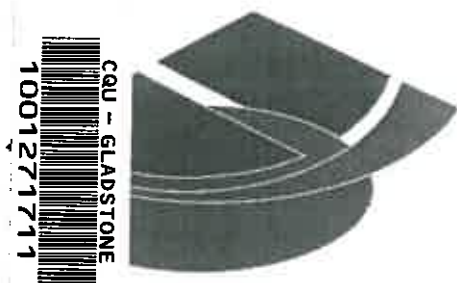


Impact of Shale Oil Production on the Yarwun/Targinnie Community

A Response to the Supplementary EIS

Richard Whitwell



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IMPACT OF SHALE OIL PRODUCTION
ON THE
YARWUN/TARGINNIE
COMMUNITY
A REPOSE TO THE SUPPLEMENTARY EIS



Centre for
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MANAGEMENT
—GLADSTONE—

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Foreword

Industrial development in the Gladstone region of Central Queensland has been substantial in recent years and this is likely to continue into the near future. The industries particularly attracted to the area are those reliant on the plentiful supply of cheap high-energy fossil fuels within Central Queensland and the adjacent port facilities. While this type of industrial development has substantial economic benefit there are also likely to be significant environmental impacts.

Deposits of oil shale naturally occur in the Gladstone region and are processed to extract oil products. At this stage these products are shipped out of Gladstone for further refining. As a first step, a demonstration plant was built to the north of Gladstone to assess the feasibility of the processing of oil shale and its commercial viability. This plant was subject to an initial environmental impact assessment and agreed operating conditions. It appears to have been successful in demonstrating the feasibility of the physical production processes. However, its economic viability has been affected by the inability of the plant to satisfy air and noise pollution levels acceptable to the local community. The air pollution was deemed to be a public health nuisance.

The community in the Yarwun/Targinnie area down wind from the demonstration plant is directly affected by the air and noise pollution emanating from the plant. The difficulty experienced by the proponent, Southern Pacific Petroleum N.L., in mitigating the incidental effects of the plant's activity on the local community has been a major problem for both the proponent and the community. Given the continuing environmental concern a supplementary environmental impact report was circulated for public comment prior to any further development of processing capacity at the production site. The supplementary report contained the proponent's comments on the community and other interested party responses to an initial report on the development of further processing capacity.

This response to the supplementary report was written in consultation with the Yarwun/Targinnie Fruit and Vegetable Growers Association Inc. and the Yarwun/Targinnie Representative Group. The main concerns of the community were:

1. Concern for the health and well being of the members of the community as a result of existing and potential health effects resulting from the operation of the Stuart Oil Shale Plant
2. Concern for the detrimental impact that the operation of the Stuart Oil Shale Plant has and will have on their horticultural activities and livelihood.
3. Concern about the impact that the Stuart Oil Shale Plant has already had on the valuation of their properties and also the future impact.
4. Concern for the impact that the Stuart Oil Shale Plant will have visually and on the reduction in the quality of life of community members.
5. Concern that not all landowners have or will be given the opportunity to sell their properties at a fair price because they are not located on the mining lease.
6. Concern for the method in which properties will be valued and purchased by SPP the Stuart Oil Shale Operators at this stage.
7. The Supplementary Environmental Impact Statement in many areas does not provide substantive evidence of statements included in the report. Many statements are general comments or very fluid their assessments.
8. That report fails to address key issues identified in the previous submission dated November 22 1999. This is evident in Appendix 1 to this response titled **'Analysis of Yarwun/Targinnie Fruit & Vegetable Grower's Association Inc. Responses in Stuart Oil Shale Project EIS Report.'**

The future of the fruit and vegetable growing industry is seen as being in jeopardy because of the impact of the existing and proposed expansion of shale oil processing on the community if the proponent does not address these issues. The health and quality of life of the members in the Yarwun/Targinnie community are of great concern and should be fully addressed by the Proponent before any further expansion of processing occurs.

The obvious issue is who should compensate the local community for such adverse effects of development where there is no reasonable scope for their amelioration. The current scope for compensation is directed solely at those in the community within the bounds of a mining lease. The effects extend well beyond the mining lease and those so affected are not currently being offered any relief. It is a question of public policy needing to be faced by government, as it is unreasonable to expect the local community to be worse-off while the general community is gaining economic benefit from industrial investment.

It is hoped that this response to the supplementary environmental impact statement will be considered by decision makers, together with the environmental impact statements and the previous response by the Yarwun/Targinnie Community, in coming to a fair outcome for the local and wider community.

Richard Whitwell

Report for the Yarwun Targinnie Fruit and Vegetable Growers Association Inc. by Central Queensland University Centre for Environmental Management on the Supplementary Report on the Environmental Impact Statement for the Stuart Oil Shale Project Stage 2- January 2002

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This submission was written in consultation with the Yarwun/Targinnie Fruit and Vegetable Growers Association Inc. The proponent Southern Pacific Petroleum Development Pty Ltd supported this consultancy by way of a contract with Central Queensland University.

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Summary of Attachments

- Appendix 1. Analysis of Yarwun/Targinnie Fruit & Vegetable Grower's Association Inc. Responses in Stuart Oil Shale Project EIS Report.
- Appendix 2. Analysis of Project Dioxin in EIS and Conservationist Response
- Appendix 3. Analysis of Stuart Oil Shale Project Environmental Management Overview Strategy
- Appendix 4. Analysis of EIS Commitment for Stage 1 – Stuart Oil Shale
- Appendix 5. Socio-Economic Report Yarwun/Targinnie Representative Group
- Appendix 6. Submission of the Yarwun/Targinnie Fruit and Vegetable Growers' Association Inc to the Queensland Department of State Development on Draft Environmental Impact Statement on the Development of Stage 2 of the Stuart Oil Shale Deposit – November 1999.

Recommendations

The following is a summary of the recommendations contained in this submission:

1. Executive Summary: The proponent must establish acceptable criteria for compensation for loss of ground water with the community, and in particular, the potentially affected users.
2. Executive Summary: There is no remedy or compensation for future air polluting incidents proposed by the proponent. This issue needs to be resolved with the community before any further work on Stage 2.
3. Executive Summary: If there are important issues relating to the operation of the plant, then they need to be dealt with in such a way as to eliminate their effect on the community. 'Close attention' is not good enough.
4. Executive Summary: There is no commitment on socio-economic effects other than to consult, and what is needed is a clear commitment to remedy.
5. Executive Summary: There is a need to have the additional requirements to 'protect the local community from impacts of noise and air emissions' included in the Environmental Authority spelt out before any meaningful comment can be made on this aspect of the supplementary environmental impact statement.
6. Executive Summary: To assert the health effects review will justify the ongoing operations of Stage 1 is a deceptive statement. Further investigation into the terms of reference of the Review and an independent scientific audit on completion of the Review may be required.
7. Executive Summary The net benefit of Stage 2 to the Yarwun/Targinnie community and individual residents must be ascertained. Where there are negative net benefits affecting individual residents, these must be compensated prior to any further approvals being granted for this project.

8. Project Description: That there be further work done on alternative sites for the processing plant for Stage 2 and related buffer zones, taking account of the environmental and the socio-economic effects on the Yarwun/Targinnie Community.
9. Groundwater: The proponent must establish acceptable criteria for compensation for loss of ground water with the community, and in particular, the potentially affected users.
10. Air Emissions: The proponent needs to state how many start-ups and shut downs had elevated emissions and how many that did not. There is a need to define 'elevated emissions'.
11. Health Impacts: The decision makers relating to this EIS should treat the statement 'The Proponent does not anticipate any additional measures arising from the study for the Project but commits to implementing any, should they arise' as evidence of the proponent's actual bias, casting doubt upon their commitment to implement any additional measures.
12. Air Emissions: Further explanation needed on the effect of the inversion on wind direction, as the result of the model is counter intuitive.
13. Air Emissions: There is a need to clarify the nature of these air quality receptors, confirm their positioning and use.
14. Air Emissions: Before any meaningful conclusions can be reached relating to results based on the use of air dispersion modelling and the consequent effect of air pollutants on the Yarwun/Targinnie Community, the dispersion model needs to be validated. If the results are not validated then the model is inappropriate for monitoring air emission dispersions. This conclusion also applies to the air emission modeling of background levels generated by existing and proposed industrial plants in the area.
15. Air Emissions: There must be comprehensive analysis of the actual and likely PM2.5 emissions before this project can proceed any further.

16. Air Emissions: Suggest that the approving agencies give consideration to the forestation of the areas around the mine site to provide a buffer zone between the mine and the nearby residents.

17. Odour/Irritant: To have access to the consultant report provided to the EPA on odour/irritant emissions so as to be able to comment on odour standards referred to in the report.

18. Odour/Irritant: Suggest that the use of human subjects is the best method for detecting the impact of odour emissions. It is appropriate to extrapolate from the findings with respect to Stage 1 to ascertain the most likely outcome for Stage 2.

19. Dioxins: The statement made by an 'independent toxicologist' on the level and effect of dioxins needs to be reviewed and an alternative independent opinion be sort.

20. Dioxins: The statement 'ten fold reductions are probably achievable' be removed from the report or a detailed explanation with evidence on how this is to be achieved.

21. Noise: Provide the definition of 'normal circumstances' for the measurement of noise levels.

22. Lighting: A lack of detail on the effects of lighting on horticultural activities needs to be rectified.

23. Visual Impact: The critical factor for the community is the planned height of the flares. The height should be specified in the report. The height of the flares should take into account the visual impact that it has on the community.

24. Health Effects: A further investigation of the health effects is currently being performed by Queensland Health. The assessment of long term health impacts as a result of Plant operations should be viewed in a precautionary framework.

25. Health Effects: Inclusion of expert medical advice to accurately determine the synergistic effects on residents.

26. Community Consultation: Proponent display greater commitment in achieving mutually agreeable outcomes.

27. Property: That the people of Yarwun/Targinnie be compensated for the decrease in the value of their properties as a result of the adverse impact of industrial development, and in particular SPP, in the Gladstone Industrial Zone and adjacent areas.

28. Social Impacts: The statement regarding 'full development of Australia's oil shale resource could provide self-sufficiency for Australia for at least the next 50 years' be reviewed and a more realistic situation outlined.

29. Water: Primary Producers have access to reticulated water for existing horticultural applications.

30. Community: Delete inference in report that the Proponent works closely with the community.

31. Property: Proponent outline what process they are using to ensure independent valuations will be performed to determine their compensation amount.

SPP fund each affected landowner to obtain a separate independent valuation from a valuer of their choice as a comparison.

32. Property: All affected landowners surrounding the Plant be given the option of outright purchase.

33. Industry: Consideration be given to the concerns of QCL and other industry employees as to the level of emissions and their effects.

34. Transport: Proponent adopt the suggested rail transportation of lime.

35. Health and Safety: Results from the Opsis Air quality monitoring station be referred to in the EIS.

36. Health and Safety: Doubt is placed on the commitment to take effective remedial action on odour/irritant emissions.

37. Health and Safety: Stage 2 be halted until results from the Health Study are known and found acceptable.

38. Health and Safety: Emergency Response Plan be completed for Stage 2.

39. EMOS: The EMOS be reviewed and precise detail and measurements findings and frequency be included.

40. EMOS: Within the EMOS and the EIS the word 'odour' be referred to as 'odour/irritant'

Executive summary

Groundwater Para 2 – It is not clear what would trigger compensation for ground water effects by the mine on existing users. Unless there are clearly defined trigger criteria there is no effective safeguard for any diminution in water access or quality for those affected.

The proponent must establish acceptable criteria for compensation for loss of ground water with the community, and in particular, the potentially affected users.

Air Quality Para 1 – The community takes a particular objection to the reference relating to the “unnecessary concern in the community”. The community is very concerned with the impact of Stage 1 of the project on their medium and long-term health, and the effect on property values and on community wellbeing. It is unclear what the proponent means by the phrase “and are now being managed”. The statement that the proponent “will aim to minimise the potential for similar incidents” infers that the proponent expects such future incidents to occur. Given the history of the Stage 1 any such future incidents involving Stage 2 are likely to be four times the magnitude of that phase and to have a catastrophic impact on the community.

There is no remedy or compensation for future air polluting incidents proposed by the proponent. This issue needs to be resolved with the community before any further work on Stage 2.

Community Consultation p.6 para 2 – It is not clear what is meant by the phrase “given close attention” in the following sentence that “the working group, which has identified a number of important issues related to the operation of Stage 1, and will ensure that the technical and operating lessons learnt from these issues are given close attention”.

If there are important issues relating to the operation of the plant, then they need to be dealt with in such a way as to eliminate their effect on the community. “Close attention” is not good enough.

Social and Economic p.6 para 2 – There is an admission by the proponent that there are “ongoing socio-economic effects of the Project”. Although there is a commitment for ongoing consultation in the EMOS, it is unclear what is meant by “and this

commitment to address the ongoing socio-economic effects”. Is this just the same commitment to consult simply being re-stated in a less direct manner?

There is no commitment on socio-economic effects other than to consult, and what is needed is a clear commitment to remedy.

Currently the plant is exceeding its Environmental Authority and had until 28 February to comply. “Dealing with unforeseen social and community issues” so far has not resulted in compliance with its Environmental Authority. It appears that there are to be some additional “requirements to protect the local community from impacts of noise and air emissions”. It is unclear what is the nature of these additional requirements.

There is a need to have the additional requirements to be included in the Environmental Authority spelt out before any meaningful comment can be made on this aspect of the supplementary environmental impact statement.

Health and Safety p.7 para 1 – “These studies are collectively designed to give assurance and confidence to the community that the previous and ongoing operations from the current plant represent no ongoing health risk.” is a statement which attacks the competence of the Health Effects Review. Surely the outcome of the Health Effects Review is to be the product of a rigorous scientific analysis and at this stage the health effects have not been ascertained.

To assert that the health effects review will justify the ongoing operations of Stage 1 is a deceptive statement.

Conclusion p.7 – The object of ensuring the social aspects of “the Project benefits are widespread and sustainable”, misses the critical issue of the likely adverse effects on the local community. It is known that the benefits are widespread, but this does not diminish the need to ensure that the Yarwun/Targinnie local community is not adversely affected.

The net benefit of Stage 2 to the Yarwun/Targinnie community and individual residents must be ascertained. Where there are negative net benefits affecting individual residents, these must be compensated prior to any further approvals being granted for this project.

2 Project Description

When considering any of the conclusions from this study, it is necessary to bear in mind that the Stage 1 demonstration plant has reportedly only being run at 60% capacity. There has been one test run in the last week of February 2002 under upset conditions however, the results from this test run are not included in the Supplementary EIS. Stage 2 is a move to a commercial operation and this would need to run closer to the design capacity to reach reasonable efficiency levels. As the results in the Supplementary EIS of the performance of the demonstration plant do not include testing for the effects of running the plant at design capacity, any projections based on partial capacity utilisation are unlikely to be reliable predictors of the Stage 2 operations.

Processing Plant Site Selection 2.2.4 – Stage 1 is a demonstration plant designed to demonstrate the incorporation of the research and development into a viable plant operation. The Commonwealth Government has granted an incentive by way of excise remission to the shale oil project. One of the requirements of the excise concession is that the demonstration plant is separate from any commercial plant operation. This principle does not appear to be adhered to in the proposal for the siting of Stage 2.

It also appears that there has been little attention to the development of Stage 2 at a site where there would be less effect on the Yarwun/Targinnie Community. The only considerations have been related to direct mine/plant cost efficiencies. This is surprising given that there are very strong social and environmental reasons for Stage 2 to be located further away from the direct wind corridor leading to the Yarwun/Targinnie Community. There needs to be research into alternate sites, which could possibly lead to the closure of Stage 1. The alternatives to re-location to either the south of the kerosene creek member or to the north appear to have not been investigated. For example, a northern site could allow for an increase in the dissipation of the odour/irritants and other noxious air pollutants over an area where there are no residential dwellings. With appropriate vegetation cover there would be a larger buffer zone established between the plant and the community, which would likely result in much reduced odour/irritant levels and noise impacts on the

community. However, this could simply result in shifting the burden away from the Targinnie community.

That there be further work done on alternative sites for the processing plant for Stage 2 and related buffer zones, taking account of the environmental and the socio-economic effects on the Yarwun/Targinnie Community.

7.3 Ground water Quality/Quantity Issues

Impacts on Flows and Availability 7.3.1

Submission 260 – “There should be no effect on water quality in the Yarwun/Targinnie area as a result of the mining operation.” is not a definitive statement but one suggesting a low likelihood. Therefore it is important that a trigger compensation threshold be agreed with the potentially affected local residents.

The proponent must establish acceptable criteria for compensation for loss of ground water with the community, and in particular, the potentially affected users.

8 Air Quality

8.1 -Introduction

Summary response 2 - It is stated that SPP employed an independent toxicologist to look at the impact on the community of the discharge of dioxins by the plant. There is no mention of his/her name or of the employer of this independent toxicologist.

Summary response 4 – The statement that: “Data is provided that shows significant reduction in odour/irritant, such that the plant can operate acceptably.” implies that there is acceptance by the community and that this has been independently confirmed. This is far from the truth of the matter, as the Health Effects Review is still ongoing and has not reached any findings at this stage. People in the community are still experiencing unacceptable odour/irritant emissions.

8.2.1 - Stage 2 Emissions

Start-up and shut-down operations and commissioning

To state that in Stage 1 the “emissions are not routinely elevated during start-up and shut-down.” does not assist in the assessment of the impact of these activities in Stage

2. Does this mean that elevated emissions do not occur at every start-up or shut-down? It would be more meaningful for the community to know how many start-ups and shut downs had elevated emissions and how many that did not. It is also unclear what is meant by elevated emissions.

The proponent needs to state how many start-ups and shut downs had elevated emissions and how many that did not. There is a need to define 'elevated emissions'.

8.2.2 Health Impacts

It was said that: "A further health study is under way under the auspices of State Development on behalf of the Stuart Facilitation Working Group the Stage 1 independent health review referred to in **Section 4.3 of Appendix B** of this Supplementary Report. The Proponent does not anticipate any additional measures arising from the study for the Project but commits to implementing any, should they arise." As the findings of this review are critical to the assessment of any health effects of the project on the community, the independence of the review is an important consideration. The proponent by saying they do "not anticipate any additional measures arising from the study" conveys the view that they have pre-judged the reports findings, rather than waiting for the results of the review and then commenting having regard to the facts ascertained during the review.

The decision makers relating to this EIS should treat this statement as evidence of the proponent's actual bias, casting doubt upon their commitment to implement any additional measures.

8.2.6 - Meteorology

There needs to be further clarification of the statement: "Wind direction during this time period is usually southwesterly to southeasterly. This generally serves to advect the plume from the Stuart site in a northerly to northeasterly direction, away from population centres." It is unclear how the inversion affects the wind direction from the Stuart site i.e. south easterlies change to a northerly direction rather than continuing in a north westerly direction on leaving the site. This could simply be an anomaly in the model as it is yet to be verified.

Further explanation needed on the effect of the inversion on wind direction, as the result of the model is counter intuitive.

8.4.3.1 - Receptors

There is some doubt about the accuracy of the positions of the receptors? The property owners in the district are not aware of any of the air quality receptors mentioned being permanently stationed on their properties. There are observations by certain members of the community that dust monitors are put in place after the completion of each run, but not during each run. Such a process may record background emissions, however, would not record any of the dust particle emissions coming from the plant.

There is a need to clarify the nature of these air quality receptors, confirm their positioning and use.

8.4.3.2 - Model Validation

The statement that: “365, 362 - A detailed dispersion model validation program to confirm calibration values is planned”, indicates that the model that has been relied upon by SPP to support their claims has not been validated. The interpretation of the results of the modeling must therefore be treated with some caution, as they may not reflect the true situation. As air pollution is a major source of concern to the Yarwun/Targinnie Community the need for proper validation of the air dispersion model is essential before any projects can be evaluated using such a model.

Before any meaningful conclusions can be reached relating to results based on the use of air dispersion modelling and the consequent effect of air pollutants on the Yarwun/Targinnie Community, the dispersion model needs to be validated. If the results are not validated then the model is inappropriate for monitoring air emission dispersions. This conclusion also applies to the air emission modeling of background levels generated by existing and proposed industrial plants in the area.

