequence the EPA believes that there will be no significant impact from the increase in transportation. This is confirmed by advice from the Social Impact Unit, which has advised that the increase in coal trucking should not result in unacceptable impacts upon the community of Collie.

6. Conclusion

Based on 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 duplicate the synthetic rutile plant at Westralian Sands Ltd, North Capel, is environmentally acceptable.

In reaching this conclusion the Environmental Protection Authority identified the main environmental issues as sulphur dioxide emissions, particulate and dust emissions and noise emissions. Other issues identified included liquid and solid waste management, groundwater and surface water management, odour, transportation, impact on the Capel River, and vegetation damage within the plant site.

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

The EPA has indicated that the proponent needs to meet an ambient ground level concentration of 350 micrograms per cubic metre at the nearest residence. This is consistent with the level generally set throughout Western Australia. As there is no buffer zone around the plant which could limit the distance to existing or future residences, the proponent has addressed the issue by making a commitment to meet the EPA's requirements on sulphur dioxide emissions at the plant boundary.

Recommendation 2

The Environmental Protection Authority recommends that Westralian Sands Limited should conform to the sulphur dioxide level of 350 micrograms per cubic metre for 99.9% of the time, and should never exceed the sulphur dioxide level of 700 micrograms per cubic metre, as measured at the site boundary.

Particulate and dust emissions

The company has given various commitments to ensure that particulate emissions comply with EPA licence conditions. The EPA is satisfied that, with the commitments made by the company and the requirements of the EPA licence, the issue of particulate and dust emissions will be managed in an acceptable manner.

Noise

The proponent has predicted sound level contours for the existing plant, extension alone and the combined plants. Predictions have also been made for the expanded plant under adverse wind conditions and indicate that the generated noise may marginally exceed the 45 dBA criterion for a residential property at a nearby residence.

The proponent has indicated its willingness to undertake a programme to ensure that acceptable neighbourhood noise levels are achieved within two years. The EPA considers that the company should meet the EPA's noise requirements from the time of commissioning the new plant.

Recommendation 3

The Environmental Protection Authority recommends that the proponent should construct and operate the proposal so that combined noise emissions from the site do not unreasonably impact on the surroundings.

The Environmental Protection Authority recommends that the proponent should ensure that noise emissions do not exceed:

- **40 dB $L_{A10,\ 1\ hour}$ slow and 50 dB $L_{A\ max}$ slow between 2200 hours and 0700 hours on any day when measured on any noise sensitive premises;**
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where such emissions would result in the noise level present at the affected premises exceeding the ambient noise level present at any time by more than 5 dB L_A slow.

The Environmental Protection Authority recommends that the proponent should ensure that noise emissions from those activities which are of concern to

5.2.2 Particulate and dust emissions.

Fugitive dust emissions may be generated by a variety of processes in and around the plant, eg stockpiles, transportation of raw materials and waste disposal. The company presently employs electrostatic precipitators and bag house filters in accordance with good dust management practices to control dust in the process. The proponent has given various commitments designed to ensure that particulate emissions comply with EPA licence conditions. The EPA is satisfied that with the approach taken by the company and the requirements of the EPA licence, the issue of particulate and dust emissions will be managed in an acceptable manner.

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The Environmental Protection Authority recommends that the proponent should ensure that noise emissions from those activities which are of concern to occupiers of noise sensitive premises do not exhibit tones, amplitude and frequency modulation, and impulsiveness of a nature which increases the intrusiveness of the noise.

