Addition of a Downstream Solids Plant to AGR's Liquid Sodium Cyanide Plants, Kwinana

Change to Environmental Conditions

Australian Gold Reagents Pty Ltd

Section 46 Report and Recommendations of the Environmental Protection Authority

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Contents

1. Background

Australian Gold Reagents Pty Ltd (AGR) is a joint venture between Wesfarmers CSBP Limited (CSBP) and Coogee Chemicals Pty Ltd and was formed to manufacture and market sodium cyanide. It is located south-east of CSBP's operations and to the west of Coogee Chemicals. AGR currently operates two liquid sodium cyanide plants at Kwinana, that have the capacity to produce a combined total of 70,000 tonnes per annum (tpa) of sodium cyanide (calculated on a 100% sodium cyanide basis) as a 30% solution. There are a number of Ministerial Statements relating to AGR's operation. In October 1987, the Minister for the Environment approved a proposal by AGR to construct a 15,000 tpa sodium cyanide plant at Kwinana and transport the sodium cyanide by rail out of Kwinana to specified rail heads and then by road to mine sites for gold extraction (Ministerial Statement No. 6). AGR obtained approval to construct a duplicate plant in August 1989, to produce a combined total of 30,000 tpa of liquid sodium cyanide (Ministerial Statement No. 73).

AGR obtained approval to increase the combined production capacity of the original liquid sodium cyanide plant and the duplicate plant to 40,000 tpa in June 1990 (Ministerial Statement 099 - Appendix 2). The Ministerial Conditions were amended in March 1991 to limit the expanded operations to 30,000 tpa until the key emergency response provisions of the Kwinana Integrated Emergency Management Systems were in place (Ministerial Statement 129 – Appendix 2). Another expansion to 70,000 tpa of liquid sodium cyanide (35,000 tpa per plant) was approved in March 1994, through another Section 46 amendment of the Ministerial Conditions (Ministerial Statement No. 347 - Appendix 2). However, the duplicate plant was not commissioned until June 1998.

Since the proposed solids plant is to downstream process part of the liquid sodium cyanide currently produced, the EPA considers that a Section 46 assessment is appropriate to allow the potential environmental impacts of the additional plant to be assessed, with subsequent changes to the current Ministerial Conditions applying to the existing liquids plants.

2. Proposal

AGR now proposes to install a downstream processing plant that is capable of producing 25,000 tpa of solid sodium cyanide briquettes from liquid (30% solution) sodium cyanide. There will be no increase in the current production capacity of liquid sodium cyanide. The solid briquettes will be exported overseas, interstate or to remote sites within Western Australia.

The additional plant will be a separate facility that is located close to the existing solution plants (Figures 1 and 2). The solids plant will be designed as a single train, apart from the evaporation section, which will consist of two parallel trains. The process flow chart is shown in Figure 3. A continuous feed of sodium cyanide solution from the liquids plants storage tanks will be directed to one of the two batch evaporation units to concentrate the solution to approximately 60%. Following evaporation the concentrated sodium cyanide will be centrifuged to separate the solid crystals, which will then be dried and compressed into briquettes. The briquettes will be packaged in Intermediate Bulk Containers and then placed in either sea containers for export or