8.6.3 - Particulates

The proponent explains: “462 - Dust from the mine is not particularly toxic in itself. However, inhalation of any small airborne particles, particularly those less than 2.5 μm (PM2.5), can irritate the lungs and cause acute and chronic (long term) health effects in humans. Particles between 2.5 and 10 μm cause less health effects, as they tend not to lodge deep into the lungs.” The difficulty of this explanation is twofold. Firstly, the dust is considered “not particularly toxic”. Toxic is a synonym for poisonous or expressed more fully, a substance capable of causing injury or death. Logic would lead to the question of what is the likelihood of such substances causing death. There is no indication of the assessment of the likelihood of this outcome by the proponent. Secondly, there is an admission that the “Earth dust particles tend to be greater than 2 μm in diameter, and combustion particles are generally less than 2 μm , which is a critical particle size in relation to potential health effects.” If the combustion particles are generally less than 2 μm , then why was there no attempt to measure the current level of emission from the Stage 1 plant and project the likely impact on levels from Stage 2? The proponent cannot plead ignorance of the possible effects, and would be negligent not to estimate the likely effect of combustion emissions on the Yarwun/Targinnie Community before proceeding further with the project. It is understood that the proponent has now allowed an independent field verification of the particle emissions from the Stage 1 plant during the last week of February 2002. These results are to be incorporated in the Health Effects Review due to report in July 2002.

There must be comprehensive analysis of the actual and likely PM2.5 emissions before this project can proceed any further.

Proponent's Progress on Net Greenhouse Gas Emissions Reduction 8.7.2

It is noted that there have been a number of initiatives in this area. However, there has been no consideration of the use of the areas adjacent to the mine site as to suitability for the cultivation of any of the trial tree growing plots. It is likely that the establishment of dense vegetation cover around the perimeter of the mine site would contribute to the reduction of some of the community noise and air pollution problems. The extent of a dense vegetative buffer zone around the plant has not been adequately discussed.

Suggest that the approving agencies give consideration to the forestation of the areas around the mine site to provide a buffer zone between the mine and the nearby residents.

8.8 Odour/Irritant

8.8.2 - Stage 1 Issues and Implications for Stage 2

The proponent says in relation to submissions 66, 465, 469, 470 473, 371 that: "After an initial phase of unacceptably high odour/irritant emissions, recent progress in reduction of odour/irritant emissions from the Stage 1 plant has demonstrated the Proponent's capability to design and operate a shale oil plant that produces an acceptable odour/irritant outcome." Although the odour/irritant incidents may have become less extreme since the 2nd Oct 1999 incident the residents of Yarwun/Targinnie still find the odour/irritant emissions are at an unacceptable level. There are still reports to the EPA by the residents about the level of odour/irritant emissions continuing.

The proponent refers to a consultants report provided to the EPA where it is said that : the "Operation of the Stuart Oil Shale Project during the September-October 2001 run was found to produce odour/irritant impacts at residential sites well within acceptable levels being proposed for new developments. Furthermore, the odour/irritant impact appears to have been no greater than, and in some cases is well below, levels experienced from similar industries in Queensland (including those industries operating in heavily populated areas)."

It should be noted that the consultant's report was only made available to the EPA one week before the final reporting date for this Supplementary EIS. It was not possible for the community to gain access to this report within the timeframe, although the proponent and EPA had been asked to supply a copy to members of the community. CQU had asked the EPA for a copy of the report for analysis and inclusion of comments in the community response to State Development, however, no copy has been forthcoming. As this report is critical to the assessment of the veracity of the claims made by the proponent, not having access to this report severely limits the community's response on odour/irritant emissions. The following comments are made within that context.

Firstly, it is unclear as to what is “being proposed for new developments”, whether this means that there is a new standard being promulgated. If not then the weight to be given to this statement would be low, as there would be a need to obtain community acceptance for such a standard. It is also understood that there is a 1994 Air Policy Standard, but there is doubt whether it could be said that the projected odour/irritant emissions are within that standard. The legal force in applying this standard is also unclear. In any case that standard only applies to atmospheric modeling, not the situation where there is an existing plant.

Secondly, to say that the “odour impact appears to have been no greater than, and in some cases is well below, levels experienced from similar industries in Queensland”. does not convey any information relevant to the evaluation of the impact of odour/irritant levels experienced by the Yarwun/Targinnie Community. That is, to say that as some people in the community are being subjected to odour/irritant impacts no greater than others is not an argument in support of the odour/irritant levels experienced by any of the communities. The other issue is whether “some” means few or another proportion of events. There need to be an explicit statement of the number of such cases. No information is provided on the psycho-physiological impacts on any of the communities. Also the issue of whether the community was formed before or after the industry established in the area is another matter not spoken about in the extract of the report. This later point is particularly relevant to determining the right for relief or compensation for the members of the community.

The proponent asserts that: “There are many alternative odour control and destruction technologies and the most appropriate for the Project will be selected with a primary objective of minimizing odour production and a secondary objective being to develop, select and optimise odour destruction technologies.” The issue is if the proponent is aware of this technology, then surely it could be used on the demonstration plant to further reduce any odour/irritant impacts and by doing so convince the community Stage 2 is sustainable from an odour/irritant perspective.

The proponent says that: “The Project will achieve ground level odour concentrations that comply with potential new Queensland odour guidelines for new developments.” These guidelines are not that relevant to the situation with Stage 1 already being operational as the guidelines are part of the 1994 Odour Policy being only atmospheric modeling criteria. That is with Stage 1 of the plant already operational it is unnecessary to apply modeling criteria as the level of odour/irritant from the plant

is discernable by direct observation. It is quite easy to understand that the odour/irritant will not improve if you have the existing Stage 1 plant operational and Stage 2 coming on stream. It would be reasonable to conclude that the level of odour/irritant producing substances being emitted would increase fourfold reflecting the increased production rate in Stage 2. One may also ask if this level of output also going to meet the allegedly “326,327 - ...stringent planning objectives in Queensland and NSW.”

The proponent says that: “The understanding gained from this work has resulted in a large reduction of routine odour emissions (over 85%) since the initial Stage 1 plant runs, and the lessons learned from this experience will be translated into the Stage 2 design and operations.” Where were the measurements taken that achieved the 85% reduction? The report omits this information. It is unclear what is meant by “routine odour emissions”. Does this include peak emissions to background which are said to be a ratio of 20:1? Further it is likely that the law of decreasing returns will apply to the technological options being considered unless it can be proved that there is no interdependence between these pollution reduction techniques.

The level of odour/irritant is not at acceptable levels according to community feedback even though it is claimed that there is an 85% reduction in odour emissions at the stack.

It is unclear what the consultants report is referring to in relation the odour standards.

Comparative analysis of impact between communities is not a valid approach to assessing the impact of odour/irritant emissions. To assess differential impacts there would need to be a survey protocol developed to reduce sampling and observer bias.

It is not sufficient to say that the technology is available to reduce odour impacts, it is necessary to test such technological solutions in the demonstration plant. The risk of scaling by four times is too great without a satisfactory demonstration of the technology.

To be able to provide additional comments on this statement it would be necessary to have access to the consultants report provided to the EPA and the relevant provisions dealing with odour/irritant emissions.

8.8.3 Predicted Odour Levels for Stage 2

The difficulty with relying on one hour odour/irritant concentration is that the immediate effects on the population are quite often of much shorter duration. The accepted standard is a 3 minute period which from a modeling viewpoint at a 99.5 percentile is a more stringent measure as it produces a greater deviation if it were applied on a continuous filed testing basis. However, as stated before the modeling is not critical as we can rely on actual observations of the demonstration plant.

Suggest that the use of human subjects is the best method for detecting the impact of odour emissions. It is appropriate to extrapolate from the findings with respect to Stage 1 to ascertain the most likely outcome for Stage 2.

8.9.2.1 – Dioxins

Reference is made to the Conservationist Report on the levels of dioxins. It is noted that there is a large discrepancy in the views expressed in the Conservationist paper and those of the proponent. These differences are summarised in Appendix 2 to this report. By way of example the proponent view was that an independent toxicologist had estimated that members of the local community could be exposed to a worst case estimate of .27 picograms dioxin I-TEQ/kg body weight/day. Of this .09 picograms could be contributed through inhaling Stage 1 plant emissions with the balance from background. Whereas the Conservationist statement alleged that the proponent was dismissive of the potential dioxin problems created by the plant, even though its own data shows that both in terms of load and estimated concentration the releases are significant.

The statement made by an ‘independent toxicologist’ on the level and effect of dioxins needs to be reviewed and an alternative independent opinion be sort.

8.9.3 Dioxin production-Stage 2 Project

The Proponent predicted that the ‘ten fold reductions’ in dioxins is ‘probably likely’ but this report fails to outline how this significant reduction will occur. Given this, the likely reduction is questionable and verification incorporated to prove how this reduction is likely to occur.

The report provide a detailed explanation with evidence on how this is to be achieved.

9. Noise and Vibration

9.1 Introduction – Noise and Vibration

The proponent says that: “Predictive modeling of noise levels emitted from the Stage 2 plant show that they are within EPP (Noise) goals under normal circumstances;”. It is unclear what is meant by “normal circumstances”. This comment is also made at 9.2.1.2 Results.

Please define “normal circumstances” for the measurement of noise levels.

9.2.1.2 - Results

Figure 9-1 Background Noise (Night-time L90 levels) has been subject to considerable prior debate. The community does not accept the standard of L90 as it does not account for all of the nighttime period and can be lead to a significant period for nighttime disturbance. The community has argued against the inclusion of this information in the Supplementary EIS and has had its point of view accepted in the Stuart Facilitation Working Group (SFWG). The community argued that locations of observation points for background noise included high point sources, which distorted the measurement of the true background noise level. Therefore the background noise level is lower than that reported in the EIS and its supplement.

In response to submissions 513, 514, 516 the proponent says:- “Predictive modeling of noise levels emitted from the Stage 2 plant show that they are within EPP (Noise) goals under normal circumstances.” This is an unsurprising result as the modeling uses an elevated background noise level with which to compare its results. Furthermore there is a need for the modeling taking into account the actual noise emission from the demonstration plant. These measurements may be made with the permission of the local government authority or the resident at or near the residence affected by the noise emissions. It is unclear whether this form of analysis was used.

What is clear, from anecdotal evidence, is that residents are experiencing a level of unacceptable nighttime noise.. This appears to be coming from on-site transport such as, dump trucks, excavators and front-end loaders, in addition to that emanating from the static plant. The residents do not accept that: “Both the external and internal levels are therefore well within the above sleep disturbance criteria and are considered acceptable.”

The report says that: “The maximum level of mine and plant noise at residential receivers is governed by prevailing weather conditions. In particular, the noise from

operations is maximised during moderate winds blowing from the site toward the receivers. Under these adverse meteorological conditions ...". The use of the term "adverse" raises the question of context. The conditions may well be adverse to the plant in terms of containing noise emissions, but they are the norm for the community affected. It is the positioning of the plant with the community directly in the wind corridor conveying the emissions from the plant, which has elevated community concern in relation to the air and noise effects of the project.

The housing in the area is not designed for high levels of noise emission. It is designed for tropical coastal conditions where there is a need to let the breeze through the house to make living comfortable in the hot humid summers. Therefore what may be acceptable to inner city dwellings specially designed for dampening the sound of freeways is not the appropriate criteria to adopt in the rural environment of Yarwun/Targinnie.

12. Lighting

12.2 – Lighting

The statement that: "757 - There is no evidence to indicate that the light from industrial facilities has either a positive or negative impact on nearby crops." is not sufficient to satisfy the horticulturalists of the risk of lighting on their crops. There need to be a more detailed justification of the proponent's position if the precautionary principle is to be overturned. For example, there is no acknowledgement of the effect of the flaring at the plant on light levels and no discussion of effects on plant germination.

A lack of detail on the effects of lighting on horticultural activities needs to be rectified.

12.3 Visual Issues during Operations

The statement 567 referring to the revised stack height increasing from 60m to 100m is expected to have only a minimal visual impact due to it's narrow profile. The additional 40m is a considerable increase on the original height and it is questionable whether the height adjustment combined with the narrower diameter will be visually insignificant.

However the critical factor for the community is the planned height of the flares. The height is not specified in the report.

The height of the flares should take into account the visual impact that it has on the community.

14 – Community Consultation

14.2 Detailed Responses

In statement 589 the report supposedly showed that there would be no short, medium or long term health concerns. Given the short period of time that the report covers it could only find that there was a public health nuisance. It is arguable that the long-term health concerns cannot be ascertained and therefore it is incorrect to comment that there are none. To be able to accurately state this comment the report would need to have made it's investigations over a longer period of time and this was not possible. *A further investigation of the health effects is currently being performed by Queensland Health. The assessment of long term health impacts as a result of Plant operations should be viewed in a precautionary framework.*

The review being undertaken by the Yarwun Targinnie Environmental Technical Monitoring Group (672, 673) covers both the synergistic effect of a combination emissions on residents and horticultural crops. Given that this group is comprised of experts in the horticultural and environmental areas, how can they accurately assess the impact on the health of residents? To be able to ascertain this component of the analysis it is imperative to utilize individuals with the appropriate skills in this area. Any results that are presented by this group on resident impact could not be given any credit without expanding their expertise base.

Inclusion of expert medical advice to accurately determine the synergistic effects on residents.

The proponent in this section refers to (672, 673) the proponent, government and the community working in an independently facilitated process. The proponent portrays the independent health review as one of the outcomes of this process. This statement requires clarification as it is the only outcome of this project. The statement that there has been 'significant progress towards addressing community concerns' is disputed. *Proponent displays greater commitment in achieving mutually agreeable outcomes.*

15. Socio-Economic

The members of the community are being adversely affected by the devaluation of their property values and their inability to sell their properties. This is a result of the development of polluting industries in the industrial zone and in areas within close proximity, and in particular at this stage, the mining and processing operations of SPP. This has led to two consequences for the individuals affected. One group who wish to stay on their properties and continue their horticultural activities are finding it difficult to raise operating capital as the value of their properties have declined and as a consequence they find it difficult to secure an operating loan for their business. This leads to a decline in productivity in horticultural production. For those who wish to retire or move to another location, the inability to sell their properties gives rise to the frustration of being unable to move to a better location free from the industrial air and noise pollution. The common problem is the level of industrial pollution, which they feel will get worse with the implementation of Stage 2 and the development of the other industries in the Industrial Zone. Details of the comparative effect on land values of the industrial development in and around the Gladstone Industrial Zone is in the report on a community survey of the land values (Appendix 5).

That the people of Yarwun/Targinnie be compensated for the decrease in the value of their properties as a result of the adverse impact of industrial development, and in particular SPP, in the Gladstone Industrial Zone and adjacent areas.

15.2 Social Impacts

The EIS contained a statement (614) that the full development of Australia's oil shale resource could provide oil self-sufficiency for Australia for at least the next 50 years. Given the slim likelihood of every resource being utilized and fully operational this statement grossly overstates and exaggerates the realistic benefits. There has been no concrete evidence that this is likely to occur in the near future if at all.

This statement be reviewed and outline a more realistic situation.

15.3 Economic

An important community issue for the Yarwun/Targinnie community is the provision of reticulated water. This access has been provided to other industries in the area that require it. The primary producers would like to be provided with the same level of

access that industry has. This would alleviate the uncertainty of water that is so vital to the sustainability of their crops.

Primary Producers have access to reticulated water for existing horticultural applications.

Within this section of the report a number of statements (613,775,228) were included which inferred that the Proponent was working closely with the community and in particular the local fruitgrowers. This statement is disputed as there has been no evidence of this occurring.

Delete the inference that the Proponent works closely with the community

15.3.1 Implications for Government including Sterilisation of Industrial Land

The final valuation of the land for the purposes of payment of compensation will be determined by an independent valuer (99,102,104). SPP will subsequently make an offer to landowners based on this valuation. Given that the valuer will be a client of SPP and consequently paying the fee for their services, how could it be assured that the valuer will, as promised, be independent and acting in the interest of both parties. What steps will be done to ensure that this valuation is independent?

Proponent outline what process they are using to ensure independent valuations will be performed to determine their compensation amount.

SPP fund each affected landowner to obtain a separate independent valuation from a valuer of their choice as a comparison.

15.3.3 Acquisition and Compensation Policy

In the raising of the Awoonga Dam, residents affected in the area received a outright purchase by the Gladstone Area Water Board. The outright purchase of the properties surrounding the shale oil plant, according to the EIS (598), will only be those landowners 'directly affected by the proposed Mining Lease for Stage 2'. Why are other residents who are affected by the Plant but located outside the mining lease, not given the same rights and benefits as those affected by the Awoonga Dam?

All affected landowners surrounding the Plant be given the option of outright purchase

There is a complaints register kept by QCL employees, which is periodically given to the EPA and the proponent. This is an important source of pollution data but there is no analysis of such reports made in the Supplementary EIS.

Consideration be given to the concerns of QCL and other industry employees as to the level of emissions and their effects.

16. Transport

16.4 Rail Transportation

Rail transportation has not been considered by the Proponent due to a lack of link to the site. A suggestion to reduce the road transportation is that the Proponent should consider a co-operative process between QCL and SPP for the rail transportation of lime. The lime could be transported to a stockpile located near the railway line close to QCL. This stockpile could then be accessed by SPP as required by trucks. This would alleviate the traffic and damage from the high volume of trucks on the public access roads plus would better utilize existing infrastructure in place. The use of trucks would only be for a very short distance.

Proponent adopt the suggested rail transportation of lime.

18. Health and Safety

18.3 Off-site Health Issues

The EIS report (59) outlines a commissioning of a real-time, continuous Opsis air quality monitoring station in the Targinnie community. There has been no obvious use of these results.

Results from the Opsis Air quality monitoring station be referred to in the EIS.

Within the statement (380) the EPA may direct the plant operator to take remedial action if members of the community report incidents such as odour/irritant emissions. Given that SPP have not yet proved that they can confidently and capably take the appropriate remedial action to address problems that have arisen it is unlikely that they will be able to do so in this instance.

Doubt is placed on the commitment to take effective remedial action on odour/irritant emissions.

The proponent is not expecting any additional measures arising from the health study (367) currently underway but it is requested that Stage 2 should not proceed until the results are known and found to be acceptable. Given the uncertainty of the findings it is not sufficient to predict that there will be no substantial findings. To commence operation without actual proof of this as a safe mining and processing technological application is to potentially endanger human lives. This should not be allowed to occur.

Stage 2 be halted until results from the Health Study are known and found acceptable.

The EIS report refers to the Emergency Response Plan (660) as being completed for Stage 1. Has the draft Emergency Response Plan been updated and completed for Stage 2?

Emergency Response Plan be completed for Stage 2

Environmental Management Overview Strategy.

As outlined in Appendix 3 this document provides very generalized comments and fails in many areas to provide factual measurement data and timing of measurement activity. Examples of this are in the Air and Noise environment value section where such comments on the levels of certain chemicals and dust are referred to as 'generally less' and 'occasionally high'. This lacks scientific authenticity and exactness and should be remedied.

The EMOS be reviewed and precise detail and measurements findings and frequency be included.

This report refers to the word 'odour'. This word fails to represent that within the air is also irritants that cause health effects and/or nuisance and therefore is referring to only part of the potential impact of the plant operations.

Within the EMOS and the EIS the word 'odour' be referred to as 'odour/irritant'.