5.2.4 Odour

The proponent has given several commitments to employ strategies to control odour. Water is to be treated to remove bacteria and algae. Combustion systems burning coal are to be maintained in order to ensure complete combustion. Hydrogen sulphide is to be collected and destroyed by combustion with air. Should odorous emissions occur, the proponent has given a

Appendix 1

Environmental management commitments made by Westralian Sands Limited

LIST OF COMMITMENTS

No.	COMMITMENT
1.	**IMPACT DURING CONSTRUCTION** The generation of dust as a result of construction activities will be managed by: • ensuring areas disturbed and left bare are kept to a minimum. • keeping unsurfaced roads dampened.
	IMPACT ON WATER RESOURCES **Ground Water Consumption**
2.	After consultation with EPA and WAWA, the existing monitoring programmes will be expanded to collect data for a regular review of aquifer performance.
3.	The company will maintain ongoing liaison and consultation with the EPA and Water Authority of WA with respect to aquifer performance.
4.	Water consumption will be minimised through recycling, dry scrubbing of gases and re-using saline water at appropriate locations.
5.	Should other demands on the aquifer compound to have a detrimental impact, the company will review with WAWA ways to reduce its impact on ground water supply.
	Surface Water Discharge
6.	A controlled monitoring point consistent with WAWA standards will be established prior to discharge into the Elgin Drain.
7.	The surface water discharge will be maintained at the licensed quality and quantity specified by the WAWA.
8.	Monitoring will be conducted as in Table 8.1. Results will be collated and submitted to the WAWA on a regular basis as requested.
9.	The company will ensure that ongoing discussions are maintained with WAWA to develop improvements in the surface water discharge.
10.	Should monitoring detect breaches of the discharge criteria set by WAWA then the source of the deviation will be identified and corrective action promptly taken. If this requires operations to be shut down, then that action will be taken.
	Site Run-off
11.	To avoid contamination of surface run-off, the company will: • maintain the physical integrity of all bunded and contained areas • regularly clean all roadways and open plant areas; and, • regularly clean plant drainage ways.

No.	COMMITMENT
	IMPACT ON WATER RESOURCES (Cont.)
	Ground Water Quality
	Dam Leakage
12.	The company will construct double membrane containment dams to contain acidic and ammonium chloride liquors. The secondary membrane will have the facility to direct leaked material to detection and collection systems.
13.	The company will maintain strict procedures to check the integrity of primary membranes in dams before being placed in use or returned to use.
	Process Liquor Transport
14.	Overland pipelines of saline or acidic liquor will be run in lined troughs draining to instrumented recovery sumps.
15.	Where pipelines cannot be treated to secondary containment the pipe will be continuous and will be of a high integrity material.
16.	Prompt action will be taken to prevent leaks or spills reporting to ground water. Action will include plant shutdown if necessary.
	Solid Waste Disposal Pit
17.	Ground water monitoring as agreed with WAWA around the North Capel disposal pit will continue. Action will be taken to identify the source of any quality deterioration. Ground water recovery and clay capping are alternatives which may be employed if required.
	Material Spillage and Storage
18.	All materials spilled during transport or transfer will be promptly disposed of in a manner acceptable to the EPA.
19.	Sulphuric acid will be transported in steel road tankers and transferred to a steel storage vessel in a secondary containment bunded enclosure. The transfer point will be designed to contain spillage during transfer.
20.	Sulphur and ammonium chloride will be transported in conventional road transport and will be stored under cover on concrete flooring.
21.	Lime will be transported in a steel road tanker and transferred to a steel storage silo. The transfer point will drain to local effluent pondage.
	Equipment Failure
22.	Processing equipment and plant pipe runs handling liquids, other than water, will be bunded and serviced by automatically activated recovery sumps.
23.	In the event of a spill escaping the bunding, soil and ground water will be tested and recovery initiated if required.