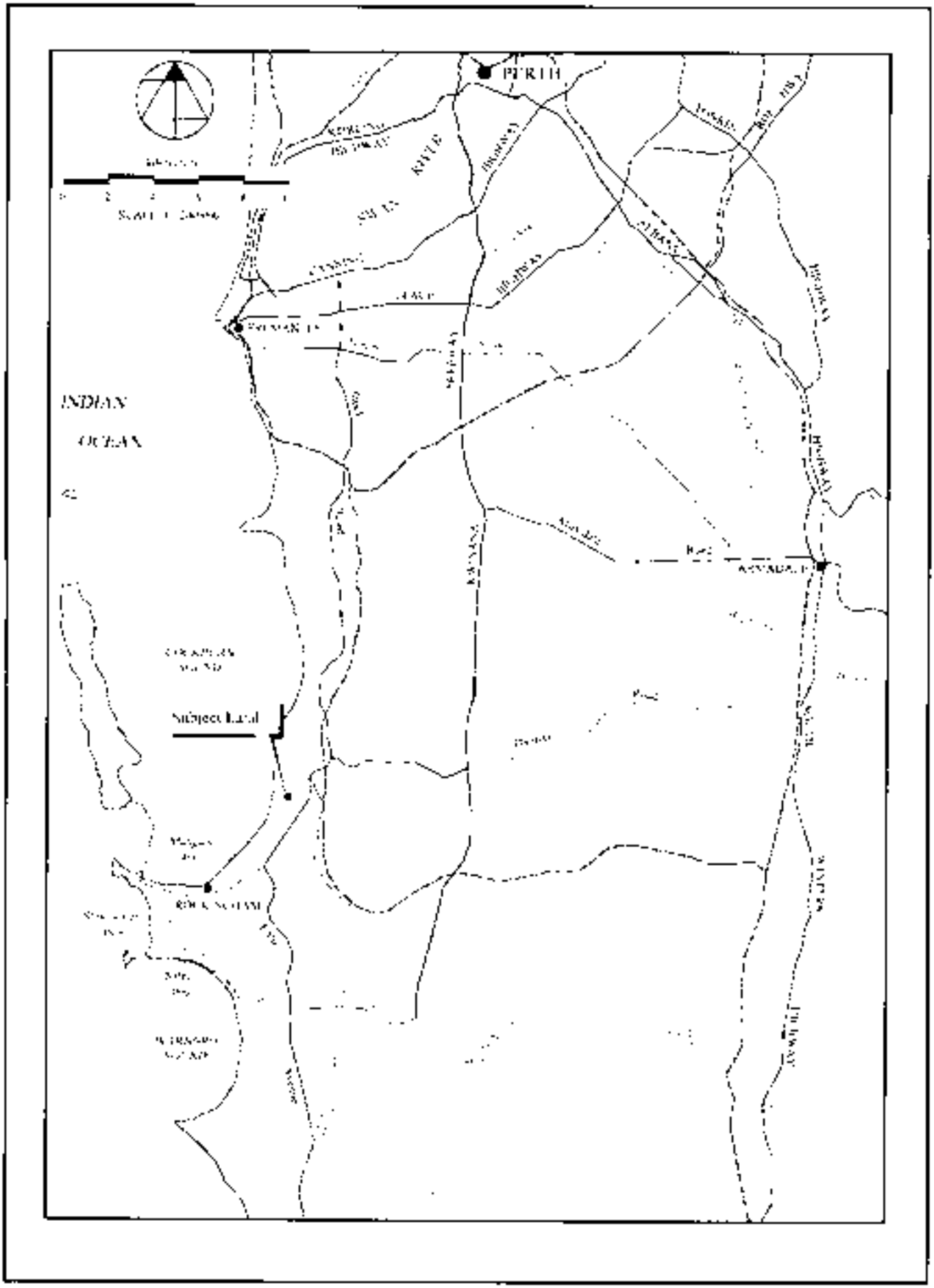

Figure 1. Regional location (Source: ATA Environmental, May 2001).

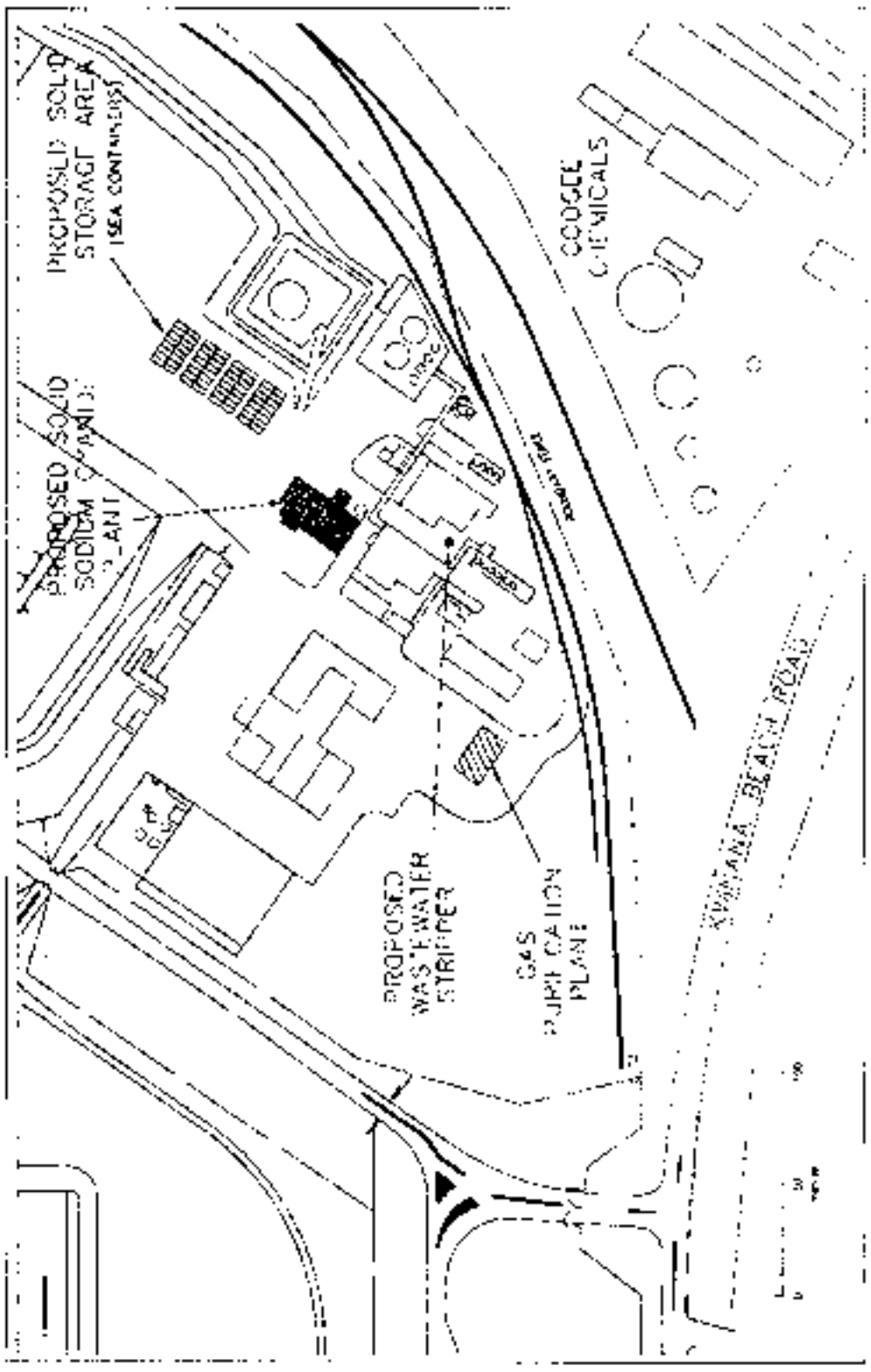

Figure 2. Site layout (Source: DNV, August 2001).