APPENDIX 1

Analysis of Yarwun Targinnie Fruit & Vegetable Grower's Association Inc. Responses in Stuart Oil Shale Project EIS Report

Submission Comment	EIS Incl?	Report Ref.	Stuart Oil EIS Report	Adequate Resp? Y/N
1. Truck Movements If lime is required for Stage 2 operations, rail facilities should be used in its transport to the Plant as opposed to haul trucks.	Yes	9.2.1	No noise issue, rail not considered In section 16.4 SPP has not considered the use of rail transportation as there is no direct rail link to the site. Rail link construction is deemed not viable in the short to medium term. A comment is made in section 9.2.1 that refers to no product being transported off site by road or rail but that approx 14 trucks per day will be visiting site to bring material. They do not believe that this will create a noise issue.	NO
2. Noise - Low Frequency Further studies into the impact of noise needs to be conducted, as the Yarwun/Targinnie residents were insufficiently investigated and/or reported in the draft EIS. In particular, it is recommended that further study be done to isolate and determine the impact of low frequency noise on the neighbouring	No		No comment No comment on low frequency noises included in the report apart from the resonance section (9.2.2) See comment 6.	NO

communities of Yarwun/Targinnie.					
3. Noise-Physical Testing It is recommended that noise modelling be combined with physical testing of simulated sounds, similar to those that shall be emitted in Stage 2 operations, to determine the validity of the modelling.	Yes	9.2.1.1 (499)	No comment, predictive model only Although referenced to the report, no direct inclusion of this comment could be found. This section refers to predictive modelling only.	NO	
4. Noise-Pre-stage 1 Background noise It is recommended that the reported minimal impact of noise at the six sensitive sites be discounted, and further monitoring of these conducted to establish pre-stage 1 background noise levels.	Yes	9.2.1.1	Current results valid Report states that the measurements were taken prior to stage one operations commencing and are therefore valid.	NO	
5.Noise- Amphitheatre Effect It is recommended that investigations be conducted to determine whether the ‘Amphitheatre Effect’, which residents speak of, does result in exaggeration of noise at their properties.	Yes	9.2.1.1 501	Background noise mask plant noise A comment made that any amphitheatre effect that may exist would result in an increase in residential/background noise as well as plant noise. They then state that the increased background noise would ‘mask’ plant noise. <i>This is unlikely as it depends which is louder to begin with.</i>	NO	
6.Noise- Resonance The draft EIS fails to mention the impact of resonance on the dwellings and buildings in the Yarwun/Targinnie area. It is recommended that research be conducted to determine whether this is a consequence of the plant’s operations, in response to such community claims.	Yes	9.2.2 502	None detected -stated extremely rare for significant resonance to occur as a result of a such an industrial plant. <i>-how did they measure whether there was any resonance? Just stated that there was none detected</i> <i>-where was the study area mentioned?</i> -discounted the comment and said unlikely to	NO	

				occur through the ground within 200m of the plan or airborne resonance unlikely for buildings that are greater than 1000m from plant. -can't predict resonance -if occurs complaints register available <i>This comment was not given consideration and their response appears to be reactive rather than proactive.</i>	NO
				Predictive models only This comment has not been addressed and the report refers to predictive models only as a means of predicting Stage 2 noise levels only.	NO
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<p>9. Noise-Stockpile Of particular concern is the deposition of overburden in stockpiles at up to 30m above ground level. The truck and machinery activity at this elevated height will exacerbate the noise level of the mining operations and cast considerable doubt on the results of the noise estimation models. These models did not include the effect of this noise source. (p13)</p>	Yes	9.2.1.2 (505)	<p>Noise Negligible The report states that the variation in the overall noise emission from the mine because of the 30m overburden stockpiles is negligible. (<1dB (a))</p>	NO
<p>10. Air-Stack Gradient More research and modelling should be undertaken to determine a more accurate potential gradient for the Stage 1 and 2 stacks under both stable and unstable conditions</p>	Yes	8.4.1 (365) 8.4.3.2	<p>Model used, conditions unknown -adopted TAPM/CALPUFF model -this will be used to determine the optimum stack height -unable to tell if both types of conditions will be included as a variable in their modelling process.</p>	NO
<p>11. Air-Govt & Nitrogen Dioxide levels It is recommended that the long-term levels of nitrogen dioxide in the Gladstone region be established by the responsible government authority</p>	Yes	8.2.3 (366) 8.2.5	<p>No monitoring required states that AIR NEPM does not require mandatory monitoring in urban areas with a population less than 25,000 -classifies Yarwun and Targinnie as a sub-region -believe that they comply with NEPM</p>	NO
<p>12. Air - Adopt PN2.5 for Health Protection It is necessary for the proposed Australian National Air Quality Standards regarding PN2.5 to be adopted and applied to ensure the health of Yarwun/Targinnie residents is</p>	Yes	18.3 (367) 8.6.3	<p>Not adopting -comment on health study underway, not expecting any issues but commit to implement any should arise -comment that PM2.5 is planned to be included in the AIR NEPM but no standard for it currently</p>	NO

not damaged.				exists - only respond to this standard when it becomes an additional requirement under Air NEPM -states that the particles from mining activities are 'mainly' larger than the PM2.5 fraction. <i>Comment made on the particles being 'mainly' larger. Need to provide some factual data to support this.</i>	
13. Air-NIOSH Hydrocarbon Limit It is recommended that the United States National Institute for Occupational Safety and Health (NIOSH) list of chemical hazards and their respective exposure limits which are outlined in Table 9 be used in determining the acceptable limits of hydrocarbons emitted.	No			No comment	NO
14. Air - Emission Compliance Strict controls on the procedures permitting plants to receive temporary commissioning allowances to emit more than the acceptable levels of emissions should be imposed. This will provide the surrounding communities with a little more security that the emission levels will not be harmful to their health or their crops.	No.			No comment	NO
15. Air - Pollution Control Technologies It is recommended that given the availability of effective pollution control technologies as referred to in this text, these	Yes	8.2.3 (512)		No commitment to suggested Technologies -general comment made that they will use whatever control strategies required to meet EPA	NO

technologies should be employed by SPP/CPM to drastically reduce their air and particulate emissions.				-didn't make comment on the suggested control technologies included in the Fruitgrowers report.	
16. Air-Odour The EIS does not address the subject of odour. Given that offensive odours have been an issue with Yarwun/Targinnie residents, particularly on October 2 nd 1999, and again on November 18 th 1999, investigations into the actual odour emitted in all stages of the process are recommended.	Yes	8.8.2 (371) 469		Odour addressed in Report -the issue of odour is addressed. Stated that routine odour emission concentration has been reduced by over 85% -agreed that Stage 1 had unacceptably high odour emissions. -outlined technologies used to reduce odour emission and monitor odour levels (8.8.2) Commented that these will be under constant investigation until the final plan design is established. <i>What about after?</i>	NO
17. Air-Headspace Vent Gases . It is recommended that the consultant's proposal of capturing and flaring the headspace vent gases incidental to the loading of oil into ships be implemented.	Yes	8.8.2 (371)		No comment included	NO
18. Air- Odour Monitors . It is recommended that odour monitors be installed so as to give early warning of potential offensive odours. This would mean that remedial action could be taken to forestall any impact on the Yarwun/Targinnie residents.	Yes	8.8.2 (467)		Forecast Only -state that the technology does not exist for odour monitors to respond as would a human nose - will use TAFP/CALPUFF modelling to forecast odour, believe that this model is effective in forecasting magnitude, timing and frequency of odours.	NO
19. Air- Preventative & Remedial Systems	Yes	8.2.3 (370)		General commitment -commitment to adopt whatever pollution control	NO

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<p>It is recommended that preventative, as well as remedial systems, be built into the plant to avoid potentially harmful concentrations of emissions being released into the atmosphere, specifically:</p> <ul style="list-style-type: none"> -a more effective method of grading oil shale, -the compression and liquefaction of the excess gaseous emissions, -the installation of electrostatic precipitators and/or bag filters 				<p>strategies are required to meet emission limits. -does not specifically refer to the suggestions mentioned.</p>	
<p>20. Air- Greenhouse Gas It is recommended that greenhouse gas emissions be regulated in a manner consistent with the intention of the Kyoto Protocol. The Co-Venturers should be encouraged to undertake further investment in carbon offsets.</p>	Yes	8.7.1 (436)		<p>Within acceptable limits -Proponent believes that their emission GHG is within acceptable limits -no Govt targets or efficiencies on industry or commercial sectors exist -will not consider implementing Kyoto protocol because it is not yet ratified -will only adopt technologies to reduce GHG emissions if govt initiate a credit for early action program -it appears that this recommendation will not be adopted.</p>	YES
<p>21. Air - Outdated GPS Data The modifications to the ISC air dispersion model were made using data from the Gladstone Power Station taken from August 1982 to March 1986, which is unsuitable</p>	Yes	8.2.4 (506) 8.2.5		<p>Revised NRG figures Within the report it states that revised NRG (GPS) emission figures were used. It does not state the period of time that the figures relate to. -report outlines air emission standards and how</p>	NO

seeing that significant changes may have occurred in the Gladstone area in the past 13 years.(p14)				EPA will set them 'based on the need to protect health and environmental values'	
22. Air-Outdated Nitrogen Oxide levels The data comparing nitrogen dioxide and nitrogen oxide levels were taken in 1984 when some of the industries affecting the Yarwun/Targinnie residents such as Orica, QCL, Tigor and the Magnesium Pilot Plant were not present. The report makes an assumption that although the EPA does not report on the longer-term averages for nitrogen dioxide in the Gladstone region, it is evident that the long-term levels would be well within the relevant goals. This assumption is not based on facts and additional reporting is required to validate this statement. (p15)	Yes	8.2.4 (507)		Updated with new industry The industries for which Gladstone emissions inventory figures were used in this report, as supplied by the EPA, were QAL, Tigor, Orica and NRG. Data for CAP and Boyne Smelters was obtained from other sources.	YES
23.Air-Nitrogen Dioxide Ground Concentration An assumption is also made that for longer term impacts, the annual average nitrogen dioxide ground level concentrations will be a 50% conversion rate from nitrogen oxide to nitrogen dioxide. This statement is not backed up by any supporting information and should be proved it is to used in modelling methods. (p15)	Yes	8.2.4 (508)		Increase in Nitrogen Dioxide Ground Concentration This report states that in the ratio of NO2/Nox in the data collected ranged from 15 to 97% with an average of 61%. This is significantly higher than previously reported.	NO
24.Air - High Nitrogen Level Impact	Yes	8.6.2		Insignificant sensitive vegetation damage	NO

<p>When the flare is functioning, the high nitrogen dioxide levels could have an unfavourable impact on the health and crops of the Yarrowun/Targinnie fruitgrowers and the community. The nitrogen dioxide concentrations including the Project will increase primarily due to the inclusion of flare emissions, which could have significant effect on fruit yields in the Yarrowun/Targinnie area. (p15)</p>	<p>(509)</p>	<p>-no reference made to the flare emissions but discussing nitrogen dioxide concentrations generally The report states: -existing industries or the project does not exceed annual average EPP goal -1 hr maximum concentration already exceeds the EPP goal over existing industries in the area on some occasions -plant emissions increase an exceedance immediately adjacent to the plant. - report states that they do not 'expect' visible injury to vegetation around project at modelled levels -damage to vegetation can occur at lower levels when nitrogen dioxide is mixed with sulphur dioxide. -comments that injury to sensitive vegetation is expected but will be insignificant.</p>	
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<p>25.Air - Odour Impact</p> <p>the EIS does not address the subject of odour due to the scarcity of measurement data in relation to odours from oil shale and plant operations and from a lack of formal policy criteria to assess odour impact. It has identified four potential odour emissions</p> <ul style="list-style-type: none"> -combustion sources - product treatment or oil storage tank -plant upsets and - ship transfer operations (p20) 	<p>Yes</p>	<p>8.8.2 (468)</p>	<p>Odour Issue under control</p> <ul style="list-style-type: none"> -odour is addressed by this report and admittance that initial phase were of an unacceptable level -believe that they have identified the main cause ie.main stack -quotes an independent consultants that produced a report for the Qld EPA that said that the plant was within acceptable levels being proposed for new devts. -does not comment on lack of data from oil shale and plant operations -believe that their technologies will ensure with appropriate levels -lists what monitoring methods will be used up to final plant design, what about after?? 	<p>NO</p>
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26. Air- Effect on Humans & Crops It is recommended that research be undertaken to determine the synergistic effect of a combined pollutant mixture on humans and horticultural crops as currently, these effects are not well known.	Yes.	18.3 (380)	Addressed by Stuart Facilitation Working Group Report refers to it being addressed by the above group and forms part of the Health Study Work Plan. -commit to adopt findings if relevant for Stage 2	NO
27. Air – Emission Parameters The emission parameters used in modelling the occurrences for the main stack and the ATP flare are not sourced.	Yes	8.2.1 (374)	No direct comment	NO
28 Air- Air Pollution Levels It is strongly held view of the fruit and vegetable growers who were in Targinnie before there was any large scale industrial development in the Gladstone area, and that the cumulative effects of air pollution need to be reduced to levels prior to industrialisation in the Gladstone/Calliope area. This would provide a sound economic outlook for the fruit and vegetable growers in the area, as it is consistent with that required for the horticultural crop production. (p34)	Yes	8.2.1 (788) 8.6.1 8.6.2	No direct comment -report comments that the possibility of damage to sensitive crops is not expected to occur as a result of the development. -no comment was made on pre-development levels.	NO
29. Air-Sulphur Dioxide Impact on vegetation There is little doubt that the increased levels of sulphur dioxide are likely to harm the vegetation, even when based on temperate climate indicators of the United Kingdom.	Yes	8.6.1 (510)	Conflicting comments The report contains information that conflicts with this statement. The report states 'the possibility of damage to sensitive crops is not expected to occur as a result of the development' - there is an expectation that the ground level	NO

It was acknowledged in the Comalco Supplementary IAS that there will be destruction of lichens. There needs to be further research to ascertain whether the tropical horticultural crops will be effected (p15)				concentration will increase in the 'immediate vicinity' of the plant but will be 'well-below' EPP goals.	
30. Air-Increased Emission Levels With Stage 2 operating, the Stuart Oil Shale Project will emit 14.8% of the Gladstone regions sulphur dioxide and 12% of the nitrogen dioxide emissions. This will represent a marked increase in the levels of sulphur dioxide and nitrogen dioxide emission levels affecting the yields of the horticultural crops of the Yarwun/Targinnie fruitgrowers.	Yes	8.6.2 (511)		Refer Comment 24.	NO
31. Air- Ash Residue Figure 5.4 shows that on six occasions since August 1997 ash residue has exceeded the acceptable level of 120mg2/day. With the commencement of Stage 2 of the Project, it is probably that the levels of dust emissions will increase dramatically due to mining operations (p16)	Yes	8.6.4 (372)		Area around mine site only affected -Comment regarding mining activities and believe that the impacted area will be around the mining site. -Stage 2 will be monitored. But doesn't say how -this comment was not addressed sufficiently	NO

<p>32. Lighting – Impact on Crops It is recommended that research be conducted into the issues of plant lighting, its visibility in the Yarwun/Targinnie area, and its potential impacts on the area's horticultural crops, as none of these community concerns are mentioned or investigated in the Draft EIS.</p>	<p>No.</p>	<p>Lighting necessary, minimum intrusion. -Comment is made in the Executive summary under the heading of lighting that lighting of the site is necessary but it will be 'placed, directed and shielded so as to minimise intrusion on nearby residents and others' -in addition to this, under the heading of 15.3 -- Economic, the report comments generally on economic matters that refer to the fruit growing industry and any issues they may be experiencing. It refers to dealing direct with the community groups to address their concerns. - no direct commitment to meet all requirements nor the impact on crops</p>	<p>NO</p>
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<p>33. Property – Decline Compensation Should land values decline in the future, it is recommended that an inquiry be undertaken by a member of the appropriate government tribunal into the cause of the decline, and, if the decline can be attributed to industrial development within the region then the landowner should be compensated.</p>	Yes	15.3.3 (606)	<p>Compensate as required by Law to properties under the proposed Mining Lease. -accepts comments and is working with govt and community groups. -committed to paying fair compensation and is required to by law to those landowners that are 'directly affected by the proposed Mining Lease for Stage 2' ie. those properties under the proposed Mining Lease. -will negotiate directly with landowners and if not agreed upon will be referred to the Land and Resources tribunal.</p>	NO
<p>34. Property – Sell Outright It is recommended that the landowners in the Targinnie area, who are directly affected by the mining lease be able to sell their properties outright to SPDP and lease them back until they are required by the Co-Venturers for mining use.</p>	No		<p>Not before Mining Lease Application, Negotiate with Owner Refers to in section 15.3.3 that they will negotiate directly with landowners. I would be assume that the landowner would need to negotiate this on an individual basis. - comment made (15.3.3) that option to purchase agreements have started but outright purchase of before a mining lease application will not be considered.</p>	NO
<p>35. Property-Disturbance Allowance In addition to this, it is recommended that they be compensated by the Co-Venturers, with a disturbance allowance based on agreed percentage of the value of their properties, due to the nature of the sale being 'compulsory acquisition'.</p>	No		<p>No commitment In section 15.3.1 it states that SPP will use an independent value to determine the compensation amount. No mention is made of including a disturbance allowance. Refers to in section 15.3.3 that they will negotiate directly with landowners.</p>	NO

				It would be assumed that the landowner would need to negotiate this on an individual basis.	
36. Property- Acquire for Reforestation In addition to the existing reforestation trials, property acquired and adjacent to the project should also be the focus of reforestation activities	Yes	8.7.2 (437)		No commitment -the report commented on their plan for rehabilitation after mine use but no comment was made on acquiring surrounding land for the purposes of a buffer zone.	NO
37. Property- Social Adjustment Assistance The government should give serious consideration to the provision of 'social adjustment assistance' for those seriously affected by the Project.	No			No comment	NO

38. Health – Plant emission particles It is recommended that there be more investigation into the accumulative health effects of increases in fine and ultra-fine particles resulting from plant emissions before the commencement of Stage-2 operations	Yes	15.3.5 (36)	Not addressed directly Referenced to a statement in the report that discusses monitoring and testing of plant emissions on crops. The fruitgrowers comment is referring to the health of community members not the health of the crop.	NO
39. Water- Tank water contamination As a number of residents use tank water, the health impacts of contaminants from plant operations must be investigated to determine the effects of possible contaminants.	No.		Not affected A comment in section 8.1 stated the following 'by complying with the air quality standards in the EPP (Air), crops and water quality in the vicinity of the plant will not be affected. -Comment in 8.6.4.2 included the concern regarding roof-collected rainwater being contaminated with plant emissions. State reasons why contamination could occur. They believe that there were no significant changes that they found using the OPSIS monitoring data for Aug/Sept 2001. -believe that the pollutants were south and south east of the Targinnie area or associated with bushfires	NO
40. Water – Quality & Quantity Reduction The residents of Yarwun/Targinnie are concerned that their groundwater resources may be affected by the mining and plant operations of the Project. Specifically, they are concerned that there may be a reduction	Yes	7.3.1 (260)	No impact Statement in the report to say that the Yarwun/Targinnie area are not in the area of impact and their 'should' be no change. -commitment to have an agreement with potentially affected landowners to compensate for	NO

<p>in the quantity of ground water and deterioration in the quality of their groundwater, as a direct result of Project operations. (p21 submission)</p>			<p>any detrimental effects on the normal quantity/quality of the landowners groundwater.</p> <p>- have they shown what are the affected areas? Are the all the fruitgrowers really outside the affected area?</p>	
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<p>41. Water-Precautionary Water Strategy It is recommended that a precautionary water strategy be implemented, with the provision of reticulated water to the Yarrowun/Targinnie community. It is suggested that the appropriate government authority(s) assess the level of supplementary water needed to offset the increased risk to water availability in this area. This supplementary water is to be supplied to the Yarrowun/Targinnie community free of charge</p>	Yes	15.3 (228)	<p>General strategy response - noted comment but referred to the SPP liaising with community groups to develop strategies. No commitment to support this recommendation</p>	NO
<p>42. Ground- Concentration It is recommended that more advanced monitoring and analysing equipment be installed to allow more accurate ground level concentration readings to be obtained. These should be easily accessible to the public and accountable departments.</p>	No		<p>No comment included</p>	NO
<p>43. Other – Stage 1 Restart It is recommended that the commitment by the company 'not to restart Stage 1 operations until confidence of controlling the process is achieved' should be enforced by the EPA. A similar policy should apply to all stages of the Project.</p>	Yes	App B (68)	<p>No comment included Even though listed in the summary of comments, I could not locate a reference in report to this comment</p>	NO

<p>44. Other-Effects of Terrain on Meteorology It is recommended that further examination of the October 2nd incident be undertaken as the methods for calculating the plume trajectory and puff model did not take into account the effects of terrain on the meteorology.</p>	Yes	8.8.2 (371) 8.4.2	<p>Terrain Included The TAPM model that is one of the models being used takes into account the grid-based database of terrain heights as well as vegetation type, temperatures and synoptic scale analysis. The CALPUFF model takes into account slope flows, terrain effects and terrain blocking effects.</p>	YES
<p>45. Other – Co-operative Future It is recommended that should the Yarwun/Targinnie Fruitgrowers' Co-operative close its operation, as a result of the exiting of members from the area, compensation should be paid equal to the difference between its fair value as at the end of the 1998 financial year, and its salvage value at the point of cessation.</p>	No		<p>Involved in Determining Long Term Viability Only comment made was that they were involved in discussing the long term viability of the industry (15.3)</p>	NO
<p>46. Other – DME Response Concern has been expressed over the time it takes the DME to respond to problems encountered by the Yarwun/Targinnie residents as a direct result of plant operations such as offensive smells and air emissions which cause adverse health symptoms (p19)</p>	Yes	8.2.5 (373)	<p>Not included In this report it only refers to the EPA and SPP as being the recipients of complaints. No mention is made of the DME.</p>	NO
<p>47. Other- EPA Monitoring It is essential that at all stages of the Project,</p>	Yes	8.2.3 (369)	<p>No Regular Monitoring Commitment -report comments on the EPA setting the</p>	NO

<p>the EPA actively monitor plant operations so remedial action is immediate and any breaches of the license conditions may be enforced.</p>		<p>8.2.5 8.4.1</p>	<p>requirements and being provided with annual information and any breaches -the report only refers to the EPA taking an active step when a member of the community reports an incident. -no reference is made about the EPA actively monitoring their compliance on a regular basis apart from an incident being reported or on an annual basis. - no comment made about EPA response times <i>This was answered with general information and did not support assisting EPA with proactively monitoring the plant nor did commit to response times to EPA enquiries.</i></p>	
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ANALYSIS OF PROJECT DIOXIN IN EIS & CONSERVATIONIST RESPONSE

EIS Report	Reference	Conservationist Response	Reference	YTFG Comment
Amounts of dioxins produced by shale processing is not considered to pose a health risk, their long life and hazardous nature indicates a cautious approach is appropriate while uncertainty remains over the issue.	Exec Summary Air Quality p4	The expected annual load of dioxin in the spent shale from Stage 2 is huge (between 6.6kg & 13.1kg/year ITEQ)	P37	Dramatic difference in the belief between the two parties on the significance of dioxin levels.
Commonwealth Government is currently considering whether a national position on the subject of dioxins is required.	Exec Summary Air Quality p4	Australian Government has yet to ratify the Stockholm Convention. A signature by the Govt in May 2001 indicated an intention to do so. In the interim period the Govt passed a resolution to apply in full provisions of the Convention on a voluntary basis	P34	SPP appear to have disregarded any progress by the Government in this area and choose to explain the situation as 'uncertain' so as to avoid any requirements that are imminent.
Independent toxicologist estimated that members of the local community could be exposed to a worst case estimate of .27 picograms dioxin I-TEQ/kg body weight/day. Of this .09 picograms could be contributed through inhaling	8.9.2.1	The proponent is dismissive of the potential dioxin problems created by the plant, even though its own data shows that both in terms of load and estimated concentration the releases are significant	P40	This statement made by an 'independent toxicologist' needs to be reviewed and an alternative toxicologist consulted as a comparison.