No.	COMMITMENT
	IMPACT ON WATER RESOURCES **Ground Water Quality (Cont.)** ***Monitoring and Recovery***
24.	The company will revise its ground water monitoring programme in consultation with WAWA to service the expanded operating site.
25.	Water quality will be reviewed with WAWA on a regular basis. Water that is adversely affected will be recovered and treated in a manner acceptable to WAWA.
	IMPACT ON AIR QUALITY **Sulphur Dioxide**
26.	The North Capel site will conform with the proposed EPA limits for SO_2 of 700 $\mu g/m^3$ never to be exceeded and the 350 $\mu g/m^3$ 99.9% compliance at the site boundaries.
27.	The company will install instrumentation for continuous SO_2 monitoring on the main waste gas stack to the satisfaction of the EPA.
28.	Ambient monitoring will be maintained but the sample monitoring site will be moved to a location approximately 1km from the stack and in the arc from west to southwest. (This location indicates the most likely impact during major inversions.)
29.	The company will establish control procedures to ensure EPA licensed emission levels are not exceeded.
30.	The company will prepare a management strategy, involving emission reduction during adverse meteorological conditions as predicted by the Bureau of Meteorology. This strategy will be prepared and agreed with the EPA prior to commissioning of the expansion. The strategy will be supported with data of stack emissions, ambient monitoring, meteorological data and model predictions for a period covering not less than one year's operation on the existing plant.
	Particulate and Dust Emissions ***Controlled Emissions***
31.	The company will treat kiln process gas and ventilation air streams to remove particulate to levels which ensure compliance with EPA licence conditions.
32.	The company will monitor stacks to ensure compliance with EPA licence limit.
33.	The company will maintain dust containment and dust removal systems in good working order to the satisfaction of the EPA.

No.	COMMITMENT
	IMPACT ON AIR QUALITY **Particulate and Dust Emissions (Cont.)** *Fugitive Dust Emissions*
34.	The company will ensure that all conveyors are covered and that all transfer points in the plant are enclosed and ventilated to prevent escape of generated dust.
35.	The company will provide a large enclosed area for the storage of dry kiln product.
36.	All trucks transporting dry material to, from and around the plant site will be required to cover potentially dusty loads to minimise wind disturbance of materials carried.
37.	Roads within the plant and disposal site will be swept and/or watered to minimise generation of airborne dust by vehicle movements.
38.	Stockpiles of materials will be located and managed to prevent fugitive emissions creating a nuisance outside the company's boundaries.
39.	The company will monitor plant and plant boundary dust loadings in air to maintain effectiveness of dust control measures.
	Odour Control
40.	Extracted ground water will be treated to remove or kill bacteria and algae which may lead to the generation of mercaptan.
41.	All sources of hydrogen sulphide will be ventilated to the kiln afterburning chamber where the hydrogen sulphide will be destroyed by combustion with excess air.
42.	Coal combustion systems will be operated to maintain complete combustion.
43.	The company will investigate any odour which may originate from the plant and will take action to manage the making or release of odorous materials.
	IMPACT OF SOLID DISPOSAL
44.	The company will develop detailed procedures for controlling solid waste disposal in the North Capel pit: – All waste material will be placed at least 1 metre above the winter water table. – Material will be compacted to minimise leachate generation. – The pit profile will be maintained to maximise rain water run-off. – Solid wastes will be covered by a minimum of 1 metre of clean sand prior to rehabilitation.

No.	COMMITMENT
	IMPACT OF SOLID DISPOSAL (Cont.)
45.	Dust generation in the active solids disposal area will be minimised by sprinkler systems and water trucks to dampen the surface and prevent nuisance outside the company's boundary.
46.	Records of disposed materials will be maintained and will be available to future land users on purchasing.
47.	Surface surveys will be annually carried out to determine stability of the ground.
48.	Trials will be undertaken to determine the best species for rehabilitation and to determine beneficial short and medium term land use.
	IMPACT OF PLANT NOISE
49.	Noise emissions will be regularly monitored to ensure compliance with EPA standards.
50.	Engineering modifications to the existing plant will be undertaken in order to reduce impact in the worst case scenario.
51.	A budget allocation will be committed for noise suppression work on the expanded plant after start up. Monitoring will determine if work is required or not. The company will undertake to progress modifications with priorities as agreed with the EPA.
	SOCIO-ECONOMIC IMPACT
52.	The company will maintain a local priority policy in terms of employment and supply of goods and services.
53.	Should a construction camp be decided upon, a management plan will be drawn up in consultation with the Shire of Capel and to the satisfaction of the EPA.
	Transport
54.	The company will require road transport contractor to supply and maintain the appropriate fleet to minimise spillage, noise and dust on the roads.