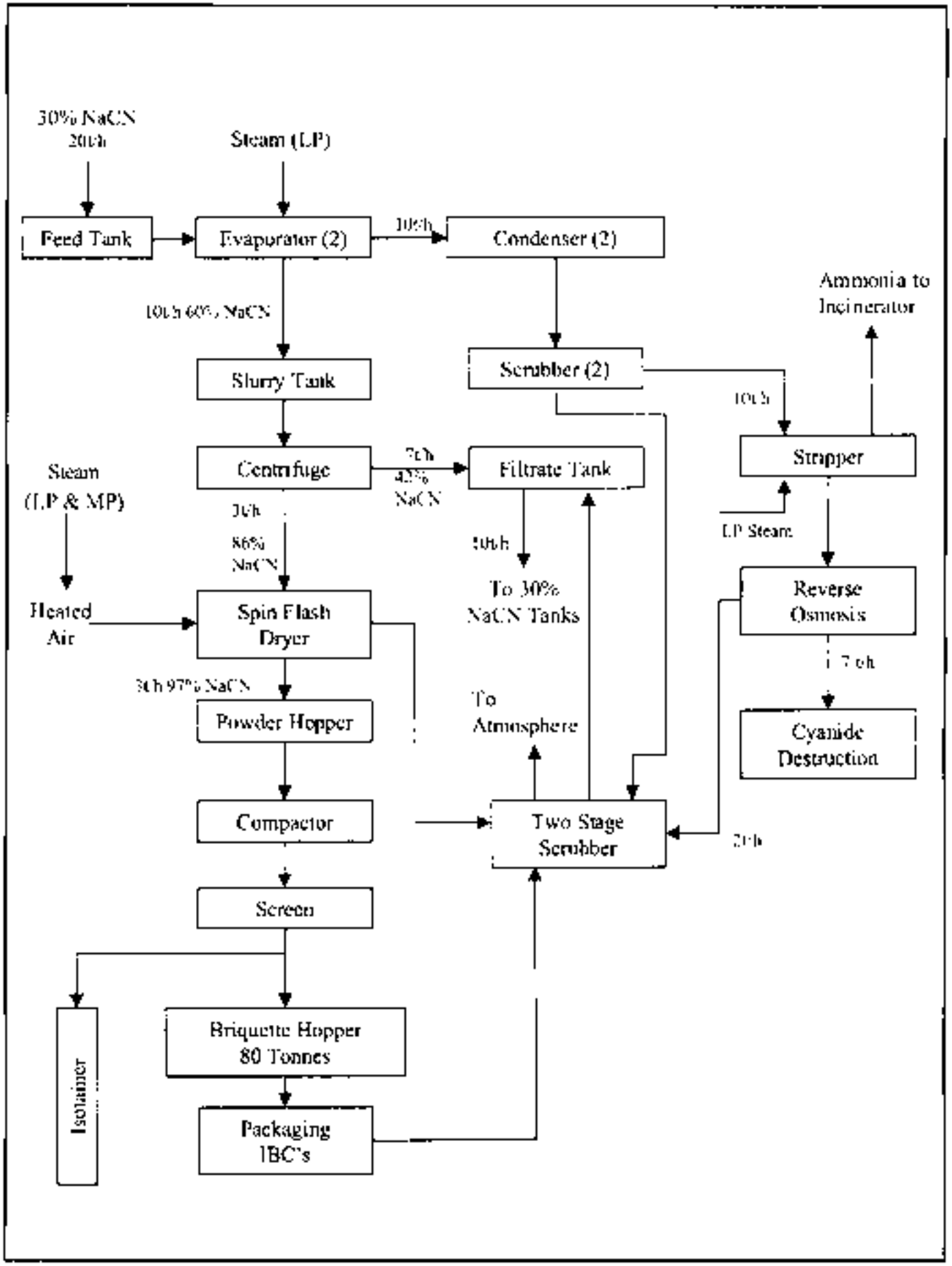

Figure 3. Solid sodium cyanide plant process flow chart.

Isotainers for transport within Australia. The solid cyanide handling system will be operated in a fully enclosed building under vacuum extraction to ensure a safe working environment. AGR proposes to store a maximum of 2,000 tonnes of solid sodium cyanide on site. Most of the sodium cyanide will be stored in sea containers, and the remainder in Isotainers. The containers are to be stored in the open on a hardstand surface. The surface of the storage area drains towards a recovery sump.

The proposal does not include the transport and export of solid sodium cyanide via Fremantle Port as these aspects will be addressed in another Section 46 review of Ministerial Conditions, prior to the transport and storage of any solid sodium cyanide off-site. AGR currently has a number of separate Ministerial Statements for sodium cyanide production, storage and transport, and has sought to incorporate these and the solid sodium cyanide operation into one Statement through that Section 46 assessment.

The Fremantle Port Authority (FPA) has advised that the export of solid sodium cyanide through the Port would be acceptable to the FPA, subject to compliance with the Port's Marine Safety Plan. The Plan requires a risk assessment to ensure that the facilities and procedures for handling solid sodium cyanide do not result in unacceptable levels of risk either within the Port or in adjoining commercial and residential areas.