Stage 1 plant emissions with the balance from background dietary intake. This is significantly lower than WHO exposure guidelines.					
Preliminary data from Stage 1 indicates that shale ash contains 8-1.6 nanograms dioxin per gram. Deemed acceptable for residential soils.	8.9.2.2	The proponent is dismissive of the potential dioxin problems created by the plant, even though its own data shows that both in terms of load and estimated concentration the releases are significant.	P40	Discrepancy between both parties as to acceptable dioxin levels.	
Proponent will undertake investigations of the mechanisms for dioxins formation in the Stage 1 plant and use this understanding to develop modified processing conditions in Stage 2 and to install control equipment and processes to reduce dioxins formation. Ten fold reductions are probably achievable.	8.9.3	Lack of explanation on how this expected reduction will occur. Claims unsubstantiated and unable to be verified	P39	Proponent does not provide any objective evidence on how this reduction figure was determined therefore no credibility can be placed on it.	
No comment identified		Dioxin in an aqueous discharge will likely lead to contamination of sediment and ultimately the food chain of the Narrows adjacent to the site.	P38	Further investigation required.	
Even if the same concentration of dioxins were	8.9.3	This is clearly unsubstantiated both in terms of load and concentration. The	P39	Clear disagreement between both parties with regards to significance	

produced in the shale ash of Stage 2 as for Stage 1, this material would remain suitable for return to the mine followed by rehabilitation		data provided shows that the potential discharges of dioxin from the mine are elevated and are significant.		of dioxin levels.
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ANALYSISOFSTUART OIL SHALE PROJECTENVIRONMENTAL MANAGEMENT OVERVIEW STRATEGY
(E.M.O.S)

Environmental Value by SPP	Reference	Y.T.F.G. Issue	Y.T.F.G. Recommendation
AIR	3.3	Sulphur dioxide comment quoted levels that were measured in 1999 whereas this EMOS Report was produced in January 2002	The EMOS report needs to be updated with current data on the measurement of sulphur dioxide levels
		Dust Deposition comment states that the average levels of dust deposition around Gladstone is 'generally less' than recommended EPP (Air) limits. This comment does not provide factual, objective data.	The EMOS should state exact measured figures and the timing of when they were taken.
		Particulates – the report stated that the measured ambient levels of fine particulates is 'occasionally high'. This comment does not provide factual objective data.	The EMOS should be updated with the exact measured figures and the timing of when they were taken to support their subjective statement.
		Nitrogen Oxides – this statement omits when the monitoring occurred and where it occurred.	The EMOS needs to specify when and where this data was collected.
NOISE & VIBRATION	3.4	Provide the sea and breezes as a reason for higher than normal background noise for remote rural	This be further investigated to determine if it is the actual reason for the higher than

		locations.	background noise.
		Ground vibration – statement uses the not significant to describe ground vibration	Objective data should be included to support this claim that the ground vibration is not significant.

Summary of Environmental Values, Operational Activities and Potential Environment Impacts

Environmental Statement by SPP	Reference	Y.T.F.G. Issue	Y.T.F.G. Recommendation
SOCIAL 16. The lifestyle, including the wealth, health, safety and wellbeing of the regional community	# 16, P21	Improved community services. Does not describe how SPP will go about this and what level of improvement they are prepared to undertake.	Outline what they will commit to improve these services as promised.
ENVIRONMENTAL PROTECTION OBJECTIVE- Assist in maintaining the viability of the area for multiple beneficial uses.	P43	Be aware of the viability of the Fruit Growers co-operative. Awareness does not imply co-operation nor any other commitment	SPP include in their EMOS more commitment to the Fruit Growers apart from just awareness.
	P43	Commitment to monitor as part of their control strategies a number of items eg. Gladstone area gross economic output. No commitment is made as to the frequency of this	EMOS include a commitment as to how often the issue will be monitored and what will be done with the results.

ENVIRONMENT SEGMENT Air Quality	P48		monitoring and the process to be followed if an issue is identified.	Proposed Strategy to undertake occasional dust sampling where dust may be a nuisance. This statement does not specify the frequency of this sampling. Is it only once a year??	The EMOS needs to commit to a frequency of performing it's dust sampling so that assurance can occur that this process is being performed and monitored on a regular basis.
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**ANALYSIS OF E.I.S. COMMITMENT
FOR
STAGE 1 – STUART SHALE OIL COMMITMENTS**

SPP COMMITMENT	REFERENCE	STAGE 1 REVIEW PAPER	REF.	EXTERNAL COMMENTS	ADEQUATE
AIR Particulates Dust emissions from the project site will be contained by the use of shielding and water sprays, either direct or by water trucks	3.10.1 p3:73	Could not locate specific comment			
Emissions Typical loss rates will be low and will be vented at a high point on the plant to eliminate ground level effect	3.10.1 p3:73	Emission from stage 1 processing plant generally comply with the requirements of the Transitional Environmental Authority average stack emission levels for particulates SO ₂ and NO _x Two areas of non-compliance 1) Exceed environmental licence condition – min gas exit temperature 2) rare brief exceedances of	4.2 p10		

		mass emission rates under licence condition B6.				
Odour Analysis of odours (Hollingsworth, Dames & Moore, 1992) using dynamic olfactometry have indicated that under typical atmospheric conditions, odour from the plant should be within acceptable levels beyond the immediate lease area	3.10.1 p3:74	The plant design in hindsight was inadequate in minimising odour emissions (which were a surprise) and noise.	4.2 P10	The odours from the two sources are quite distinct. At present, there are no objective plume sampling data available to determine the extent to which the objectionable odour is accompanied by irritants (Qld Health Interim Report 05/01 p13)		
		After an initial phase of high odour emissions, the capital works and operational improvements made under the EMP (Air) have been successful in reducing odour emissions from the Stage 1 plant in accordance with the aim of reducing air and odour emissions so that by the end of the EMP there is no environmental nuisance at any odour sensitive place beyond the boundaries of the mining lease. This has demonstrated	4.2 p11			

<p>WATER Minimise the impact on the existing surfaces and groundwater regimes</p>	<p>3.9 p3:61</p>		<p>the Proponent's capability to design and operate a shale oil plant that produces an acceptable odour outcome.</p> <p>Received an Order to Comply because on an overflow event during a major storm. The investigation outcomes and modifications made to the site water management system were sufficient enough for the Order to Comply to be closed out. No discharges from the licenced discharge point at the mine since Feb 2001</p>	<p>4.2 p12 & p13</p>	<p>From the first samples of Targinnie residents' rainwater tanks in October 1999, there is little basis for concern about the integrity of the water supplies, given the nature of the emissions. (Qld Health Interim Report 14/5/01 p13)</p>	
<p>NOISE The distance and topography between the noise sources within the lease area and the nearest residential properties will result in significant attenuation of noise levels such that the noise amenity of these sites will not be adversely affected</p>	<p>3.7.5 p3:59</p>		<p>SPP implemented a comprehensive noise monitoring program in July 1997, prior to commencement of clearing. Outline complaints received and modifications done to alleviate this noise.</p>	<p>4.2 p12</p>	<p>The continued noise problem is, however, a reported cause of significant health effects in some residents of Targinnie (Qld Health Interim Report p13 14/5/01)</p>	
			<p>The plant design in hindsight was inadequate in minimising odour emissions (which were</p>	<p>4.2 p10</p>		

<p>SOCIAL IMPACTS</p> <p>No comment made on the impact on community and methods of communication.</p>		<p>a surprise) and noise.</p> <p>Establishment of the Yarwun Targinnie Representative Group to meet with the Joint Venture representatives.</p> <p>Establishment of the Stuart Facilitation Working Group to progress resolution of a full range of community issues.</p>	<p>4.3 p15</p>	<p>Report outlined comments made by residents. The report summarised these statements by the following: "Taking all these impacts together, there is little doubt that the operations of the plant to date have given rise to what may rightly be termed a 'public health nuisance'". (Qld Health Interim Report 14/5/01)</p>	
<p>No comment on the impact on value of surrounding properties nor the compulsory acquisition of properties on the mining lease.</p>		<p>Outlined what progress had been made in this area. This included owner hardship assistance and the offering of options for purchase of leaseholders properties at market value.</p>	<p>4.3 p16</p>		

**SOCIO-ECONOMIC REPORT YARWUN / TARGINNIE
REPRESENTATIVE GROUP**

Background:

The general background will form part of the project overview. This particular section restricts itself factors that are currently or may in the near future represent significant issues that have bearing on the well being of the local community and the local economy it generates. The approach to the overview is strictly neutral. At the center of speculation and local concern is the effect of pollution arising from the first stage of the Stuart Oil Shale project that is sited in Yarwun. That pollution takes the form of intermittent and unpredictable emissions of gases and some particulates that creates noxious odors and irritant vapours and low but discernable noise patterns. The widely varying wind directions create a situation of chance as to which sector is affected and for how long. The effluents from the plant have been implicated certainly in unpleasant smells that pervade indoors as well as outside, throat and bronchial irritation, and some distraction from the noise. So far this author is unaware of documented affects linked directly with the water supply, the soil, the flora and fauna, and commercial products arising from cropping, grazing and tropical fruit growing.

Potential adverse social and economic consequences of the operation predictably arise from the perceived stigma associated with living in the area and individual feelings of lowered esteem. Similarly there is a real danger that locally produced produce is perceived by the outside market place in the same way, whether that impression be real or induced. Certainly there appears to be ample evidence of a depression of the real estate values and a reduction of corresponding equity in the form of bank credit.

Predominantly this represents a dilemma in the need to balance the values and lifestyle of long term residents along with their land based commercial interests against the revenue, the jobs, and the overall growth generated by the clustering of other dependent industries. On this occasion the exercise simply represents a broad bench mark that will act as a reference point for the more analytical approach that will hopefully follow.

The Investigation:

The brief for this work centered around three areas:

1. A questionnaire survey
2. A historic data review of land and property values
3. A review of previous literature against the current findings.

The questionnaire survey:

A. General

The 29 question survey was formulated by the YTRG committee based on parameters they felt would expose any overall trends in the economic and social well being of the Yarwun and Targinnie residents and other stake holders . One hundred of these were mail dropped tom the local area and the completed forms were kept under close security before processing. Of the 100 forms, 56 responses were obtained.

The survey was expanded to include other areas outside of the area of the original survey drop in an attempt to rationalise information gained from within the affected area. Due to the critically tight time frame, it was necessary to conduct this questionnaire by telephone.

in those areas. Calliope, Gladstone, and Tannum Sands/Boyne Island were chosen as representing areas that had a broad economic interest in outcome of the plant yet were sufficiently removed from the latter to be unaffected by its fall outs. Of 100 calls, the hit rate was the order of 30% during the short period available.

B. Shortfalls:

A number of constraints were quickly placed on the survey in a way as to inevitably affect the analysis and validity of the outcomes.

a. Lead in time. The time from notification to proceed to the required report date was of the order of 5 days. For this section that needed to include developing a background to the history of the exercise and conducting the telephone side of the survey There was also a requirement to integrate the findings of this general report with government publications in the areas of health and state development with which the report was required to interface.

The need to complete the phone survey over a Friday to Sunday interval did have an effect on the hit rate that could be accomplished. For obvious reasons, it was not until the calls were extended to Monday evening that the hit rate climbed from 2% to 30%.

b. Funding. Lean project funding is something project managers and investigators are used to and more than often it can bring out the cost effective innovative measures. In this case I believe funding was equate for the scope of the investigation had such a very tight schedule not been involved.

c. Formulation of the questionnaire.

It is important to understand that any of the following comments do not detract from the time, and commitment of individuals and the committee toward the Yarwun/Targinnie project

The construction of a market survey requires critical attention to the nature of the questions. Since the validity of the overall survey is important, care should be taken to eliminate leading questions, ambiguity, and the type of bias that can be brought about by creating questions that evoke a particular responses. A short lead in time does not allow for quality thought and meticulous planning required.

Ideally it should be the analyst of the questionnaire who formulates the survey to begin with. This is usually accompanied with a trial run with a representative group to ascertain that the questions are meaningful and are able to evoke a response that reflects the intention of the survey organiser. Comments on the survey responses will be made on a question by question basis and where appropriate defects in the line of questioning will be referred to.

In the same vein, the fact that the survey needed to be split into a telephone and a mail drop format is likely to have created an artifactual difference in the target group as apposed to the reference areas that were supposed to act as survey reference points. Phone surveys do have their benefits. In some cases it is possible to eliminate ambiguity by explanation and in others to draw out an interesting attitudinal response by zeroing in on some key words used by the respondent and having them elaborate. Alternatively mail dropped questionnaires allow the possibility for more thought on the

various answers. Generally the two forms should however not be combined for the one outcome.

Two other factors have inevitably entered into the outcomes of the survey. One is the small number of responders otherwise required to provide a reliable statistical sample and the other is the relatively high number of multiple choice questions but each with black and white options. Answers based on a graded scale of preference can overcome this problem.

For all the above reasons then the statistical reliability of the current survey must be regarded with some caution, especially when the responses are few and similarly divided. For some responses however the sense of consensus differed significantly from the control groups. It is these that will be concentrated on and aired

Survey results.

Please refer to the accompanying table in conjunction with the simplified index of questions. (App2)

The survey displayed significantly positive responses in the areas of declining market values of property, their economic circumstances, their perception on business prospects and lifestyle, the need for Government representation, and the positive role in a strategy of re-location.

Additional differences from the reference areas were obvious in age brackets, years of residence in Y/T, and the number of school age children in their care.

As an extension of the survey, a number of expanded responses provided useful insight into prevailing attitudes. Most of these related to questions 26 to 29. A number are quoted below as examples:

The major findings of the survey can be summarized as follows:

1. The appears to be a significant difference in the economic well-being of the Yarwun/Targinnie residents and the reference group. For example, half of the Yarwun/Targinnie residents said that they were just making ends meet, with a tail indicating that they were in difficulty. The reference group generally

considered themselves to be comfortably-off. This response was consistent with the view expressed by the Yarwun/Targinnie residents in that their livelihood had been affected as a result of the adverse effects of the industrial development on their farming businesses.

2. The Yarwun/Targinnie residents generally see the purchasing of their properties as part of their retirement plan.
3. There have been no sales of property in the Targinnie area in the last three years, with the proportion of residents listing their properties for sale being much higher than in the reference areas.
4. There is a significant difference in the perceived growth in the market value of Yarwun/Targinnie properties and those in the reference area. There are stable to buoyant conditions in the reference areas, whereas in the Yarwun/Targinnie area the prices are very depressed. The depression in prices was also affirmed in the valuation survey commissioned by the Yarwun/Targinnie Fruit and Vegetable Growers. This picture is consistent with the view that the Yarwun/Targinnie area is subject to adverse environmental impacts from the industrial development.
5. The proportion of residents seeking to raise finance is smaller in the Yarwun/Targinnie area when compared with the reference area. Of those in Yarwun/Targinnie who were unsuccessful in raising finance, half of those indicated that a reduction in equity in their property was an adverse factor. However, the number of responses to this question was low and it would be difficult to consider this response as more than indicative.
6. The view as to who should bear the cost of relocation or compensation for the effects of the environmental pollution differed between the two groups. The Yarwun/Targinnie residents generally favoured intervention whereas the reference group was not supportive of a solution involving government intervention.

REFERENCE AREA RESPONSES:

Q 20. 1. *Health is money!*

2. *Economic gains will lead to security & opportunities*

3. *Concerns on water usage, effects on food chain. Won't be able to sell properties.*

Q 28 & 29.

1. *Obligation to help themselves but perhaps some incentive for genuine cases.
Adverse publicity has been created within their group and real estate market affected by that.*
2. *Retiree has strong support for project so long as it is thoroughly planned.*
3. *Government participation necessary from an environmental stance.
The company itself should be responsible for relocation assistance.*
4. *You are where you are: Not Government's responsibility.*
5. *No. Greenies are creating the problems
Government assistance OK but feels operating company should buy willing residents out and plant trees for greenhouse credits.*
6. *Concerns justify extra involvement by government but Greenies over active. Leave Company to rectify problems.
"I work on the plant as a contractor and I don't notice the problems"
Lot of other plants churning out nasties over a range of chemicals up and down the coast.*
7. *Regulatory guidelines already in place . Use Government as watch dog to ensure compliance.
Yes to relocation assistance but also believes the company has a responsibility.*
8. *Tend to think the economics of the plant is valuable to the near community.
Sells mangoes locally so market not affected.*
9. *Company should provide relocation assistance.
"I don't trust the Government to intervene".*
10. *Lifestyle and prospects affected positively but through economic flow on.
Use ETA environmental guidelines and Government as their watch dog.
Should wait until the definitive plant is up and running before criticizing.
If still not OK then Government has a role.*
11. *Assistance only in genuine casers.
Government has responsibility to subsidise re-location if they have been major supporters and backers of the project.*
12. *"Ex goat farmer" No to Government assistance. If people in "shit" they should get themselves out.*
13. *Two questions linked. If Government involved in plant then they should provide re-location assistance.
Plant should assist in worthy cases.*
14. *Plant is self limiting. If nasties prevail then should be no further expansion. Market place should decide.*

Not Government's responsibility to bail people out that want to leave. If company adversely affected it should be them. Emissions affecting International standing.