No.	COMMITMENT
55.	**EMERGENCY PLANS** The company will have in place drills designed to handle the following emergency situations: Spillage of sulphuric acid. Spillage of quicklime. Fire. Injury. These drills will be set up as part of the employees' regular training and updated as and when required.
56.	**RISK ANALYSIS** Should the company select the alternative technology for inclusion into the proposed plant expansion, then that portion of the plant and process not associated with the traditional Becher process will be subjected to a full risk analysis.
57.	**MANAGEMENT AND ADMINISTRATION** The company will produce an Area Management Plan which clearly defines short, medium and long term objectives, management and monitoring procedures. It will incorporate commitments, communication and licensing conditions and will identify responsibilities and accountabilities.
58.	The company will include environmental responsibilities in the job descriptions of all employees.
59.	The company will ensure that all employees receive sufficient training in environmental management procedures and practices to carry out their duties.
60.	The company will maintain a reporting procedure to promptly identify non compliance or potential non compliance to senior management and government authorities.
61.	The company will conduct audits on environmental performance and practices at intervals not exceeding two years.
62.	**MONITORING PROGRAMME** The company will maintain a programme of monitoring to support the management of environmental impacts.
63.	The company will review the monitoring programme to ensure that it is appropriate to the needs of good environmental management.

Appendix 2

Responses by Westralian Sands Limited to issues raised in public submissions on the Consultative Environmental Review

ENVIRONMENTAL ISSUES ARISING FROM PUBLIC CONSULTATION DURING THE ASSESSMENT OF THE DUPLICATION OF THE SYNTHETIC RUTILE PLANT - WESTRALIAN SANDS, CAPEL

1 TRANSPORTATION OF RAW MATERIALS

1.1 Considering the increase in heavy transport using the Coalfields Highway will there be any upgrading programme undertaken by Westralian Sands of this road?

WSL uses infrastructure in accordance with the rules, regulations, licences and taxes of the government agencies which service them. Coal will be transported on major public roads for most of its journey. There is a body of evidence which suggests that well maintained, suitably designed and loaded trucks will not cause excessive deterioration of road surfaces. The quantum of activity required for this project does not identify it as a significant impact above existing impacts.

1.2 There is concern that additional transport of coal by road through Collie will increase noise, vibration and traffic hazards.

Commitment 54 acknowledges the concern of Collie residents and seeks to address a minimisation of impacts.

1.3 The section of Coalfields Highway from Collie to Roelands is showing wear which is believed to have occurred as a result of the existing volumes of heavy traffic. Concern has been expressed that further deterioration will occur in the road surface with the proposed increase in heavy vehicle traffic.

See answer to 1.1.

1.4 Further consideration should be given to the option of rail transport in order to lessen the expected impacts of added road transport.

Dialogue with Westrail is ongoing.

2 SOCIO-ECONOMIC IMPACT

2.1 Is the company fully committed to the employment of local labour?

The company has committed to 'Local Priority' for employment and supply of goods and services in Commitment 52. This means that if there is a local person suitable for a vacancy that person will have preference to a similarly suited non local.

3 SULPHUR DIOXIDE EMISSIONS

3.1 How can the company substantiate the claim that sulphur dioxide levels at the site boundaries be less than 350 ug m^{-3} for 99.9% of the time, and never exceed 700 ug m^{-3}? It is also surprising that 700 ug m^{-3} of sulphur dioxide will never be exceeded when the CER reports that the main stack will discharge sulphur dioxide at an average concentration of 3 g m^{-3}. The probability of the levels being exceeded will be raised by the incidence of inversions, morning fumigation and thermal convection as indicated in the CER (p69-70).