The Department of Mineral and Petroleum Resources' (DMPR) preliminary advice on dangerous goods indicates that AGR's proposed approach with respect to transport and storage of solid sodium cyanide is reasonable. Solid sodium cyanide has already been imported via Fremantle Port and transported by various transporters within the Perth metropolitan area. AGR will be required to meet the DMPR's guidance note "Transport Route Selection" and other requirements currently imposed on solid cyanide transporters. It may also require a transport management plan, and a risk assessment of the storage and handling operations at the Port.

3. Consultation

The proponent has made public presentations to:

- Kwinana Community and Industries Forum (reported in community papers);
- Rockingham IP14 Consultative Community;
- Cockburn Sound Management Council Executive Committee;
- Fremantle Port Authority; and
- Town of Kwinana, and City of Rockingham, Cockburn and Fremantle.

The proponent advised that the main concern raised related to current nitrogen discharges from point and diffuse (via the groundwater) sources from CSBP, which although a major partner in AGR, is not the proponent for this project. Other issues raised include the rationale for a Section 46 assessment for the proposal and the transport of solid sodium cyanide, which as mentioned earlier, will be addressed as part of another Section 46 review of Ministerial Conditions.

4. Relevant environmental factors

In the EPA's opinion the following environmental factors are relevant to this proposal:

- Off-site Individual Risk;
- Wastewater discharge to Cockburn Sound;
- Air Emissions; and
- Noise.

It is the EPA's view that any potential emissions of sodium cyanide to groundwater as a result of its manufacture and storage can be managed by complying with the DEP and DMPR requirements for containment and storage, and therefore does not require further examination in this assessment.

Off-site Individual Risk

AGR commissioned Det Norske Veritas to conduct a Quantitative Risk Assessment (QRA) for the proposed solid sodium cyanide plant (DNV, Aug 2001). The identified scenarios in the report with potential for off-site risk were toxic ammonia releases from:

- The ammonia stripper;
- The waste gas discharge line from the ammonia stripper; and
- The refrigeration package.

A release due to a leak or rupture from the above scenarios would occur between 6 to 12 metres above ground level. Modelling predicted that the emissions would dissipate before reaching ground level and that there was no potential for off-site fatalities. Therefore no individual risk contours could be produced for these scenarios. However, by using a highly conservative approach for modelling and assuming:

- a ground level release of ammonia instead of from a height of 6 metres; and
- the toxic gas release composition to be 100% ammonia instead of the expected 20% ammonia and 80% steam,

the individual risk contours can be generated, as shown in Figure 4.

The $50x10^{-6}$ individual fatality risk contour extends just outside the solids plant boundary, but falls well inside AGR's site boundary. The report also considered the risk to the public to be as low as reasonably practicable.

DMPR has reviewed the QRA. It is of the opinion that the QRA is representative of the likely risk levels and that it demonstrates that the site meets the EPA's individual risk criteria as specified in its Guidance Document No. 2 "Guidance for Risk Assessment and Management: Off-site Individual Risk from Hazardous Industrial Plant". AGR is required to submit a final QRA to the DMPR, if the final plant design is altered. DMPR also requires AGR to submit a Construction Safety Management Plan for review prior to construction of the proposed plant.

In 1998 Quantarisk estimated the cumulative individual risk for the liquid sodium cyanide plants. It determined that the $50x10^{-6}$ contour is contained fully within the AGR site (Figure 5). DNV has not yet independently verified the Quantarisk methodology for the quantitative risk assessment of the sodium cyanide plants, but DNV assumes that it is accurate and appropriate. On this basis, it is the opinion of DNV and DMPR that the solids plant would not significantly increase the risk from the existing plants and that the combined $50x10^{-6}$ individual risk contour for the proposed solids and the existing liquids plants will not exceed AGR site boundary. The EPA accepts the opinion expressed by DNV and DMPR.

AGR has engaged DNV to undertake a revised QRA of the existing sodium cyanide plants and the proposed 25,000 tpa solid sodium cyanide plant, prior to commissioning. AGR has made a commitment to undertake any plant modifications as necessary, should the revised QRA indicate that the $50x10^{-6}$ contour extends outside the AGR site boundary.

The storage area for solid sodium cyanide will be fenced and secure from public access. It will be required to meet DMPR and DEP requirements, which includes the need to develop a contingency plan and emergency procedure to deal with on-site spillages of solid sodium cyanide.

The EPA concludes that the off-site individual risk for the combined solid and liquid sodium cyanide plants can be managed to meet the EPA's risk criteria at AGR's site boundary and at the nearest residential site.

Wastewater Discharge to Cockburn Sound

Wastewater from AGR is pumped to CSBP's effluent ponds, which is then directed to CSBP's marine outfall as shown in Figure 6. Any contaminants in AGR's wastewater will increase the overall level of emissions from the outfall. CSBP is ultimately responsible for ensuring the marine discharge complies with licence conditions. The EPA therefore, expects the proponent to protect the environmental values of Cockburn Sound by investigating ways to recycle or reuse any potential wastewater and to minimise the level of contaminants in discharges that cannot be avoided.

The two existing liquid sodium cyanide plants rarely discharge wastewater from the site, as under normal operation all wastewater can be utilised as dilution water to produce the 30% sodium cyanide solution. The solids plant however, will discharge about $10m^3/h$ of wastewater (surplus condensate) that is generated as a result of concentrating the sodium cyanide solution. The condensate requires further treatment prior to disposal as it is contaminated with ammonia and sodium cyanide carry-over during vacuum distillation. The wastewater treatment process includes:

- Stripping of ammonia and free cyanide in a steam heated reboiler;
- Treatment in a reverse osmosis unit; and
- Destruction of the remaining cyanide with hydrogen peroxide oxidation, using a copper catalyst.