- 15. Problems rest with EPA. Focus attention through Greenpeace. Needs more attention from community organizations. Influence should be through them rather than Government. More work is required at set up and planning stages.*
- 16. Government should be more involved in all noxious plants. Worked at QAL 7 years and feels it is worse than the Oil S. P. Yes Government should be involved in re-location.*
- 17. Yes strongly to both. It is shameful the emissions are allowed to continue.*

YARWUN / TARGINNIE RESPONSES

- 1. State Government as the Land Lords need to be more accountable. Greater sense of co-existence with Government required.*
- 2. "Everything that attracted us to this region in 1989 has changed along with our lifestyle. " Plans to retire here now ruined and we feel for our health.*
- 3. "Part of property on Stage 3 land. Difficult financially and cant sell up property to move" Stuck in between because asset limits pension allowance.*
- 4. Extended family lifestyle. Retirement prospects in doubt and cant quit property.*
- 5. "Noise all the time and stink mostly. I am going to sue the bastards"*
- 6. "I welcome industrial growth but it must not be at the cost of human health & well being. I manged to co -exist well with other large industries.*
- 7. Couple in late seventies find emotional difficulty in leaving area to move to a flat in Brisbane but there are health issues here.*
- 8. Media coverage ruining potential sale of property and stuck in a cycle of despair and poverty and failing health.*
- 9. If currently planned expansion of plant and introduction of other companies to area a greater buffer zone needs to be planned. Compulsory acquisition of the Yarwun/Targinnie area is only solution.*
- 10. Unknown longer term effects on crops and water and livestock after buying a farm at Targinnie. Uncertain whether to build.*
- 11. Assess circumstances on an individual basis.*

12. *Shut the plant down.*
13. *Compensate those whose health is affected. Purchase land at pre valuation prices and make up the balance in market prices.*
14. *Shale oil not needed when we have other alternatives.*
15. *Doubts about stage 2 operation & small community lacks voting power to do anything about it.*
16. *Moving people out will accelerate decline in community.*
17. *The new industry is located on excellent agricultural land that could otherwise be used more productively*
18. *Dignity and lifestyle ruined for what is only an experimental plant.*
19. *Exit plan should also involve ensuring quality of life for those left behind.*
20. *Number of people who do not wish to leave area.*
21. *Market value is now less than 50% of replacement. Have stopped doing any more maintenance and improvements*
22. *Concern over fragmentation of community by exit strategy.*
23. *Drastic effects on tourism potential*
24. *Don't mind industry coming so long as it is controlled properly.*
25. *Requires greater medical attention to health problems. Plant should be stopped til adverse affects are sorted out. \$500, 000 in investment turned to a liability.*
26. *People squatting and renting in the area should move out if they are unhappy and stop dividing the community. Noise and odour not a problem. The total industrialization of the area with traffic increase on roads is a worry.*

SUMMARY:

The significant difference between the responses from the control areas and those of Yarwun Targinnie is one of objectivity versus those that hold deep emotional ties to their community, their land, and the lifestyle it represents to them. From an external viewpoint, most of the response from the control group reflects a “cerebral” or thinking separation from those in the Y/T community. Since the former have no ties with the land and are not part of the Y/T community are, their natural instinct is to think favourably on the economic fallout rather than environmental effects on those

whose lives are adversely affected. These environmental effects are likely to be reflected in the health, family, social and financial depression experienced by individuals within the affected community.

The two different approaches are adequately illustrated from the above quotations and the length of the written responses given by those from the community. By way of contrast, responses from the reference areas tend toward Government non-intervention in either the affairs of the company or in the issue of financial assistance for those who wish to re-locate.

This investigation has of necessity been limited by a number of factors. The plans for further expansion of the Oil Shale plant and the possible entry of other industries with noxious bi-products will inevitably require an enhanced investigation of Socio Economic trends in the near future. In that sense this exercise has performed a valuable role in creating a baseline of information and an investigation methodology which can be modified and correspondingly improved.

ATTACHMENTS:

1. Survey index of questions (Summarised from the original)
2. Spread sheet summaries of the replies from the reference areas (telephone) together with percentage summaries based on numbers of responses. (C = Calliope. T = Tannum Sands & Boyne Island, G = Gladstone)
3. Summaries of the responses from the Yarwun / Targinnie area based on mail drops.
Numbered Y1 to Y56. in groups of 10.
4. Percent responses of the important determinants summarized for the Yarwun / Targinnie area.
5. A comparison of results for Yarwun Targinnie against those of the reference areas together with appropriate comments on differences and trends.

SURVEY INDEX OF QUESTIONS

Q	
1	Are you aware of concerns surrounding the Stuart Oil Shale Project
2	Do you feel that you are or might be personally affected by the current or planned phases of the operation.
3	Do you own or are purchasing your own property.
4	What land area do you have. Building block (A), 0-2 hect (B), 2-5 hect (C , 5-50 (D), 50 -500 (E), More (F).
5	Why do you choose to live / operate in your location. Convenience (A), Lower cost (B), Lifestyle (C .
6	Did you buy your property for retirement planning
7	How long have you been at the current address. 0-2yrs (A), 2-5yrs (B), 5-10yrs (C , Longer (D).
8	What is your age bracket 0-20 (A), 20-30(B), 30-40 (C , 40-50 (D), 50-60 (E), 60-70 (F), Over 70 (G).
9	Do you have school children
10	What level Preschool (A), Primary (B), Secondary (C , Tertiary (D).
11	Have you considered listing your property for sale in the last 2 years.
12	Have you tried to sell in the last year (A), 2 years (B), 3 years (C .
13	Have you withdrawn your property from sale
14	Was there any favourable interest in the property (Comments)
15	Did you sell the property.
16	Was the selling price above or below your market expectations
17	Have you done any capital improvements to your property since 1999 (three years)
18	Have you done any capital improvements to your property before 1999 (three years)
19	Do you believe the estimated market value of your property has increased (A), decreased (B), or stayed the same (C .
20	Do you believe there are any major factors that are, or may limit the success of your business or property venture.(Comment)
21	Have you tried to access additional finance in the last two years using your property as collateral
22	Were you successful
23	If not what factors affected the application Interest (A), Excessive borrowing, (B), Reduction in equity (C , Other (D).
24	Do you produce income from your property. If so is it Primary (A), secondary (B), Other (C .
25	How would you describe your financial circumstances Well off (A), Comfortable (B), making ends meet (C , Difficult (D), Other (E).
26	Do you feel that the growth of industry and the possibility of further mining in the area have affected your farming business.
27	Do you feel that the growth of industry and the possibility of further mining in the area have affected your life style and future plans.
28	Do you think the Government should meet with the Yarwun/ Targinnie community to discuss future development plans.
29	Do you think Government should develop an exit strategy (re-location assistance) to assist those who wish to leave

Attachment 2

SOCIO ECONOMIC SURVEY-YARWUN / TARGINNIE AGAINST TANNUM BOYNE / GLADSTONE / CALLIOPE

Q	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	No.	R	R	R	R	R	R	R	R	R	%	%	%	%	%	%
1	Y	N	Y	Y	Y	Y	Y	Y	Y		9	N/1	Y/8								Y 89					
2	N	N	N	N	Y	N	N	N	N		9	N/8	Y/1								N 89					
3	Y	N	Y	Y	N	Y	Y	Y	Y		9	N/2	Y/7								Y 78					
4	B	A	C	E	A	A	F	D	A		9	A/4	B/1	C/1	D/1	E/1	F/1				A 44	B 11	C 11	D 11	E 11	F 11
5	C	C	C	C	C	C	C	A,C	A		9	A/1	AC/1	C/7							C 77	A 11	AC 11			
6	N	N	N	N		N	Y	Y	Y		8	N/5	Y/3								N 63					
7	D	A	C	D	A	A	C	D	D		9	A/3	C/2	D/4							D 44	A 33	C 22			
8	D	C	C	E	C	E	G	F	D		9	C/4	D/2	E/1	F/1	G/1					C 44	D 22	E 11	F 11	G 11	
9	Y2	Y1	Y2	Y2	N	N		Y1	Y1		8	N/2	Y1/3	Y2/3							Y2 38	Y1 38	N 12			
10	C,D	B	C,D	C				D	C		6		B/1	C/2	CD/2	D/1					C 33	CD 33	B 22	D 22		
11	N		Y	N		N	N	N	N		7	N/6	Y/1								N 86					
12											0															
13			N								1	N/1														
14			N		N						2	N/2														
15						N					1	N/1														
16											0															
17	Y		Y	N		N	N	Y	N		7	N/4	Y/3								N 57					
18	N		N					N	Y		4		N/3	Y/1							N 75					
19	A	C	A	A		C		A	A		7	A/5	C/2								A 71	C 29				
20	N		N	N	C		A	N	N		7	N/5	A/1	C/1							N 71	A 14	C 14			
21	Y		N	N		N		N	Y		6	N/4	Y/2								N 66					
22	Y							Y	Y		2		Y/2													
23							A				1	A/1														
24	N	N	A				A	A			5	N/2	A/3								A 60	N 40				
25	B	C	B	B		B		B	B		7	B/6	C/1								B 86	C 14				
26	N		N	N			N	N	N		6	N/6									N 100					
27	N	N	N	N	N	N	N	N	N		9	N/9									N 100					
28	N		Y	Y	Y	Y	N	N	N		8	N/4	Y/4								N 50	Y 50				
29	Y	Y	Y	Y	Y	Y	Y	N	Y		9	N/2	Y/7								Y 78	N 22				

SOCIO ECONOMIC SURVEY - YARWUN / TARGINNIE AGAINST TANNUM BOYNE / GLADSTONE / CALLIOPE

Q	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	No.	R	R	R	R	R	R	R	R	%	%	%	%	%	%
1	N	Y	Y	Y	Y	Y	Y	Y	Y		9	N/1	Y/8							Y 89					
2	N	N	N	N	N	N	N	N	N		8	N/9								N 100					
3	Y	Y	Y	Y	Y	Y	Y	Y	Y		9	N/2	Y/7							Y 78					
4	A	A	E	D	A	A	A	A	A		9	A/7	D/1	E/1						A 78	D 11	E 11			
5	A	C	A	C	A	C	A	C	C		9	A/6	C/3							A 67	C 23				
6	N	N	N		N	N	N	Y	Y		8	N/6	Y/2							N 75					
7	B	C	D	A	A	B	D	B	D		9	A/2	B/3	C/1	D/3					B 33	D 33	A 22	C 11		
8	B	D	E	B	E	D	D	G	F		9		B/2		D/3	E/2	F/1	G/1		D 33	B 22	E 22	F 11	G 11	
9	N	N	N	N	N	Y	Y				7	N/5	Y/2							N 71	Y 28				
10						B,C,D					2		B/C/1	CD/1						BC 50	CD 50				
11	N	N	Y		N	Y	N	N	N		8	N/6	Y/2							N 75	Y 25				
12			N			Y					2	N/1	Y/1							N 1	Y 1				
13			N			Y					2	N/1	Y/1							N 1	Y 1				
14			N			N					2	N/2								N					
15			N								1	N/1								N					
16											0														
17	Y	Y	N		N	Y	N	N	Y		8	N/4	Y/4							N 50	Y 50				
18		Y	N		N		Y	N	N		5	N/3	Y/2							N 60	Y 40				
19	A	A	Y		A	A	A	A	A		8	Y/1	A/7							A 88	Y 12				
20	N	N	N		N						4	N/4								N 100					
21	Y	Y	N		N	Y	Y	N	N		8	N/4	Y/4							N 50	Y 50				
22	Y	Y	N			Y	Y				5	N/1	Y/4							Y 80	N 20				
23											0														
24	N	N	Y	N				N			5	N/4	Y/1							N 80	Y 20				
25	B	B	D	B	B	C	B	C	B		9		B/6	C/2	D/1					B 67	C 22	D 11			
26	N	N	Y				N		N		5		N/4	Y/1						N 80					
27	N	N	N	Y		Y	N		N		8		N/6	Y/2						N 75					
28	N	N	Y	Y	N	N	Y	N	Y		7		N/4	Y/3						N 57	Y 43				
29	Y	Y	N	Y	N	N	N	N	Y		9		N/5	Y/4						N 56	Y 44				

SOCIO ECONOMIC SURVEY - YARWUN / TARGINNIE AGAINST TANNUM BOYNE / GLADSTONE / CALLIOPE

Q	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	No	R	R	R	R	R	R	R	R	%	%	%	%	%
1	Y	Y	Y	Y	Y	Y	Y	Y	Y		9		Y/9							Y 100				
2	Y	N	Y	N	N	N	N	Y	N		9	N/6	Y/3							N 67				
3	Y	N	Y	Y	Y	Y	N	Y	Y		9	N/2	Y/7							Y 78				
4	A	A	A	F	A	A	A	A	F		9	A/7								A 78	F 22			
5	B	A	A,B,C	A,B,C	C	A,B,C	A	B			8	A/2	B/2	BC/2	C/1					AZ5	B25	BC 25	AB 12	C 12
6	Y	Y	Y	Y	Y	N	N	N			7	N/3	Y/4							Y 57				
7	D	A	A	D	C	C	A	C			8	A/3		C/3	D/2					A 38	C 38	D 25		
8	F	C	C	C	D	C	D	C			8			C/5	D/2					C 63	D 25	F 13		
9	N	N	Y1	N	Y3	N	N	Y2	N		9	N/6	Y1/1	Y2/1	Y3/1					N 67	Y 11	Y2 11	Y3 11	
10			B	C	A,B,C		A,B				4		B/1	C/1	AB/1	ABC				B 25	C 25	AB 25	ABC25	
11	N		N	Y	Y	N	N	Y	N		8	N/5	Y/3							N 63	Y 38			
12				A	N		N				3	N/2		A/1						A 1				
13				N							1	N/1								N 1				
14				Y							1		Y/1							Y 1				
15				Y							1		Y/1							Y				
16											0													
17	Y		N	Y	Y	Y	A	Y	N		8	N/2	Y/5							Y 63				
18	N			N		N		Y	Y		5	N/3	Y/2							N 60				
19	C		A	C	A	A		A	A		7	A/5		C/2						A 70	C 29			
20	N		N	N	N	N		N	N		7	N/7								N 100				
21	N		N	N	Y	N	N	Y	N		8	N/7	Y/2							N 88				
22					Y			Y			2	Y/2								Y 25				
23											0													
24			N	A	N	N	N	N	N		7	N/6	A/1							N 86	A 14			
25	B	C	B		C	B	C	C	B		8		B/4	C/4						B 50	C 50			
26				N	N	N	N	Y			4	N/3	Y/1							N 75	Y 25			
27	N	N	N	Y	Y	N	N	Y	Y		9	N/5	Y/4							N 56	Y 44			
28	Y		Y	Y	Y	Y	N	Y	Y		8	N/1	Y/7							Y 88				
29	Y		Y	Y	Y	Y	N	Y	Y		8	N/1	Y/7							Y 88				

SOCIO ECONOMIC SURVEY - YARWUN / TARGINNIE AGAINST TANNUM BOYNE / GLADSTONE / CALLIOPE

[illegible]

Attachment 4

SOCIO ECONOMIC SURVEY - YARWUN / TARGINNIE AGAINST TANNUM BOYNE / GLADSTONE / CALLIOPE

Q	No	%	%	%	%	%	%
1							
2							
3	56	Y 96					
4							
5	4	3 C					
6	55	Y 82					
7	55	D 60	C 20	B 16	A 5		
8	56	D 32	E 29	F 18	C 16		
9	54	N 60	Y1 35	Y2 20	Y4 6		
10	26	B1/1 4	B2/2 3	BC 5	B2C 1	D 1	DD 1
11	54	Y 60					
12	30	C 30	B 23	A 20			
13	27	N 80	Y 19				
14	29	N 69					
15	27	N 100					
16							
17	55	Y 64					
18	53	Y 47					
19	48	B 81	C 10	A 8			
20	54	Y 78					
21	54	N 74					
22	14	Y 64					
23	8	B 50	A 38	D 12			
24	42	A 57	C 21	B 12	N 9		
25	56	C 50	B 21	D 13	E 9		
26	49	Y 84					
27	54	Y 100					
28	55	Y 100					
29	55	Y 100					

Q	YAR/TARG	CALLIOP	TAN/BOY	%	%	COMMENTS
1	Y (89)	Y (89)	Y (89)	Y (100)		Are You aware of concerns surrounding the Shale Oil Plant? Positive response from reference areas
2	N (89)	N (89)	N (100)	N (87)		Do you feel you might be personally affected by the operation & extensions? Positive response from the negative
3	Y (96)	Y (78)	Y (78)	Y (78)		Do you own your property? Strong ownership in the Y/T area reflecting rural values.
4	A (44)	A (78)	A (78)	A (78)		What land area do you have? (Not in mail drop version but would have been useful) (Dominance of 2 hectare blocks)
5	*	C (77)	AC (67)	A (25)		Reasons for location.? Very significant lack of total response from Y/T area. (4) Are we to take it for granted that it is lifestyle
6	Y (82)	N (63)	N (75)	Y (57)		It is to be predicted that the lifestyle factor in the other reference areas is diluted by factors such as convenience. Is property part of retirement plan? Very significant positive response that inevitably reflects life style and relationship with the land. Situation in reference areas is in contrast to that response - reflecting itinerant attitudes.
7	D (60)	D (44)	B (33)	A (38)		How long at current location? 60% of residents in the Y/T area have been there longer than 10 yrs. As would be expected areas of Calliope have similar characteristics however Gladstone reflects more transience.
8	D (32)	C (44)	D (33)	C (63)		What age bracket? Significantly 60% of Y/T residents are 50 to 60yrs
9	N (60)	Y2 (38)	N (71)	N (67)		Do you have school aged children? 60% have no children which correlates with the previous question.
10	B1 (54)	C (33)	BC (50-)	B (25)		Education levels? Slightly more than half are at High School. Indications are that older children might move away when older to the reference areas for higher education & jobs.
11	Y (60)	N (86)	N (75)	N (63)		Listing of property ? Highly significant that 60 % of the Y/T residents have considered listing. Trend opposite in ref areas.
12	C (30)		N/1, Y/1	A/1		30 % of those above in Y/T have actively tried to sell for te last three years. Small figures from the ref centres are not valid
13	N (80)	N / 1	N/1	N/1		Withdrawn property from sale? 80 % in Y/T who have got their property for sale are still promoting the sale.
14	N (69)	N / 2	N	Y/1		Almost 70% of those interested in selling in the Y/T area report no interest from the market.
15	N (100)	N / 1	N	Y		No sales have been recorded over the last three years in Y/T.
16		*		*		
17	Y (64)	N (57)	N (5)	Y (63)		Capital improvements last 3 years? 64 % in Y/T report they have. Whether this is an attempt to promote sale is in question.
18	Y (47)	N (75)	N (80)	N (60)		Capital improvements before 3 years showed a strong positive trend over ref areas. ?? Before plant problems.
19	B (81)	A (71)	A (88)	A (70)		A highly significant inverse correlation in the perceived market value of Y/T properties against those in the reference areas.
20	Y (78)	N (71)	N (100)	N (100)		Almost 80% felt depression of their market values in Y/T whereas the opposite was true of reference area properties.
21	N (74)	N (66)	N (50)			Factors limiting success?!! Overwhelmingly (78%) this was interpreted by Y/T in terms of the presence of the plant. This was opposite to ref areas. Perhaps the latter sees the plant as contributing to their welfare from a distant perspective.
22	Y (64)	*	Y (80)	Y (25)		Tried to access finance? Negative responses were similar for all areas & provide no conclusion.
23	B (50)		*	*		Successful? The small response figures are unreliable. Although 64% succeeded it might have been on larger properties.
24	A (57)	A (80)	N (80)	N (86)		Factors in borrowing? The greatest proportion attributed adverse borrowing factors to reduction in equity.
25	C (50)	B (86)	B (67)	B (50)		Produce income? 57% of income produced by Y/T residents is primary in origin. In contrast Tannum & Gladstone do not. The greatest proportion of Y/T residents (50%) believe they are just meeting ends meet. A number were worse off still.
26	Y (84)	N (100)	N (80)	N (75)		Significantly greater proportions in the reference areas were quoted as being comfortably off.
27	Y (100)	N (100)	N (75)	N (56)		Affect on farming business? 100% of Y/T residents believed their livelihood is affected.
28	Y (100)	N (50)	N (57)			Lifestyle? 100% in Y/T believed their way of life was affected. Again the opposite was true of the reference areas
29	Y (100)	Y (78)	N (56)	Y (88)		Government representation? 100 % of Y/T wanted to have State or Federal presence. The ref centres were ambivalent. Government exit strategy? Again 100% for from Y/T. Sympathy from Calliope Y/T8% but not from Tannum (N/56%)

**Submission of the Yarwun/Targinnie Fruit and Vegetable Grower's Association
Inc to the Queensland Department of State Development on the Draft
Environmental Impact Statement on the Development of Stage-2 of the Stuart
Shale Oil Deposit
November 1999**

Main issues identified

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Recommendations

The following is a summary of the recommendations contained in this submission:

1. Transport: If Lime is required for Stage-2 operations, rail facilities should be used in its transport to the Plant as opposed to haul trucks.
2. Noise: Further studies into the impact of noise need to be conducted, as the Yarwun/Targinnie residents' noise concerns were insufficiently investigated and/or reported in the draft EIS. In particular, it is recommended that further study be done to isolate and determine the impact of low frequency noises on the neighbouring communities of Yarwun/Targinnie.
3. Noise: It is recommended that noise modelling be combined with physical testing of simulated sounds, similar to those that shall be emitted in Stage-2 operations, to determine the validity of the modelling.
4. Noise: It is recommended that the reported minimal impact of noise at the six sensitive sites be discounted, and further monitoring of these be conducted to establish pre-Stage-1 background noise levels.
5. Noise: It is recommended that investigations be conducted to determine whether the 'Amphitheatre Effect', which the resident's speak of, does result in exaggeration of noise at their properties.
6. Noise: The draft EIS fails to mention the impact of resonance on the dwellings and buildings in the Yarwun/Targinnie area. It is recommended that research be conducted to determine whether this is a consequence of the plant's operations, in response to such community claims.
7. Air Emissions: More research and modelling should be undertaken to determine a more accurate potential gradient for the Stage-1 and 2 stacks under both stable and unstable conditions.
8. Air Emissions: It is recommended that the long-term levels of nitrogen dioxide in the Gladstone region be established by the responsible government authority.