The CER supplies modelling data compiled by experts which has prompted WSL to make the claim. See Appendix 6.

3.2 It is assumed that the mass emission figure from the main stack of 215 g s^{-1} for sulphur dioxide is for the traditional process. What is the sulphur dioxide figure for the alternative process? Where did the figure of 215 g s^{-1} come from?

There is no anticipated advantage of the alternative process in terms of SO_2 emissions at this stage. The figure 215 g/sec has been derived from actual stack monitoring and sulphur balances on the existing plant.

3.3 The company has previously indicated that current sulphur dioxide emissions may reach or exceed the proposed enforceable limits. How will the proponent ensure that sulphur dioxide levels do not reach 2 - 3 times the current levels when the expansion comes on line?

See Commitments 26, 27, 29 and 30.

4 SAFETY

4.1 The company has recognised the need for a full risk analysis should its alternative technology be employed. Given the raised risk potential, is the company aware of the need for a higher level of operator training, specialist controls and equipment?

Development of the alternative process has identified the extent of requirements in the areas mentioned.

4.2 If LPG is to be stored on site in a 50 tonne capacity tank it is felt that the company should undertake a risk assessment of the facility, including the possibility of leaking gas flowing onto neighbouring properties.

Discussions with the EPA on this matter will continue. It is felt that assessment will be possible without a formal 'risk assessment'.

5 NOISE

5.1 The presence of tonal or other characteristics needs to be recognised. The use of audible warning devices is required on remotely controlled conveyor belts. These devices produce noise characteristics and therefore a statement to the contrary as on page (ii), ie, "No tonal or other annoying characteristics exist in the noise", is inappropriate.

Alarm devices referred to can be set at a noise level to be audible within the immediate area. The plant will not use start-up procedures except following annual shutdown or other shutdown (power outage) making occurrences rare. The statement is not inappropriate.

5.2 The computer studies indicate that noise levels will be within EPA standards except at one residential site. Can a time limit be placed for the correction of this problem should it occur in practice.

Commitments 49 and 51 indicate consultation with EPA on progress to achieve compliance. These commitments are felt to be satisfactory.

6 HYDROGEOLOGICAL ASPECTS

6.1 The report recognises that leakage from the effluent and solid waste holding ponds will be a major problem. Could the proponent submit details of the proposed leakage interception system?

The report indicated that leakage had occurred from the existing ponds and provided information on improved pond design. Leakage interception consists of excavating a trench in front of the affected plume, placing coarse gravel or very permeable medium in the trench, installing a soak well and recovering the water at a high rate with a pump. The water is treated, added to the circulating loads in the process or used for irrigation depending on quality.

6.2 Is the proponent aware of the importance of the impact of the addition of large amounts of water to the watertable system?

The company has access to employees and consultants with expertise in this area.

6.3 Would the proponent agree that as ammonium chloride is one of the most important contaminants in the liquid effluent, the frequency of the monitoring should be increased from annually to at least quarterly?

Liquid effluent to the Elgin Drain is monitored on a weekly basis for free and total ammonia and chloride, Table 8.1 p88.

7 WASTE DISCHARGES

7.1 There is a concern with the need to improve the health and well being of the Capel River. Whilst the company has adequately covered the quality of discharges to the river, is it aware of the growing dissatisfaction within the community of the present quality of the Capel River?

The proponent knows of no connection between existing or planned SR development and recent concerns with the 'health of the Capel River'. The company has been represented at LCDC meetings and is aware of concerns.

7.2 The effluent water quality guideline concentration levels for health and safety (National Health and Medical Research Council Guidelines for Drinking Water Quality in Australia) are below the monitoring sensitivities for some elements and mercury is not monitored at all. Can a commitment be made to make spot analyses to a higher sensitivity at regular intervals and include mercury?