Figure 4. Individual risk contours for solid sodium cyanide plant (Source: DNV, August 2001).

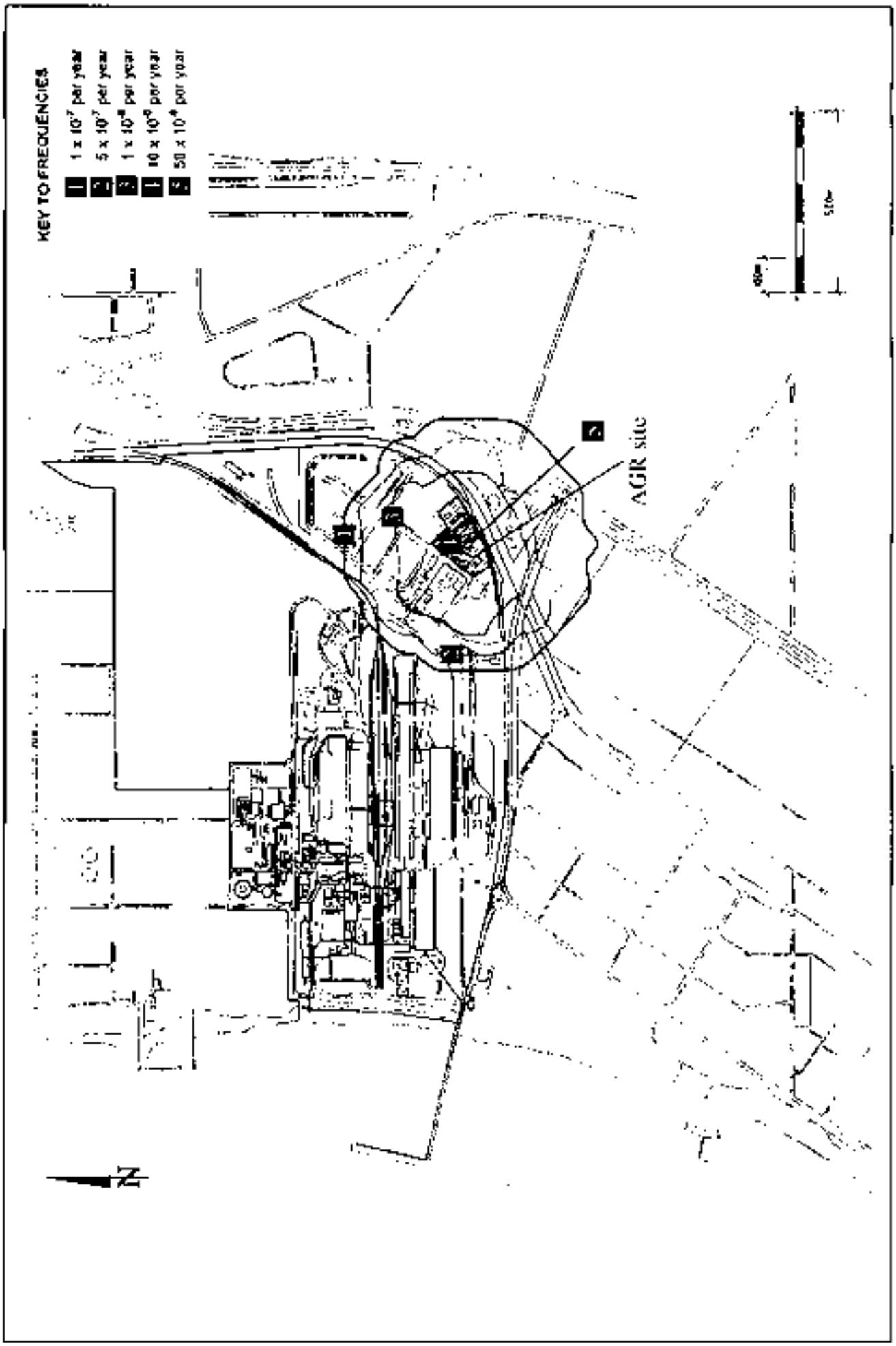

Figure 5. Individual risk contours for existing liquid sodium cyanide plants (Source: Quantarisk, 1998).