9. Air Emissions: It is necessary for the proposed Australian National Air Quality Standards regarding PM_{2.5} to be adopted and applied to ensure the health of Yarwun/Targinnie residents is not damaged.
10. Air Emissions: It is recommended that the United States National Institute for Occupational Safety and Health (NIOSH) list of chemical hazards and their respective exposure limits which are outlined in Table 9 be used in determining the acceptable limits of hydrocarbons emitted.
11. Air Emissions: Strict controls on the procedures permitting plants to receive temporary commissioning allowances to emit more than the acceptable levels of emissions should be imposed. This will provide the surrounding communities with a little more security that the emission levels will not be harmful to their health or their crops.
12. Air Emissions: It is recommended that given the availability of effective pollution control technologies as referred to in the text, these technologies should be employed by SPP/CPM to drastically reduce their air and particulate emissions.
13. Air Emissions: It is essential that at all stages of the Project, the EPA actively monitor plant operations so remedial action is immediate and any breaches of the license conditions may be enforced.
14. Odour: The EIS does not address the subject of odour. Given that offensive odours have been an issue with Yarwun/Targinnie residents, particularly on October 2nd 1999, and again on November 18th 1999, investigations into the actual odour emitted in all stages of the process are recommended.
15. Odour: It is recommended that the consultant's proposal of capturing and flaring the headspace vent gases incidental to the loading of oil into ships be implemented.
16. Odour: It is recommended that odour monitors be installed so as to give early warning of potential offensive odours. This would mean that remedial action could be taken to forestall any impact on the Yarwun/Targinnie residents.

17. Groundwater: It is recommended that a precautionary water strategy be implemented, with the provision of reticulated water to the Yarwun/Targinnie community. It is suggested that the appropriate government authority(s) assess the level of supplementary water needed to offset the increased risk to water availability in this area. This supplementary water is to be supplied to the Yarwun/Targinnie community free of charge.
18. Crop Exposure to Artificial Light: It is recommended that research be conducted into the issues of plant lighting, its visibility in the Yarwun/Targinnie area, and its potential impacts on the area's horticultural crops, as none of these community concerns are mentioned or investigated in the Draft EIS.
19. Devaluation of Land: Should land values decline in the future, it is recommended that an inquiry be undertaken by a member of the appropriate government tribunal into the cause of the decline, and, if the decline can be attributed to industrial development within the region then the landowner should be compensated.
20. Purchase of Properties: It is recommended that the landowners in the Targinnie area, who are directly affected by the mining lease be able to sell their properties outright to SPPD and lease them back until they are required by the Co-Venturers for mining use.
21. Purchase of Properties: In addition to this, it is recommended that they be compensated by the Co-Venturers, with a disturbance allowance based on an agreed percentage of the value of their properties, due to the nature of the sale being 'compulsory acquisition'.
22. Health Effects: It is recommended that preventative, as well as remedial systems, be built into the plant to avoid potentially harmful concentrations of emissions being released into the atmosphere, specifically:
- A more effective method of grading oil shale,
 - The compression and liquefaction of the excess gaseous emissions,
 - The installation of electrostatic precipitators and/or bag filters.

23. Health Effects: It is recommended that there be more investigation into the accumulative health effects of increases in fine and ultra-fine particles resulting from plant emissions before the commencement of Stage-2 operations.
24. Health Effects: It is recommended that the commitment by the company “not to restart Stage-1 operations until confidence of controlling the process is achieved” should be enforced by the EPA. A similar policy should apply to all stages of the Project.
25. Health Effects: As a number of residents use tank water, the health impacts of contaminants from plant operations must be investigated to determine the effects of possible contaminations.
26. 2nd October 1999 Release Event: It is recommended that further examination of the October 2nd incident be undertaken as the methods for calculating the plume trajectory and puff model did not take into account the effects of terrain on the meteorology.
27. 2nd October 1999 Release Event: It is recommended that more advanced monitoring and analysing equipment be installed to allow more accurate ground level concentration readings to be obtained. These should be easily accessible to the public and accountable departments.
28. 2nd October 1999 Release Event: It is recommended that research be undertaken to determine the synergistic effects of a combined pollutant mixture on humans and horticultural crops as currently, these effects are not well known.
29. Greenhouse Gas Emissions: It is recommended that greenhouse gas emissions be regulated in a manner consistent with the intention of the Kyoto Protocol. The Co-Venturers should be encouraged to undertake further investment in carbon offsets.
30. Reforestation Activities: In addition to the existing reforestation trials, property acquired and adjacent to the project should also be the focus of reforestation activities.
31. Effect on the Yarwun/Targinnie Fruitgrowers’ Co-Operative: It is recommended that should the Yarwun/Targinnie Fruitgrowers’ Co-Operative close its operation, as a result of the exiting of

members from the area, compensation should be paid equal to the difference between its fair value as at the end of the 1998 financial year, and its salvage value at the point of cessation.

32. Effect on the Yarwun/Targinnie Fruitgrowers' Co-Operative: The government should give serious consideration to the provision of 'social adjustment assistance' for those seriously affected by the Project.

Introduction

This submission contains several issues, which are of concern to the fruitgrowers and the community of Yarwun/Targinnie. Each issue is depicted in bold in the body of this submission, followed by an explanation of the reasons why they cause concern. As well as introducing and discussing these issues, this submission presents recommendations for actions which the Co-Venturers and government should perform to ease or eliminate the impact of these concerns.

The project is in close proximity to an area of highly productive tropical fruit growing land, which has been used for horticultural activities for over one hundred years. Some of this land will be resumed by the shale oil mine if Stage-3 of the Stuart Oil Shale Development proceeds. However, for those that remain there will be considerable disturbance to both their domestic and farming activities. The properties are directly down wind of the plant and existing mining operations of the Stage-1 development. This means that any defect in the plant operations producing noxious pollutants, transposes to an immediate impact on the residents and the commercial crops in the Yarwun/Targinnie area.

It is understandable that the residents expect an emission standard from the mining and processing operations to be of a particularly high standard, so as to prevent noxious chemicals and particles from causing harm to their general health and wellbeing and from adversely affecting their livelihood. The most immediate issue is the testing of the Stage-1 plant, where the emissions have reached unacceptable levels during the commissioning of the processing plant. They question whether this is just a taste of the future, and if so they hold fears for their wellbeing, both physically and financially.

The fruitgrowers fail to understand the hands-off approach of the government to this problem. They were the first to settle the area and are becoming very upset with the government's inaction in seeking realistic solutions to the increasing levels of pollutants reaching the Yarwun/Targinnie area as a result of increasing industrialisation of the Gladstone/Calliope industrial zone. The fruitgrowers are not opposed to the development of the industrial base in this region, but insist that it be done in a manner so as to improve the surrounding environmental conditions. There seems to

be little restraint on the level of emissions by industries in the industrial zone, and if a stand is not taken, the position is likely to get worse.

Yarwun/Targinnie Fruitgrowers' Concerns

In December 1998, the Yarwun/Targinnie Fruitgrowers submitted for inclusion in the Stage-2 DEIS Terms of Reference, the following concerns:

- The effect on the asset values and sale price of properties surrounding the project area and ability to attract purchasers,
- The desirability of the Yarwun/Targinnie fruit and vegetable areas for horticultural production and grazing in adjacent areas having been affected by the shale oil development and other proximate industrial developments,
- The uncertainty surrounding the effect of the project on the availability of groundwater for irrigating crops, pasture growth and stock watering,
- The additive social and economic impacts of the project on top of that attributable to existing industries in the local area,
- The possible effects of the project on the quality of water supply for domestic consumption and for the production of horticultural crops,
- The effect of air pollutants, lighting, air temperature, sulphur dioxide emissions, salinisation of existing water resources, and other environmental impacts on the quality of horticultural products, and
- Overall impact of the project on community well-being and welfare, and on the quality of the present and future environment.

Policy Parameters

Section 3A The Commonwealth Environment Protection and Biodiversity Conservation Act 1999 sets out the principles of ecologically sustainable development in the following terms:

- (a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;
- (b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;

(c) the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;

(d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;

(e) improved valuation, pricing and incentive mechanisms should be promoted.

The Queensland provisions are incorporated in the Environmental Protection Act 1994. This Act is to protect Queensland's environment while allowing for development that improves the total quality of life, now and in the future, in a way that maintains ecological processes on which life depends. This approach is termed 'ecologically sustainable development'.

Both the State and Commonwealth provisions are worthy of consideration in the assessment of the Stuart Shale Oil Stage-2 project. They both embrace the concept of ecological sustainable development, and are indicative of the need to take a pro-active approach rather than a simple compliance approach to environmental requirements.

The Impact Assessment Study takes the compliance approach. It is evident that the analysis needs to be improved in a number of areas, before this project can be considered for approval by the Queensland State Government as the lead organisation and affirmed at the Commonwealth level. The additional information needed is contained in the attached questions to the proponent.

Transport

There is concern over the increase in large trucks that will be travelling to and from the plant in Stage-2. The EIS estimates that there will be 4120 truck trips (or 8240 truck movements) per annum during the operational phase.¹ It is estimated that trucks carrying lime from the mine at Taragoola will account for 3000 (or 70%) of this annual figure.² At this stage it is not certain whether lime will actually be required in Stage-2 operations, as this is dependent on Stage-1 results. If it were required, it would be used during the combustion process in the ATP to reduce the Sulphur Dioxide emissions in the flue gases³.

Two schools, namely Calliope State School and Clinton State School, are proximate to the route the lime-carrying trucks will take. The existence of approximately ten trucks trips per day (or twenty truck movements)⁴ will represent a substantial risk to school children travelling to and from the nearby schools as well as to residents and commuters. It is felt that if this increase in truck movements can be avoided, then the chance of accidents will be lowered.

If Lime is required for Stage-2 operations, rail facilities should be used in its transport to the Plant as opposed to haul trucks.

Utilising rail facilities would remove the bulk of estimated Stage-2 truck trips from 4120 to 1120 per annum. There is an existing rail facility which links neighbouring plant QCL with its own East End Mine approximately 35 kilometres away. Although the Taragoola mine is on the Monto line, it would be possible to rail lime to the plant using the QCL spur, although it is acknowledged that an extension of this line to the Stuart Oil Shale Plant would have to be constructed.

It is acknowledged that rail deliveries of lime would mean Stage-2 would have to receive larger quantities of lime at a time and therefore it would need facilities to store the stock increase. However, lime is an inert material and therefore it would not be difficult to store.

Noise

There is concern over the noise that may result from Stage-2 operations. These noises are those which are incidental to mining and processing, such as, the ATP, Induced-Ducting and Forced-Ducting fans, crushers, pumps, compressors, conveyors, rollers, chain reclaimers, gas burners, excavators, loaders, trucks and warning hooters on machinery, etc. The landowners and residents report that noises have been often heard during Stage-1 operations and therefore believe that the larger scale operations of Stage-2 will be even more audible.

Sections 4.7 and 5.5 of the EIS, and the consultancy report by Pacific Air & Environment on Noise is not very comprehensive.

Further studies into the impact of noise need to be conducted, as the Yarwun/Targinnie residents' noise concerns were insufficiently investigated and/or reported in the draft EIS.

Of particular concern is the carrying of the low frequency noises. The EIS makes only a brief mention of frequency, simply stating that it is a factor of noise transmission.⁵ The report refers only to the total decibels either recorded or expected. Although low frequency noises may not have a loud impact, they can be very annoying, and can cause fatigue. Residents complain about low frequency noises, such as whirring of ATP fans and various other machinery, which they regularly hear during the current Stage-1 plant operations.

It is recommended that further study be done to isolate and determine the impact of such low frequency noises on the neighbouring communities of Yarwun/Targinnie area.

While actual background noises were physically tested at several sites in the Yarwun/Targinnie area, it appears, from the Pacific Air & Environment Noise Impact Assessment, that modelling was the only method used to predict future noise levels expected of Stage-2. Whilst it is acknowledged that a widely tested model based on internationally accepted methods was used by the consultants,⁶ it is considered that physical testing should also have been performed. An example of this would be creating noises at the plant similar to those that will be generated in Stage-2 operations and analysing whether these can be detected at the testing sites and/or by residents of Yarwun/Targinnie.

It is recommended that noise modelling be combined with physical testing of simulated sounds, similar to those that shall be emitted in Stage-2 operations to determine the validity of the modelling.

The EIS states that the high level of night-time noise is due to the influence of natural noise sources such as insects and frogs.⁷ These noises may result in the monitoring stations recording a high background noise, however, these noises do not bother the residents as cicadas and other insect noises are a natural element of a rural environment and the residents are conditioned to hearing them. The noises that they hear from the plant, such as the ATP are foreign, mechanical noises, which 'stand out' from the natural noises because they are alien to the environment. Even though the EIS reports that the plant's noises may not be louder, they are the ones which bother the residents as they do not belong in a rural setting, and therefore are very audible.

The EIS makes mention of six sites in the Targinnie area which are noise sensitive.⁸ The EIS states that the impact of noise on noise sensitive sites not only depends on the noise level, it also depends on the amount that noise stands out *above the existing background noise at that place*.⁹ The EIS fails to mention whether any background testing was performed at these noise-sensitive sites, and if it was, it does not provide the data from this testing. The EPA specifies that noise at any sensitive place must not exceed the background noise during the day and evening by more than 5dB or by more than 3dB during the night. Not knowing what the background noise levels are at these sites makes it impossible to determine whether this will be breached.

It is therefore recommended that the reported minimal impact of noise at the six sensitive sites be discounted, and further monitoring of these be conducted to establish pre-Stage-1 background noise levels.

The Targinnie residents speak of an 'Amphitheatre Effect', which results in noises from the plant being amplified at their properties. The properties are surrounded by hills with Mt Larcom being immediately behind them. They believe that the soundwaves from the plant/mine bounce off the surrounding undulations and are channelled back to their properties, thereby heightening the noise.

It is recommended that investigations be conducted to determine whether the 'Amphitheatre Effect', which the residents speak of, does result in exaggeration of noise at their properties.

The EIS found that the current levels of ground vibration were negligible and therefore it was not measured.¹⁰ It also claims that vibrations are unlikely to be an issue of Stage-2, due to operations being more than 50 metres from a vibration-sensitive place, and the fact that blasting is not planned to occur at the mines.¹¹ Residents have reported that they have experienced possible (ground) vibrations during the Stage-1 operations, and therefore question the claim that they will not be a consequence of Stage-2. It is quite possible that the vibrations they feel are as a result of resonance. The resonance which causes vibrations in their dwellings are a result of the low frequency noises mentioned previously. Many residents say that their homes currently resonate when the Stage-1 plant (particularly when the ATP) is operating. They therefore believe that resonance will continue to be an issue with Stage-2 operations.

The draft EIS fails to mention the impact of resonance on the dwellings and buildings in the Yarwun/Targinnie area. It is recommended that research be conducted to determine whether this is a consequence of the plant's operations, in response to such community claims.

The Report "Advisory Standard for Noise" which was issued by the Division of Workplace Health and Safety (Qld) states that exposure to low level noise (between 40 and 75 dB), although not capable of causing noise-induced hearing loss, is known to cause stress and other adverse health effects. It describes the consequences of stress resulting from this low-level, low frequency, noise as: fatigue, anxiety, depression and/or hostility. It also mentions noise related stress factors such as irritability, headaches, moodiness, insomnia, disturbance of psychomotor reactions, loss of concentration and speech interference. These consequences are consistent with resident's reports of the effects of Stage-1's noise on them.

All monitoring sites (R1 to R6), recorded background noises which were less than 40dB, with the exception of Swans Road (R4). When the noises from the plant and mining operations are added, the increased noises may well trigger the above-mentioned stress and health related consequences in the Yarwun/Targinnie residents. The Workplace Health and Safety Report recommends that plants should be designed to prevent or minimise any risks to health or safety resulting from the emission of noise.¹²

Of particular concern is the deposition of overburden in stockpiles at up to 30 metres above ground level. The truck and machinery activity at this elevated height will exacerbate the noise level of the mining operations and cast considerable doubt on the results of the noise estimation models. These models did not include the effect of this noise source.

The question of the remedial effects of planting fast-growing trees within the vicinity of the mine site is discussed elsewhere in this report.

Air Emissions

The report does not deal with the effects of the atmospheric emissions on horticultural activities. It is assumed that the plant will be emitting a low level of toxins and that the additions to the existing load will be negligible. The fruit growers are directly affected parties as the fruit growing areas are

proximate and in a direct line to the prevailing winds from the refinery site. Any increase in pollution levels is likely to have a direct effect on the health of the residents in the area and on the viability of fruit and vegetable crops. Therefore it is necessary to carefully evaluate any foreseeable environmental effects on the area.

The modelling conducted for this assessment relies primarily on the Industrial Source Complex (ISC) dispersion model. Even though the Ausplume model is accepted as the preferred regulatory dispersion model in Queensland, the ISC model was chosen.¹³ The Ausplume and ISC3 models both have limitations and use several key assumptions, which need to be considered in light of the fact that they are only ever approximately satisfied.¹⁴ The modifications to the ISC air dispersion model were made using data from the Gladstone Power Station taken from August 1982 to March 1986 which is unsuitable seeing that significant changes may have occurred in the Gladstone area in the past 13 years.¹⁵ The Pasquill-Gifford-Turner (PGT) scheme used in ISC is based on specific and limited experiments and more research has clearly shown that there are shortcomings in the dispersion estimates based on the PGT scheme. It was established by Venkatram (1996) that dispersion coefficients based on surface-layer similarity theory (SST) offers significant improvement. The coefficients used to predict plume spread with increasing distance from the source were developed approximately 10 years ago.

In certain conditions it can be said that the plume travels downwind, and relatively high in-plume pollutant concentrations are maintained. The impact of such a plume on nearby elevated terrain can therefore yield high ground level concentrations which could cause adverse affects to flora.¹⁶ If the actual gradient at the height of the plume is higher or lower than the default value in class F conditions of 0.035K/m which is used in most Guassian air dispersion modelling programs, the final rise may also be higher or lower than expected. In some situations this could dramatically alter the modelled ground level concentrations and could mean the difference between impacting significantly on elevated terrain and having no impact. The potential gradient of the Stage-1 and 2 stacks is likely to lie no higher than the range 0.005 – 0.01K/m under stable conditions.¹⁷

More research and modelling should be undertaken to determine a more accurate potential gradient for the Stage-1 and 2 stacks under both stable and unstable conditions.

There have been some difficulties in the accurate measurement of the pollution levels noted in the report. The data comparing nitrogen dioxide and nitrogen oxide levels were taken in 1984 when some of the industries affecting the Yarwun/Targinnie residents such as Orica, QCL, Ticor and the Magnesium Pilot-Plant were not present.¹⁸ The report makes an assumption that although the EPA does not report on the longer-term averages for nitrogen dioxide in the Gladstone region, it is evident that the long-term levels would be well within the relevant goals.¹⁹ This assumption is not based on facts and additional reporting is required to validate this statement.