The company as part of its 'Minor Element Audit' (see Monitoring Programme) will address measurement of trace elements to appropriate analysis sensitivity.

7.3 The leaves on the trees on the present site are commonly covered by a black substance. Can the reason for this be determined and its cause be addressed if necessary?

The substance is thought to be coal dust. It does not appear to harm the function of the trees and is not widely distributed. Dust in general has been addressed in the proposal and work is planned for the existing plant in 1993. Further investigation will be conducted to confirm the cause and impact of the substance.

8 MONITORING

8.1 As it is unrealistic to expect the public to be able to supply its own monitoring data for possible future needs, can the company provide environmental monitoring data to representatives of the public or to their consultants? This could include such bodies as the Capel Shire Communities Association, the Capel River LCDC and the Capel Council.

This matter is open for discussion between the Capel River LCDC and the company. The proponent does not recognise the relevance of such a request as part of a CER review.

9 CER - GENERAL

9.1 There is a concern that this document is incomplete, as the alternative process has still not been decided upon, given that the alternative is still being researched?

This matter has been discussed with the EPA. The environmental impacts of the new process differ very little from the existing process. Because the reactions are intensified by pressure and temperature, a risk assessment will be conducted when a plant design is developed (if the new process is attractive).

9.2 The guidelines require the proponent to show how the expansion will be managed in such a way that aims to improve or maintain the natural and social environment of the area. How will the proponent achieve this when there will be increased sulphur dioxide emissions which must be detrimental to the environment?

The company is guided by the EPA's recommendation as to levels of SO_2 which may lead to a deterioration of the natural or social environment. The proposal will meet these recommendations (Commitment 26).

9.3 Does the company feel that the guidelines have been met, given that it has not provided flow diagrams for the synthetic rutile plant that include flow rate and mass balance information.

Flow diagrams are given in Figures 5.4 and 5.5. Relevant flow rates and balance data is provided in tables and figures throughout the body of the report.

Appendix 3

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

Submitters:

1. P R Clarke.
2. Mr R Schaffer.
3. Department of State Development.
4. Department of Minerals and Energy.
5. Water Authority of Western Australia.
6. Mr J Vukovich.
7. Capel Shire Communities' Association Inc.
8. Shire of Collie.

Appendix 4

Advice from Department of Minerals and Energy — storage of LPG

DEPARTMENT OF
MINERALS AND ENERGY
WESTERN AUSTRALIA

MINERAL HOUSE
100 PLAIN STREET
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Our Ref 2531 MW:MW
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The Chairman
Environmental Protection Authority
8th Floor, Westralia Square
38 Mounts Bay Road
PERTH WA 6000

Attention: Mr G Penno

Dear Sir,

WESTRALIAN SANDS LIMITED - LPG STORAGE.

I refer to your letter of 22 September 1992 regarding Westralian Sands proposal to store 50 tonnes of LPG (butane) at their Capel Synthetic Rutile Plant. The proposed location was inspected by officers from this Division and the following comments on the proposal are provided for your consideration:

1 Provided the siting of the storage is in the immediate vicinity of the proposed expansion (as detailed to DOME officers during their site inspection) then the EPA criteria for public safety as defined in bulletin 611 should not be exceeded. Therefore, a quantified risk assessment of the storage is not warranted at this stage.

2 The LPG storage must comply with all the requirements of the Dangerous Goods Regulation 1992, which includes full compliance with AS 1596 "LP Gas - Storage and handling".

3 The location of the LPG storage should be reviewed to minimise the risk to on-site personnel. In particular its location in relation to the office block should be examined.

The above are the comments of the Explosives and Dangerous Goods Division (DOME). Comments from other sections of the Department of Minerals and Energy have been made under separate cover. Should you have any queries regarding the above please contact Matthew Wylie on (09) 222 3256.

Yours faithfully

K Price
CHIEF INSPECTOR

24 September 1992