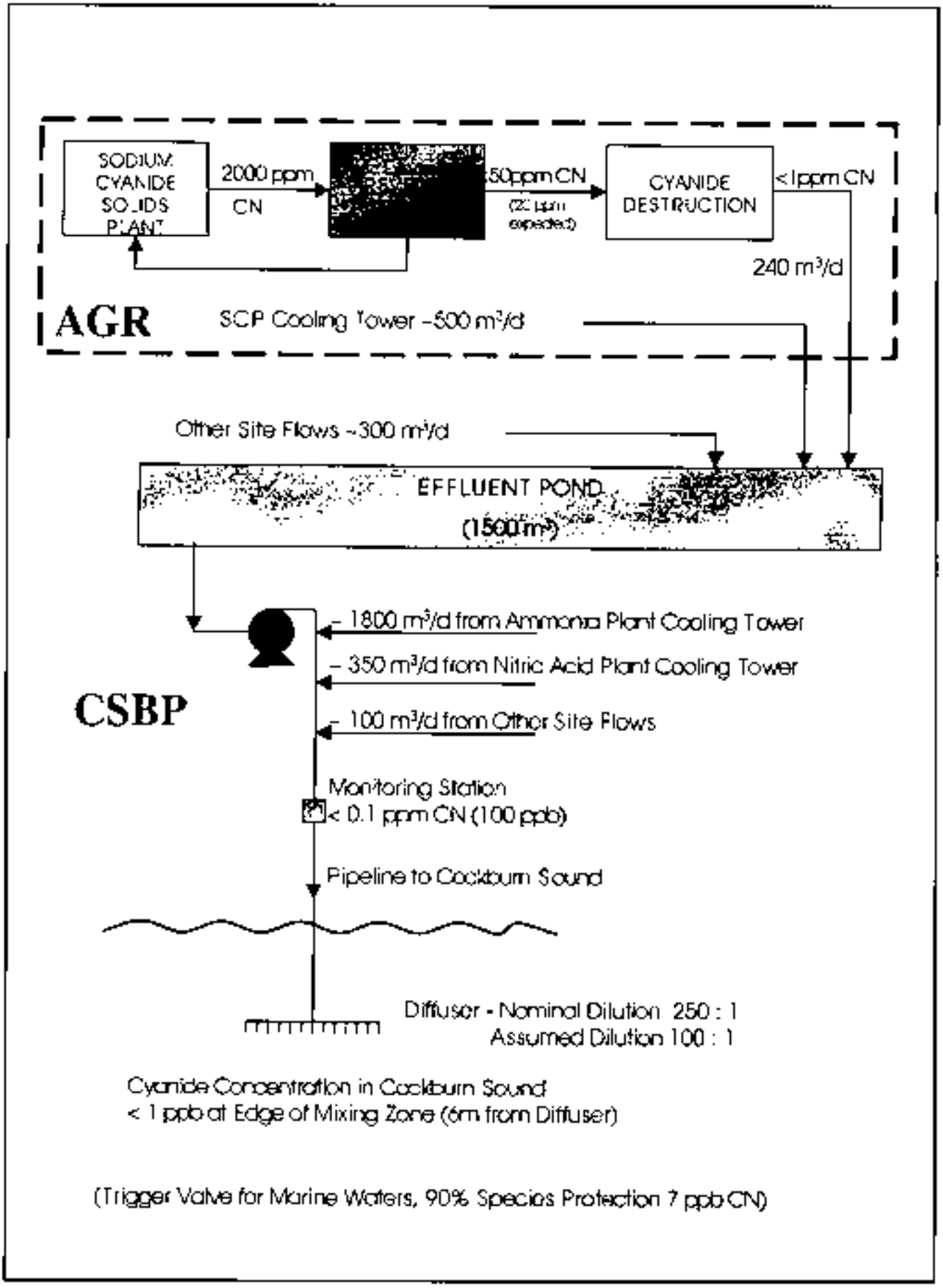

Figure 6. AGR's wastewater discharge.

Cyanide Discharge

AGR has undertaken a series of laboratory tests in order to determine the optimum conditions for cyanide destruction and the levels of cyanide likely to remain in the effluent stream. Laboratory results indicate that cyanide emission levels can be reduced to below 1ppm without the addition of a copper catalyst. However, as the laboratory conditions may not accurately simulate operations, AGR is prepared to commit to meeting a cyanide and copper concentration of 1 ppm in the wastewater leaving its treatment plant. Prior to commissioning the solids plant, a monitor will be installed to continuously measure the concentration of cyanide in the wastewater. The Chemistry Centre has assessed the proponent's approach and found it to be technically sound.

After treatment, AGR's wastewater is pumped to CSBP's effluent pond where it combines with CSBP's wastewater and cooling tower bleed water, effectively diluting contaminants in AGR's wastewater by about one order of magnitude. As a result, the concentration of cyanide and copper in CSBP's marine discharge will be reduced to below 100 ppb. This is predicted to give a cyanide and copper concentration of less than 1ppb at the edge of CSBP's outfall mixing zone (6m from diffuser), which is below the 90% species protection level (cyanide 7 ppb, copper 3 ppb). CSBP has written to the DEP giving an undertaking to meet the 90% species protection level at the edge of the diffuser mixing zone (Appendix 3).

Nitrogen Discharge

The ammonia concentration in the condensate is reduced from approximately 7000 mg/L to about 50 mg/L in a steam heated reboiler ammonia stripper. The potential increase in nitrogen to Cockburn Sound from AGR's wastewater discharge ($10m^3/h$) via CSBP's marine outfall, is about 12 kg/day. This represents a 9% increase in emissions of nitrogen from CSBP's operations (about 137 kg/day) or about a 1% increase in total nutrient input into Cockburn Sound from all sources (Lord, June, 2001).

CSBP has written to the DEP, committing to a reduction in current nitrogen emissions to Cockburn Sound from its operations by the end of 2002, in order to offset the increase in nitrogen emissions from AGR (Appendix 3). CSBP also has a nitrogen reduction program in place to achieve ongoing reductions in nutrient emissions into Cockburn Sound in the long term.

The EPA is satisfied that the relevant environmental quality objectives for Cockburn Sound will be met for copper and cyanide immediately outside the mixing zone. It is also satisfied that the proposal will not result in an overall increase in the discharge of nitrogen into the Sound. The EPA concludes that based on the commitments made by the proponent, the discharge into the marine environment can be managed to meet the EPA's objective for this factor.