It is recommended that the long-term levels of nitrogen dioxide in the Gladstone region be established by the responsible government authority.

An assumption is also made that for longer-term impacts, the annual average nitrogen dioxide ground level concentrations will be a 50% conversion rate from nitrogen oxide to nitrogen dioxide.²⁰ This statement is not backed up by any supporting information and should be proved if it is to be used in modelling methods. The four-hour average value predicted for the Project operating with regional sources is 179ug/m³ which exceeds the *EPP (air)* guidelines of 95ug/m³. This will be due to the flare burning excess gas, which accounts for 53% of the Project nitrogen emission and should occur only very occasionally, if at all.²¹ However, when the flare is functioning, the high nitrogen dioxide levels could have an unfavourable impact on the health and crops of the Yarwun/Targinnie fruitgrowers and the community. The nitrogen dioxide concentrations including the Project will increase primarily due to the inclusion of flare emissions, which could have a significant effect on fruit yields in the Yarwun/Targinnie area.²²

Table 5.15 indicates that there will be a considerable increase in air emissions of sulphur dioxide in Stage-2.²³ There is little doubt that the increased levels of sulphur dioxide are likely to harm the vegetation, even when based on temperate climate indicators of the United Kingdom. It was acknowledged in the Comalco Supplementary IAS that there will be destruction of lichens. There needs to be further research to ascertain whether the tropical horticultural crops will be effected. It is unclear whether the supposed effect of the buoyancy of the plume or the introduction of scrubbers will be sufficient to give the degree of certainty required for viable horticultural.

Table 4.2 shows that the goal for 10 years in regards to the maximum allowable exceedances of sulphur dioxide and nitrogen dioxide is either one day a year or none at all.²⁴ However this year

alone, 4 incidents have occurred on August 19th and 20th, October 2nd and November 18th on which the level of emissions may have exceeded these levels.

With Stage-2 operating, the Stuart Oil Shale Project will emit 14.8% of the Gladstone regions sulphur dioxide and 12% of the nitrogen dioxide emissions.²⁵ This will represent a marked increase in the levels of sulphur dioxide and nitrogen dioxide emission levels affecting the yields of the horticultural crops of the Yarwun/Targinnie fruitgrowers.

Figure 5.4 shows that on six occasions since August 1997 ash residue has exceeded the acceptable level of 120mg/m²/day.²⁶ With the commencement of Stage-2 of the Project, it is probable that the levels of dust emissions will increase dramatically due to mining operations. Table 10.1 also indicates that the total solid particulates experienced during Stages 1 and 2 of the Project will produce only 3ug/m³, however, in years 6, 14 and 17 of the mining operations, the levels will increase dramatically to 93ug/m³, 90ug/m³ and 83ug/m³ respectively.²⁷ Even though dust mitigation measures will be undertaken by the Project mine, the increase in dust emissions is likely to have an adverse impact on the Yarwun/Targinnie fruitgrowers and the community. The two standardised approaches for measuring particulates are:

1. To measure only particles less than or equal to 10 microns equivalent diameter to give a parameter named "PM10" - also referred to as "inhalable particles", and
2. To measure only particles less than or equal to 2.5 microns equivalent diameter to give a parameter named "PM2.5" - also referred to as "fine particles".

In Australia there are only guidelines in place regarding emission levels of PM10, however, the proposed Australian National Air Quality Standards are 50 ug/m³ maximum 24-hour average for PM10, and 25ug/m³ for PM2.5.²⁸ Latest research indicates that PM2.5 relate more closely to the health data. From a physiological perspective, it is well established that "smaller" airborne particles – for example, in the size range 1 to 2.5 microns diameter, penetrate and deposit more deeply into the lungs than "larger" particles greater than 10 microns diameter.²⁹ As the health of the residents may be at risk from exposure to high levels of particulates, it is necessary to obtain readings and monitor the levels of PM2.5 in conjunction with levels of PM10. In 1997, the U.S. Environmental Protection Agency created new federal air quality standards for PM2.5 and proposed new requirements to reduce the regional haze that impair visibility. The PM2.5 standards complement existing federal and state standards that target the full range of inhalable particulate matter

(PM10).³⁰ The 1997 EPA PM2.5 standards adopted for the United States are a 24-hour standard of 65 ug/m³ and an annual standard of 15 ug/m³.³¹

It is therefore necessary for the proposed Australian National Air Quality Standards regarding PM2.5 to be adopted and applied to ensure the health of Yarwun/Targinnie residents is not damaged.

There are currently no guidelines in place in Queensland regarding acceptable levels of hydrocarbons. The United States National Institute for Occupational Safety and Health (NIOSH) has developed a list of chemical hazards and their respective exposure limits which are outlined in Table 9 should be used in determining the acceptable limits of hydrocarbons emitted.³²

*It is recommended that the United States National Institute for Occupational Safety and Health (NIOSH) list of chemical hazards and their respective exposure limits which are outlined in Table 9 be used in determining the acceptable limits of hydrocarbons emitted.*³³

Presently, Stage-1 of the Project is allowed to emit double the air emission levels set by the EPA which may be attributable to the very new technology utilised by the pilot plant.

Strict controls on the procedures permitting plants to receive temporary commissioning allowances to emit more than the acceptable levels of emissions should be imposed. This will provide the surrounding communities with a little more security that the emission levels will not be harmful to their health or their crops.

These strict controls would have forced the Project to minimise their emission levels from the beginning and would not have allowed them to experiment with untried technology which resulted in adverse effects for the surrounding Yarwun/Targinnie community.

To reduce the level of emissions of sulphur dioxide the Kalgoorlie Nickel Mine has adopted a method where the process gas from the smelter containing sulphur dioxide is ducted to the acid plant. This plant comprises a gas cleaning section to remove impurities and an oxidation section where the sulphur dioxide is removed from the gas to produce market grade sulphuric acid. After the sulphur dioxide has been removed, the clean gas is discharged into the atmosphere.

Exxon has also developed processes to reduce the emissions from its operations. Exxon Research and Engineering Company's (ER&E) environmental technologies, which are well-known in industry and licensed globally, include:³⁴

Wet Gas Scrubbing

Kellogg Brown & Root (KBR) has an agreement with ER&E to assist in the marketing, design, procurement and erection for Exxon's Wet Gas Scrubbing (WGS) technology.

Exxon's Wet Gas Scrubbing process is used to control atmospheric emissions of particulates and sulphur oxides from fluid catalytic crackers (FCCUs). This process offers a simple, effective, reliable, and economic method of meeting environmental regulations for FCCU's. Commercial experience has demonstrated that no FCCU has ever been shut down due to a failure of an Exxon WGS system and recent innovations have further enhanced this technology. One significant enhancement has been the reduction of costs while maintaining performance. The new technology complies with current new source performance standards and results in a greater than 90% SO₂ reduction and less than 455g of particulates per 455kgs of carbon burned. The single-step removal of particulates and sulphur oxides offers up to 99% SO_x removal which can be achieved with no additional equipment.

FLEXSORB Solvents

Flexsorb SE and SE Plus selectively removes hydrogen sulphide, Flexsorb SE selectively removes hydrogen sulphide and organic sulphur and Flexsorb PS is used for the bulk removal of hydrogen sulphide and carbon dioxide.

Thermal DeNO_x

The feature of Exxon Research & Engineering Company's patented selective non-catalytic reduction (SNCR) technology for NO_x control include a reduction in NO_x which occurs in flue gas streams without the use of a catalyst, it has no measurable effect on emissions of CO, CO₂, SO_x, etc. and NH₃ (ammonia) can be stored in either aqueous or anhydrous ammonia tanks. The technology utilised also has the potential to minimise safety hazards in handling sulphur.

Liquid Sulphur Regassing

Liquid sulphur regassing involves the technology to minimise a potential safety hazard in handling sulphur. The main feature of this process is that any of the three technology options can be retrofitted readily into existing facilities with minimum down-time and can be used in new facilities. The three process alternatives available are:

1. Air only: Proprietary air-sparging nozzles mix the sulphur with very small air bubbles, providing a high bubble surface area to volume ratio effectively increasing mass transfer of hydrogen sulphide while providing liquid agitation in the liquid inventory.
2. Catalytic: A small quantity of proprietary catalyst is used for this technology to enhance the decomposition of H_2S_x to H_2S , which is subsequently liberated from the sulphur.
3. Air plus catalyst: The combination of the above two options.

Degassing can be accomplished in a sulphur pit or in an external storage device (pit or tank).

It is recommended that given the availability of effective pollution control technologies as referred to in the text, these technologies should be employed by SPP/CPM to drastically reduce their air and particulate emissions.

There is currently a problem regarding the government body regulating the air emissions of the Project. It is understood that Stage-1 and 2 will be under the jurisdiction of the Department of Mines and Energy (DME) which is based in Rockhampton whilst the plant operations of Stage 3 will be overseen by the EPA. Concern has been expressed over the time it takes the DME to respond to problems encountered by the Yarwun/Targinnie residents as a direct result of plant operations such as offensive smells and air emissions which cause adverse health symptoms.

It is essential that all stages of the Project are supervised by the EPA for plant operations to be actively monitored with short response times so remedial actions may be enforced.

Odour

The EIS does not address the subject of odour due to the scarcity of measurement data in relation to odours from oil shale and plant operations and from a lack of formal policy criteria to assess odour impact.³⁵ It has identified four potential odour emissions:

- Combustion sources
- Product treatment or oil storage tanks
- Plant upsets
- Ship transfer operations

The nature of the operations and the oil being handled means that odour is a potential issue. More research and tests should be completed to determine the actual odours present in all stages of the process. The consultants propose that the headspace vent gases incidental to the loading of oil into ships will be captured and flared to destroy odour compounds and gases.³⁶ This would appear to be a reasonable solution.

It is therefore recommended that the consultant's proposal of capturing and flaring the headspace vent gases incidental to the loading of oil into ships be implemented.

The incident occurring on October 2nd 1999 resulted in residents reporting odours resembling "burning tyres", "burnt oil", "electrical", "foul", "horrible", "overpowering", "pungent", "sulphur", "rotten eggs" and "sweet".³⁷

Given that offensive odours have been an issue with Yarwun/Targinnie residents, particularly on October 2nd 1999, and again on November 18th 1999, investigations into the actual odour emitted in all stages of the process are recommended.

It is also recommended that odour monitors be installed so as to give early warning of potential offensive odours. This would mean that remedial action could be taken to forestall any impact on the Yarwun/Targinnie residents.

Groundwater

The Stage-2 developments of the Stuart Oil Shale Project present a risk to the current groundwater supply of the Yarwun/Targinnie landowners. The residents of Yarwun/Targinnie are concerned that their groundwater resources may be affected by the mining and plant operations of the Project. Specifically, they are concerned that there may be a reduction in the quantity of groundwater and deterioration in the quality of their groundwater, as a direct consequence of Project operations. Although the EIS states that generally, the groundwater accessed by Yarwun/Targinnie landowners will be unaffected, the landowners would like to see some pro-active measures implemented by the Co-Venturers in the event that adverse effects do occur.

The EIS states that the majority of private bores in the Targinnie area are located outside the area of expected impact and will not be affected as groundwater level (quantity) impact is mainly expected to occur within the Project area.³⁸ The EIS justifies this by explaining that the mining pit will mainly affect the groundwater of the Rundle Formation,³⁹ which contains only a small number of landowner bores due to the salinity of its water. The EIS mentions that the groundwater of the Quaternary alluvium will also be adversely affected by mining.⁴⁰ This water source tends to “dry out” during dry seasons, and replenishes due to wet season rainfall. The EIS predicts that this aquifer will remain dry for longer periods with any aquifer recharge expected to be quickly removed as mining progresses,⁴¹ with the greatest drawdown effects reaching a peak in approx. year-10 of operations.⁴²

The majority of landowners’ bores draw from the Targinnie Granite and Berserker Beds aquifers and some from the Quaternary Alluvium aquifer. While it is acknowledged that the quality and quantity of water obtained is significantly variable from bore to bore, many currently enjoy a water quality which in many cases is generally suitable for stock watering and some crop irrigation. This is also used for domestic purposes such as bathing, washing and toilets.

The Yarwun/Targinnie residents are not connected to the Gladstone Area Water Board’s water supply. They rely on a combination of water sources including rainfall, private dams, bore water, and purchased water trucked in by private contractors. The usage and reliance on these sources varies from property to property, depending upon the individual water management strategies of each landowner. For many landowners, their bore water is a significant component of their water supply.

The EIS states that mitigation measures may be considered if the 'Groundwater Monitoring Program' reveals that impacts are greater than were expected.⁴³ It mentions a possible measure being the replacement of affected supplies for the duration of the impact. This reactive measure would positively represent the proponent taking responsibility for any negative effects imposed on the current groundwater supplies. However, it would not satisfy the Yarwun/Targinnie landowners who may require water in the interim, before the measures are implemented, to avoid detrimental impacts on their horticulture and eventual (possible) income effects.

It is therefore recommended that a precautionary water strategy be implemented, with the provision of reticulated water to the Yarwun/Targinnie community. It is suggested that the appropriate government authority(s) assess the level of supplementary water needed to offset the increased risk to water availability in this area. This supplementary water is to be supplied to the Yarwun/Targinnie community free of charge.

This strategy would provide the community with a reliable water supply in the event that their groundwater is affected, and would help to minimise, or even eliminate, the potential risks the project and mining operations could present to the current water supply of the area.

Impact of Artificial Light on Horticultural Crops

There is concern amongst the Yarwun/Targinnie fruitgrowers that their properties and crops may be exposed to artificial light from the plant in the evening and night. Neither the issue of plant lighting, its visibility in the Yarwun/Targinnie area, nor its potential impacts on the area's horticultural crops is mentioned or investigated in the Draft EIS.

It is acknowledged that the communities of Yarwun/Targinnie are situated in (relatively) close proximity to Gladstone and its industries, and also to nearby QCL and Ticor plants, all of which emit considerable quantities of evening and night-time artificial light. However, the addition the Stage-2 plant, which will be the nearest industry to the Yarwun/Targinnie area, may intensify the light to the point where horticultural crops are influenced. To lessen the impact of the Project lights, it is recommended that 'blinkers'/shades should be attached to all plant lighting.

The residents are unsure as to the effects that the plant's lights may have on their crops. Hydroponic and artificial light techniques influence plant growth, therefore it would be reasonable to make assumptions that the light emitted from the Plant may have an affect on the Yarwun/Targinnie horticulture. Some of the possible crop effects that 'night brightening' could cause include: variations in plant growth, changes in flowering times and duration, fruit development, crop yields, and crop seasonality.

It is therefore recommended that research be conducted into the issues of plant lighting, its visibility in the Yarwun/Targinnie area, and its potential impacts on the area's horticultural crops, as none of these community concerns are mentioned or investigated in the Draft EIS.

Land Values

The land-holders adjacent to and in the near vicinity of the project are concerned about the potential devaluation of their properties as a result of the future operations of the project. This is acknowledged in the report and was advised by ImpaxSIA in their consultancy report.⁴⁴

The maintenance of the value of their properties is of critical importance to the Yarwun/Targinnie landowners as their properties are their superannuation. They have invested capital into their properties to increase productivity and the property value. They expect the increase in the capital value of their properties to be realised on sale, to support them in later life. A decline in land values due to the project's future operations would undermine the retirement plans of these landowners.

The report on land values by ACIL consultancy is reasonably comprehensive. Their data analysis in the report confirmed that neither residential or fruit growing properties had experienced any adverse effect on their land values in the 10 year period up to 1998. Fruit farms in the Calliope Shire (in which Targinnie is situated) have experienced an upward trend in value per hectare during this period. Therefore, the issue is whether land values will decline in the future, due to the development of the Project.

ImpaxSIA expressed the view that the project would become an easy target for blame for events which are totally unrelated to the project.⁴⁵ This was unsupported by any evidence and it is recommended that the comment be excluded or disassociated from the final report.

Should land values decline in the future, it is recommended that an inquiry be undertaken by a member of the appropriate government tribunal into the cause of the decline, and, if the decline can be attributed to industrial development within the region then the landowner should be compensated.

Such a proposal would be in line with that proposed by the previous Minister for Mines and Energy, Mr Tom Gilmore, to compensate land-holders adjacent to the mining lease for any adverse effects of the mining development.⁴⁶

The EIS lists three positive impacts on land values as a result of the project⁴⁷. It is questionable whether two of the positive impacts on land values mentioned ('Continuing growth for hobby farms' and 'Continuing growth in the size and value of the mango crop') could be attributed to the project. Additionally, the positive impact of 'Increased demand for land generally resulting from the increase in income and population' appears to be based upon only one (unsourced) local real estate agent's opinion⁴⁸. It is therefore recommended that this point also be either omitted or amended in the final report.

Visual Effects

Some elevated properties in Targinnie have and/or will have, a view of the mine pit and plant. This will represent a visual eyesore, and have the potential to result in a reduction in property values. It will also have an impact on the resident's quality of life, as pre-Stage-1, they enjoyed uninterrupted views of the narrows inlet and nearby islands.

It is recommended that reforestation activities be undertaken on the unused perimeter of the mining lease, and in appropriate surrounding areas to minimise the visual impact of the pit on the community.

Purchase of Properties

It is recommended that the landowners in the Targinnie area, who are directly affected by the mining lease, be able to sell their properties outright to SPPD and lease them back until they are required by the Co-Venturers for mining use.

In addition to this, it is recommended that they be compensated by the Co-Venturers, with a disturbance allowance based on an agreed percentage of the value of their properties, due to the nature of the sale being 'compulsory acquisition'.

The landowners do not want SPPD to offer an option to purchase their land. Doing so would result in a number of adverse consequences for them. One of these consequences would be uncertainty about their future as they would not know whether SPPD will or will not exercise the option to purchase at a future date. Uncertainty can have a detrimental affect on a person's level of motivation. A decrease in motivation can cause follow-on effects such as idleness, decline in productivity, loss of employment and/or downturn in business profitability, depression, family friction etc. Uncertainty can also cause stress and anxiety in people, and has the potential to cause adverse health effects, such as headaches, irritability, moodiness, insomnia, disturbance of psychomotor reactions, gastric ulcers, reduced immune response, and a raised blood pressure and heart rate.⁴⁹

Many landowners want SPPD to purchase their land, where it is affected by plant and mine operations, and/or land within the confines of the Stage-2 or 3 mining lease. This would provide them with an immediate cash flow, enabling them to leave their property and relocate, and re-establish themselves and their families elsewhere. They could also assign their leasehold rights to people wishing to look at short-term land use. It would also provide the immediate means to (a) sustain them while they search for new jobs (including skills training), and/or business opportunities, and/or (b) contribute to, or provide for, the purchase of an alternative business venture or source of income.

Some affected landowners may wish to continue to work their properties after the sale to SPPD, until their land is required for use by the Co-Venturers. They suggest that lease-back options be considered. This would represent a win-win situation for both parties. It would represent a win for the Co-Venturers who would receive a source of revenue, for land that would not be mined until a

future date. It would also represent a win for the former landowners, who could continue to farm their properties until such time as their land is excavated. This would be particularly relevant to horticultural properties directly affected, as the former owners, in exchange of the lease monies, could continue to cultivate the crops, until such time as their land is required by the project, and the trees and crops are felled. There would be a need to ensure that any leasehold arrangements take account of future GST obligations.

The landowners feel that they should be compensated for having to sell their land to the Co-Venturers due the nature of the sale being 'compulsory acquisition'. In addition to receiving the fair value of their property, they believe that a percentage of the value of their properties be granted to them as a 'disturbance allowance' to compensate for the costs they will be forced to bear as a result of relocation. They believe that the said compensation is a fair request, as in the absence of the Stuart Oil Shale developments, they would not have otherwise voluntarily sold their properties, and the only reason they would do so now is due to the obligatory nature of the sale. As would normally be expected, if the mining lease extends over part of a property, the entire property would be purchased.

It is recommended that these proposals, being outright purchase of land as opposed to options to purchase, lease-back options, and the allocation of an additional disturbance allowance, be investigated and considered by the Co-Venturers in the final EIS.

Health Effects

The Project claims that the rights are respected of workforce members and surrounding communities to be informed about any adverse health risks they may incur from exposure to fugitive emissions from the operation and their right not to be exposed to undue risk.⁵⁰

At sufficiently high concentrations, sulphur dioxide is irritant of the eyes, nose and respiratory tract and has a pungent odour. The potential impacts of sulphur dioxide are direct human health impacts, effects on vegetation and the potential to lead to acid rain.⁵¹

Therefore, it is recommended that preventative, as well as remedial systems, be built into the plant to avoid potentially harmful concentrations of emissions being released into the atmosphere, specifically:

- A more effective method of grading oil shale,*
- The compression and liquefaction of the excess gaseous emissions,*
- The installation of electrostatic precipitators and/or bag filters.*

Particulate levels are also detrimental to human health and the biota. Reducing particulate levels can be achieved through switching to particulate controls such as electrostatic precipitators or bag filters.⁵² In relation to the increase in particulate matter coming from the plant site, there appears to be no analysis of whether the cumulative effect of below 10u ultra-fine particles will increase. These ultra-fine particles are known to produce adverse health effects on the population affected.

It is recommended that there be more investigation into the accumulative health effects of increases in fine and ultra-fine particles resulting from plant emissions before the commencement of Stage-2 operations.

The incident occurring on October 2nd resulted in Targinnie residents reporting several symptoms such as burning and stinging of mucous surfaces, mouth ulcers, coughs, voice changes, asthma, headaches and nausea. It was established by Doctor Beryl Turner that as the reports were very consistent, they are clearly attributable to the emissions. She concluded that it was probably a combination effect of sulphur dioxide, hydrogen sulphide and hydrocarbons which caused the symptoms.⁵³ The short-term effects of exposure to sulphur dioxide are mucous membrane irritation and asthma, exposure to hydrogen sulphide causes mucous membrane irritation, asthma, headaches and nausea and exposure to hydrocarbons cause irritations. The long-term effect of exposure to the emissions is cancers, which result from long duration exposures.⁵⁴

It is recommended that the commitment by the company not to restart Stage-1 operations until confidence of controlling the process is achieved,⁵⁵ should be enforced by the EPA. A similar policy should apply to all stages of the Project.

As a number of residents use tank water, the health impacts of contaminants from plant operations must be investigated to determine the effects of possible contaminations.

Of particular interest is the proposition that the stability of the plant could be improved significantly by further investment and aimed at the minimisation of excessive particulate and other emissions. This could be done by investing in a more effective method of grading oil shale before it reaches the ATP so as to ensure stability in the composition of the feedstock reaching the ATP. The other avenue is to compress and liquefy the excess gaseous emissions rather than simply flaring them off to the atmosphere. This would prevent the escape of toxic and irritating gases and particulate matter into the atmosphere.

Release Events Occurring on 19th and 20th of August 1999

As a result of the materials handling and dust collection system performance issues, dust emissions exceeded regulatory guidelines for a few hours on August 19th and 20th during the initial ATP hot commissioning test run with shale. As a result, plant operations were voluntarily suspended and regulatory agencies advised. Modifications to equipment and operating procedures currently underway are directed at ensuring regulatory limits are met in future test runs of the ATP.⁵⁶

During this initial hot commissioning test run, odours from the sour water stripping system were also detected off-site and equipment modifications were quickly made to eliminate this issue.

Release Event Occurring on 2nd October 1999

The report detailing the events occurring on 2nd October between 1352 hours and 1830 hours indicates the experimental nature of the Project. During these hours it is estimated that 310kg of sulphur dioxide, 2.9kg of hydrogen sulphide, 740kg of particulates, 2700kg of unburnt hydrocarbons and 28000kg of water vapour was released.⁵⁷ The particulates were produced at a rate of 44g/s which is twice the regulated limit. The particulates released were half of the Gladstone emissions, however, when linked with unburnt hydrocarbon emissions at a rate of 162g/s this represented twice the Gladstone emission rate.

The hydrocarbons released produced a mixture of compounds, which are harmful to humans and cause numerous side effects as set out in Table 8.⁵⁸ These compounds are currently listed under the United States National Institute for Occupational Safety and Health (NIOSH) list of chemical

hazards.⁵⁹ It is recommended that the government apply guidelines relating to hydrocarbons emissions in accordance with the United States standards, as currently there are no Australian standards for regulating hydrocarbon emissions.

The emission parameters used in modelling the occurrences for the main stack and the ATP flare are not sourced.⁶⁰

It is recommended that further examination of the October 2nd incident be undertaken as the methods for calculating the plume trajectory and puff model did not take into account the effects of terrain on the meteorology.

This may have an effect on the results obtained from the modelling completed as the Targinnie area is set amongst a small mountain range. To obtain more accurate results, the effect of the surrounding Mount Larcom Range should be taken into account.

The report indicates that all of the predicted ground level concentrations are subject to scientific uncertainties arising from routine estimation and measurement errors in all of the input data used in the analysis.⁶¹

It is therefore recommended that more advanced monitoring and analysing equipment be installed to allow more accurate ground level concentration readings to be obtained. These should be easily accessible to the public and accountable departments.

This will allow the process of analysing the effects of the emissions on the surrounding areas to be more precise to establish when appropriate modification measures must be taken.

The report states that the unknown synergistic effects may have led to a combined pollutant mixture that was sufficiently potent to cause such effects. The synergistic effects of mixtures of compounds are generally not well documented.⁶²

It is recommended that research be undertaken to determine the synergistic effects of a combined pollutant mixture on humans and horticultural crops as currently, these effects are not well known.

Additional reporting may be required to determine and predict the short-term and long-term effects of excessive emissions on horticultural crops in the Yarwun/Targinnie area.

Release Event Occurring on 18th November 1999

Suncor conducted six weeks of extensive studies, following a malfunction of the shale dryer that occurred on 2nd October 1999 involving additional technical experts from Suncor, SPP/CPM, Bechtel (the contractor) and other external parties.

The work confirmed that there was no serious physical damage to the plant during the recent malfunction. These studies resulted in a series of recommendations for the safe and effective resumption of operations. In line with these recommendations, Suncor has made modifications to improve equipment reliability and has implemented changes to commissioning and operational procedures. None of these changes have required any material capital expenditure.

Suncor now believes it is now well prepared to commence the next hot shale commissioning test run. Prior to ramping-up of oil shale feed rates, Suncor will complete final work to test the modified control procedures. As is typical of commissioning periods, Suncor expects operational improvements to be ongoing throughout this and future runs.

While some technical risk remains in commissioning a new technology at this scale, the Co-Venturers remain confident that the ATP technology is fundamentally sound and that commissioning activities will reach a satisfactory conclusion.

Following the start up of the plant on 18th November, Targinnie residents complained of offensive odours similar to “burning tyres” discharged by the plant and reports of health effects were evidenced by reports of irritation to their airways, eyes and skin.

Greenhouse Gas Emissions

The Co-Venturers SPP/CPM have set their expected Greenhouse Gas emissions (GHG) at levels comparable to or less than GHG emissions resulting from the production of conventional refined

oil.⁶³ They expect to achieve this goal through a mix of measures including improved energy efficiency in the plant and offsets including forestry carbon dioxide sinks.⁶⁴ Presently the Stuart Shale Oil Project is producing more carbon dioxide in its production of shale oil than conventional oil methods. This is due to the fact that the production of shale oil is very energy intensive as the shale rock is required to be heated to around 500 degrees Celsius in order to extract kerogen from which to produce the oil. The Co-Venturers envisage to invest in a GHG R&D program to demonstrate the feasibility of achieving significant reductions in GHG emissions from 75kg of carbon/barrel of oil equivalent to a “best case” scenario of 40 kg of carbon/barrel of oil equivalent.⁶⁵ The implementation of these initiatives in Stage 3 would be dependent on the success of the Project and on other countries implementing GHG emission policies internationally and domestically. Currently no legislative or regulatory framework exists within Australia requiring any limit to net GHG emissions.

Australia has signed, but not as yet ratified, the Kyoto Protocol, to limit its increase in greenhouse gas emissions to 8% above 1990 levels by 2008-2012. Table 5.33 indicates that carbon dioxide levels for the life of the Project are steadily increasing making the attainment of SPP/CPM’s goal of reducing GHG emissions harder to achieve.⁶⁶

It is recommended that greenhouse gas emissions be regulated in a manner consistent with the intention of the Kyoto Protocol. The Co-Venturers should be encouraged to undertake further investment in carbon offsets.

Reforestation Activities

The Co-Venturers are currently conducting several reforestation R&D trials involving a total investment in excess of \$3.5 million. The initial projects undertaken to date have involved the planting of more than 180,000 native eucalypt trees on 160 hectares of cleared land in Central Queensland.⁶⁷

In addition to the existing reforestation trials, property acquired and adjacent to the project should also be the focus of reforestation activities.

It is recommended that money be spent acquiring appropriate land adjacent to the Project for reforestation to minimise greenhouse gas emissions and to act as a barrier to reduce dust, noise, and visual impact. This will also give the Project a better indication of the species of trees, which are the fastest growing, and best suited to the land in the immediate surrounds of the mine. A joint venture should be undertaken with QCL to reforest areas surrounding the two plants to not only reduce their carbon dioxide emissions, but to also act as a natural buffer to minimise the noise levels coming from the plants. This scheme will also help to block the visual eyesore of the pit seen by many Targinnie residents.

Effect on the Yarwun/Targinnie Fruitgrowers Co-Operative

The Yarwun/Targinnie Fruitgrowers Co-Operative has been in operation for over 75 years. No mention was made regarding the detrimental effect the Project may have on the continuing viability of the Yarwun/Targinnie Fruitgrowers Co-Operative. Concern was expressed that as members of the association leave the area, the Co-Operative may be forced to close down which will increase prices of necessary equipment which are currently available at discounted prices to the fruitgrowers in the Yarwun/Targinnie area.

This will invariably result in a capital loss for the members of the Co-Operative, which will need to be compensated. The salvage value of buildings and purpose built fixtures will be minimal with the cessation of operations.

It is recommended that should the Yarwun/Targinnie Fruitgrowers' Co-Operative close its operation, as a result of the exiting of members from the area, compensation should be paid equal to the difference between its fair value as at the end of the 1998 financial year, and its salvage value at the point of cessation.

There will also undoubtedly be numerous social impacts on the individual members of both the Yarwun/Targinnie Fruitgrowers' Co-Operative, and the Yarwun/Targinnie Fruit and Vegetable Growers Association. If forced to relinquish their land to the Project and move elsewhere they will be faced with a considerable personal adjustment process. For example, a 55-year old fruitgrower who has lived and worked in the area for their entire life would suffer enormous culture shocks in

relocating to either another regional environment, or into an urban area. The task of finding employment would be difficult, given their mature age, and lack of diversity in work-experience. It would be very likely that this former fruitgrower would suffer lack of motivation and depression as a result of the move.

It is recommended that compensation be awarded to fruitgrowers whose properties are resumed or seriously affected by the Project in the form of 'social adjustment assistance'. This compensation would be necessary to sustain them and their families while they attempt to rebuild their lives elsewhere and undertake the skills training to provide them with saleable skills to present to the employment market. In the event that they are unemployable, the said compensation will help to sustain them and their families, and avoid the need to rely on social security.

The government should give serious consideration to the provision of 'social adjustment assistance' for those seriously affected by the Project.

Environmental Management Overview Strategy (EMOS)

Air Quality - Impacts and Controls

The objective of the *Environmental Protection (Air) Policy 1998 (EPP Air)* is to protect the air environment while allowing for development that improves the total value of life, both now and in the future, in a way that maintains the ecological processes on which life depends.⁶⁸ EMOS Commitment 28 implies that a contaminant level below the recommended goals of the *EPP Air*. This implication stems from the discussion of the existing air quality condition in the report, all referring to compliance with the goals of the *EPP Air*.

If such compliance is seen as adequate and has been accepted by the Environmental Protection Agency, then this commitment is not in accord with the *EPP Air*. The *EPP Air* clearly states that: "The levels of the contaminants in the air indicate the extent to which the environmental values have been enhanced or protected."⁶⁹

Although there are policy goals, these are simply maximum permissible levels and necessary compliance levels.⁷⁰ An environmental management decision is the approval of license or program and must take account of a number of factors.⁷¹ These factors include:

- The order in which the applicant and affected persons started to occupy land at or near the relevant site;
- The views of affected persons; and
- Any other information or other matters concerning the affect of the relevant activity.⁷²

The administering authority is also required to monitor the cumulative effects of the releases.⁷³

It is the strongly held view of the fruit and vegetable growers who were in Targinnie before there was any large scale industrial development in the Gladstone area, and that the cumulative effects of air pollution need to be reduced to levels prior to industrialisation in the Gladstone/Calliope area. This would provide a sound economic outlook for the fruit and vegetable growers in the area, as it is consistent with that required for the horticultural crop production.

Similar considerations apply to the generation of noise by industrial plants in the Gladstone/Calliope area impacting on the Yarwun/Targinnie area.

Environmental Management Plan

Audit Reports

Of particular interest to the fruit growers is the requirement for audit. It is proposed that an environmental audit be conducted annually.⁷⁴ This is considered inadequate and it is recommended that there be targeted and random audits applied with an average frequency of once every four weeks. In addition, the auditor will always report on the effectiveness of any corrective action. There will be a report on each inspection/audit. The auditor appointed will be appointed annually by mutual agreement between the licensee and the elected community representatives of the liaison group. The agreement between the licensee and the operator will need to allow unrestricted access to the auditor. The results and the report of each inspection/audit are to be made publicly available on the licensee's web site on the same day as they are given to the licensee or any other interested person, and no later than one week after the audit inspection. The audit reports will be able to be accessed by the public for the duration of the project.

Wharf

It is said that there will be implementation of emergency spill control procedures.⁷⁵ However, there needs to be more detail as Fisherman's landing is in an area of high tidal flows, and there will be a need for control booms to be in place during the loading of oil, as there simply would not be enough time to contain any sizeable spill if there was not immediate containment.

With respect to the air quality, it is not sufficient to rely on complaints.⁷⁶ There should be odour detectors close to the source of emission so that detection of any malfunction can occur before the odour becomes offensive to the community.

There needs to be more detail as to the operations of the oil sump, the environmental safeguards and the re-use back in the refinery system.⁷⁷ There is also a need to specify the licensing arrangements for the transport, storage and disposal of waste.

Conclusion

It is important to note that the Yarwun/Targinnie Fruitgrowers are not entirely opposed to the development of the neighbouring oil shale resource, as long as it does not negatively affect their existing conditions. However, they are concerned about whether this can be achieved.

This submission has attempted to convey the fruitgrowers' primary concerns and offer solutions for ways in which the Co-Venturers and the Queensland Government can offset these concerns. Thirty-two recommendations have been put forward in this submission. A great deal of thought has gone into compiling these recommendations, and the results are practical and workable solutions. For this reason, it is trusted that both the concerns and the corresponding recommendations will be fully evaluated.

It is expected that all issues raised in this submission will be addressed in the Supplementary EIS and the recommendations effected, to ensure that the fruitgrowers and the Project can coexist in a sustainable environment.

Any questions on this submission can be addressed to either:

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Yours sincerely 



Keith McGavin

Vice President

Endnotes

- ¹ Table 3.18 of the DEIS.
- ² Para 3.831 of the DEIS.
- ³ Para 3.831 of the DEIS.
- ⁴ 10 trips per day approximated from 3000 trips ÷ 365 days/year.
- ⁵ Para 5.511 of the DEIS.
- ⁶ Para 5.511 of the DEIS.
- ⁷ Para 4.72 of the DEIS.
- ⁸ Para 5.523 of the DEIS.
- ⁹ Para 5.523 of the DEIS.
- ¹⁰ Para 4.74 of the DEIS.
- ¹¹ Para 5.54 of the DEIS.
- ¹² Page 20, Advisory Standard For Noise Report, Division of Workplace Health and Safety.
- ¹³ Page 28 of the Consultants Report Volume II Chapter 6.
- ¹⁴ Para 5.45 of the DEIS.
- ¹⁵ Page 29 of the Consultants Report Volume II Chapter 6.
- ¹⁶ Para 5.45 of the DEIS.
- ¹⁷ Page 44 of the Consultants Report Volume II Chapter 6.
- ¹⁸ Para 4.72 of the DEIS.
- ¹⁹ Para 4.73 of the DEIS.
- ²⁰ Para 5.59 of the DEIS.
- ²¹ Para 5.62 of the DEIS.
- ²² Para 5.47 of the DEIS.
- ²³ Para 5.47 of the DEIS.
- ²⁴ Page 11 of the Consultants Report Volume II Chapter 6.
- ²⁵ Page v of the Consultants Report Volume II Chapter 6.
- ²⁶ Page 19 of the Consultants Report Volume II Chapter 6.
- ²⁷ Page 63 of the Consultants Report Volume II Chapter 6.
- ²⁸ <http://www.ozemail.com.au/~airqual/nepm.html>
- ²⁹ http://www.enviro.nsw.gov.au/pubs/hazc/hazc_7.htm
- ³⁰ <http://www.arb.ca.gov/pm25/pm25.htm>
- ³¹ <http://www.arb.ca.gov/pm25/tccforum/tccforum.htm>
- ³² Page 15 of the Analysis and Air Dispersion Modelling of Release Event.
- ³³ Page 15 of the Analysis and Air Dispersion Modelling of Release Event.
- ³⁴ http://www.exxon.com/exxontech/refining_process/protection.html#degas
- ³⁵ Para 5.68 of the DEIS.
- ³⁶ Page 74 of the Consultants Report Volume II Chapter 6.
- ³⁷ Incident Report – October 2nd 1999.
- ³⁸ Para 5.372 of the DEIS.
- ³⁹ Para 5.371 of the DEIS.
- ⁴⁰ Para 5.372 of the DEIS.
- ⁴¹ Para 5.372 of the DEIS.
- ⁴² Fig 5.13, of the DEIS.
- ⁴³ Para 5.372 of the DEIS.
- ⁴⁴ Page 37, Report 11, Vol IV, ImpaxSIA Consultancy Report.
- ⁴⁵ Page 45, Report 11, Vol IV, ImpaxSIA Consultancy Report.
- ⁴⁶ Page 44, Report 11, Vol IV, ImpaxSIA Consultancy Report.
- ⁴⁷ Para 5.9.4.2 of the DEIS.
- ⁴⁸ Page 52, Report 10, Vol III, ACIL Consultancy Report.
- ⁴⁹ Page 8, Advisory Standard For Noise Report, Division of Workplace Health and Safety.
- ⁵⁰ Para 5.145 of the DEIS.
- ⁵¹ Page 49 of the Consultants Report Volume II Chapter 6.
- ⁵² Page 50 of the Consultants Report Volume II Chapter 6.
- ⁵³ Incident Report – October 2nd 1999.
- ⁵⁴ Incident Report – October 2nd 1999.

⁵⁵ Incident Report – October 2nd 1999.

⁵⁶ <http://www.sppcpm.com>

⁵⁷ Incident Report – October 2nd 1999.

⁵⁸ Page 14 of the Analysis and Air Dispersion Modelling of Release Event.

⁵⁹ Page 14 of the Analysis and Air Dispersion Modelling of Release Event.

⁶⁰ Page 11 of the Analysis and Air Dispersion Modelling of Release Event.

⁶¹ Page i of the Analysis and Air Dispersion Modelling of Release Event.

⁶² Page i of the Analysis and Air Dispersion Modelling of Release Event.

⁶³ Para 5.4.8 of the DEIS.

⁶⁴ Para 5.4.8 of the DEIS.

⁶⁵ Para 5.4.8 of the DEIS.

⁶⁶ Para 5.4.8.1.1 of the DEIS.

⁶⁷ Para 5.4.8.2 of the DEIS.

⁶⁸ s.5 Environmental Protection (Air) Policy 1997.

⁶⁹ s.8(3) Environmental Protection (Air) Policy 1997.

⁷⁰ s.9(2) Environmental Protection (Air) Policy 1997.

⁷¹ s.10 (a)(iii) Environmental Protection (Air) Policy 1997.

⁷² s.12 (b) (i), (ii) and (iii) Environmental Protection (Air) Policy 1997.

⁷³ s.13(2)(c) Environmental Protection (Air) Policy 1997.

⁷⁴ Para 5.5 Appendix F2 of the DEIS.

⁷⁵ Para 7.2.1 Appendix F2 of the DEIS.

⁷⁶ Para 7.2.2 Appendix F2 of the DEIS.

⁷⁷ Para 7.2.3 Appendix F2 of the DEIS.