Air Emissions

Currently AGR is required to meet licence limits for the gaseous discharge of total cyanide, ammonia and oxides of nitrogen from the incinerator stacks in each of the liquid sodium cyanide plants (Table 1).

Table 1. Sodium Cyanide Plant Licence Limits (Normal Operation)

Parameter	John Zink Incinerator Stack[1]	Maxitherm Incinerator Stack[2]
Oxides of nitrogen (greater than 99% of operating time)	5 g/s	5 g/s
Oxides of nitrogen (less than or equal to 1% of operating time)	12 g/s	12 g/s
Ammonia	38 mg/m^3 (1.21 kg/h)*	38 mg/m^3 (1.15 kg/h)*
Total Cyanide (as HCN)	60 mg/m^3 (1.91 kg/h)*	60 mg/m^3 (1.81 kg/h)*

[1] No. 1 sodium cyanide plant incinerator
[2] No. 2 sodium cyanide plant incinerator
* Emission rate calculated from process data

The licence permits significantly higher emissions during plant start-ups and shutdowns. However, the duration of these events is relatively short (less than an hour) and infrequent and for start-ups, can only occur under certain meteorological conditions to minimise any impacts.

Emissions from the solids plant scrubber stack will include ammonia, hydrogen cyanide (gas) and sodium cyanide (particulates). The current emissions from the liquids plants during normal operation and the proposed increase in emissions with the inclusion of the solids plant are shown in Table 2.

Table 2 Sodium Cyanide Plant Emissions (Existing and Proposed)

Pollutant	No.1 Liquid SCP*	No. 2 Liquid SCP	Total (Existing)	Solid SCP (Proposed)	Total (Existing & Proposed)
Hydrogen Cyanide	Nil	Nil	Nil	20 mg/Nm^3 (0.16 kg/h)	(0.16 kg/h)
Sodium Cyanide	Nil	Nil	Nil	30 mg/Nm^3 (0.26 kg/h)	(0.26 kg/h)
Ammonia	1.1 mg/Nm^3 (0.04 kg/h)	1.1 mg/Nm^3 (0.04 kg/h)	(0.08 kg/h)	63 mg/Nm^3 (0.53 kg/h)	(0.61 kg/h)

*SCP (Sodium Cyanide Plant)

AGR has made a commitment that the proposed solid sodium cyanide plant and liquid sodium cyanide plants will cumulatively meet the current site licence limits (as converted to emission rates) for total cyanide (as CN) and ammonia.

Environ Corporation modelled the air emissions for the solid sodium cyanide plant, as well as the existing plants (under normal, start-up and shutdown conditions). The predicted ground level concentrations of ammonia, hydrogen cyanide and sodium cyanide from the proposed solids plant are several orders of magnitude lower than the Victorian EPA guideline values (Victorian

EPA, 1999). The cumulative ground level concentrations from the existing plants and the proposed plant are also well under the guideline values, during normal operations.

During start-ups and shutdowns of the existing liquid sodium cyanide plants, the EPA notes that the model predicted higher off-site ground level concentrations of ammonia and hydrogen cyanide gases. The EPA has been advised that there have been no complaints of odorous emissions from start-ups and shutdowns of the liquid sodium cyanide plants during the last 5 years. However, the EPA considers that both the DEP and the proponent should continue to carefully monitor and manage emissions during start-ups and shutdowns. The proponent should investigate and identify improvements to process control and plant design with a view to further reduce impacts during plant start-ups and shutdowns, consistent with the "as low as reasonably practicable" (ALARP) and continuous improvement principles.

The EPA considers the increase in emissions from the site as a result of the solid sodium cyanide plant is relatively minor and the air quality impacts from the combined plants are acceptable. There is a need for the DEP under Part V of the *Environmental Protection Act 1986* to review the licence limits for the combined plants, with respect to ammonia, hydrogen cyanide and sodium cyanide (particulates), with a view to maintaining the current mass emission limits from the site for total cyanide (as CN) and ammonia. The EPA concludes that the factor of gaseous emissions can be managed to meet the EPA's objective of compliance with acceptable air quality standards and EPA guidelines.

Noise

Herring Storer Acoustics was commissioned to develop an environmental noise model of the existing plants and the proposed plant in order to predict noise impacts at the premises boundary (HSA, May 2001). The current noise levels were predicted to be 63.7 dB(A) at the southern boundary of the site, exceeding the assigned noise levels by almost 4 dB(A), after adjustment for tonal characteristics. The noise emissions from AGR's two existing liquid sodium cyanide plants, therefore do not comply with the *Environmental Protection (Noise) Regulations 1997.*

The Regulations are currently under review and the EPA is aware that there is broad support from the heavy industrial sector to increase the assigned noise level for an industry to industry boundary, where there is no office near the boundary of the receiving premises. AGR has committed to move through the Regulation 17 process, if it becomes clear that the proposed change to the industry to industry assigned noise level is not endorsed.

AGR has implemented a number of noise reduction measures over the last several years, including silencers on the main blowers. AGR has committed to rectifying an irregular noise source related to the start-up vent on the Peter Brotherhood turbine and will continue to investigate other measures to reduce noise emissions from the liquids plants.

The primary noise sources associated with the solids plant will be vacuum pumps, scrubber and cooling tower fans and a centrifuge. The calculated boundary noise level from these sources is 48 dB (A). Based on the information provided, the new plant is predicted to be significantly more than 5 dB (A) below the assigned noise levels, and will not result in a discernable increase in boundary noise levels.

The EPA considers that the non-compliance with the *Environmental Protection (Noise) Regulations 1997* will be addressed through either the review of the Regulations or by the Regulation 17 process. The EPA is satisfied that the proposed solids plant will be an insignificant contributor to the overall noise levels from the AGR site.

5. Conclusion

The EPA considers that the proponent has demonstrated that the addition of the solid sodium cyanide plant to AGR's existing operation can be managed in an environmentally acceptable manner subject to the supplementary commitments that have been made by the proponent, which will need to be incorporated into the existing Ministerial Statement 347.

6. Recommendations

The EPA submits the following recommendations:

1. That the Minister for the Environment and Heritage accept the proposal by AGR to install on its site a downstream processing plant that is capable of producing 25,000 tpa of solid sodium cyanide briquettes from its current production of liquid sodium cyanide.

2. That the Minister for the Environment and Heritage amends the conditions and procedures in Ministerial Statement No. 099 as proposed by the EPA in Appendix 4.

Appendix 1

References

ATA Environmental, May 2001. *Notice of Intent for the Construction of Solid Sodium Cyanide Plant Production Facility, Kwinana*. ATA Environmental, Perth.

D.A. Lord & Associates, June 2001. *The State of Cockburn Sound, A Pressure-State-Response Report.* D.A. Lord & Associates, Perth.

Det Norske Veritas, August 2001. As-Designed *Quantative Risk Assessment of AGR Solid Solium Cyanide Plant.* Det Norske Veritas, Fremantle.

Environ Australia, August 2001. *Air Dispersion Modelling – Proposed Kwinana Sodium Cyanide Solids Plant.* Environ Australia, East Perth.

Environmental Protection Authority WA, 2000. *Final Guidance No. 2, 'Guidance for Risk Assessment and Management: Off-site individual risk from Hazardous Industrial Plant'.* Environmental Protection Authority, Perth

Herring Storer Acoustics, May 2001. *CSBP Wesfarmers Kwinana Gas Purification Plant and Solids Plant Noise Emission Study.* Herring Storer Acoustics, Perth

Victorian Environmental Protection Authority, February 1999. *State Environment Protection Policy (Ambient Air Quality).* Victorian Environmental Protection Authority, Melbourne.

Appendix 2

Previous Statement of Conditions for this Proposal

Statement No.s 099, 129 and 347

Ass # 300

Bull # 427

State # 099

WESTERN AUSTRALIA

MINISTER FOR ENVIRONMENT

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

SODIUM CYANIDE (LIQUID) PLANT-EXPANSION TO 40 000 tpa (DEBOTTLENECKING), KWINANA

This proposal may be implemented subject to the following conditions:

1. The proponent shall adhere to the proposal as assessed by the Environmental Protection Authority and shall fulfil the commitments made on 28 March 1990 (copy of commitments attached) and shall adhere to the assumptions made in the risk assessments.

2. The proponent shall prepare and subsequently implement a comprehensive hazard identification and risk management programme in stages, to the satisfaction of the Minister for the Environment on advice from the Environmental Protection Authority and the Department of Mines.

   This programme shall include the following:

   (1) hazard and operability studies (HAZOP) of the process units, to be completed and submitted before mechanical construction commences;

   (2) safety engineering design, during the design process;

   (3) quantified risk assessment, prior to commissioning;

   (4) implementation systems, prior to commissioning; and

   (5) safety reviews during the life of the plant at intervals to be determined by the Environmental Protection Authority.

3. The proponent shall:

   (1) maintain the process equipment, instrumentation and alarm systems consistent with the safety and reliability assessments of the plant; and

Published on

1 JUNE 1990

(2) install very high integrity instrumentation for the control of the plant and for the detection of and response to any unplanned releases;

to the satisfaction of the Minister for the Environment, following advice from the Environmental Protection Authority and the Department of Mines.

4. Prior to construction of the expansion, the proponent shall revise the present site emergency plan to the satisfaction of the Environmental Protection Authority to cover the proposed expansion. The plan shall also meet the requirements of the Kwinana Integrated Emergency Management System (KIEMS).

5. No approval or licence to commence the expanded operations which will increase production from 30 000 to 40 000 tpa shall be issued by any statutory authority (nor shall the proponent commence these expanded operations beyond 30 000 tpa) until the key emergency response provisions of the Kwinana Integrated Emergency Management System are in place to the satisfaction of the Minister for the Environment on advice from the Environmental Protection Authority.

6. The proponent shall revise the previous construction and operational stage management plans to cover the proposed expansion. Each revised plan shall be submitted to, and shall be to the satisfaction of the Environmental Protection Authority following advice of the Department of Mines, before that stage of the development commences. The plans shall include the following:

(1) management of stormwater run-off;

(2) emergency response for site workers in the case of plant failure;

(3) storage and bunding requirements of additional sodium cyanide storage; and

(4) storage requirements for additional ammonia.

The proponent shall implement the approved plans to the satisfaction of the Environmental Protection Authority.

7. Prior to commissioning the expanded plant, the proponent shall revise, to the satisfaction of the Environmental Protection Authority, the present wastewater and solid waste management plan to take into account the additional effluent resulting from expansion of the plant.

8. The proponent shall install in the ammonia pipeline, remotely operated, fast action safety valves which can isolate the plants from each other and from the pipeline, to the satisfaction of the Environmental Protection Authority.

9. The proponent shall be responsible for decommissioning and removal of the plant and installations and rehabilitating the site and its environs to the satisfaction of the Environmental Protection Authority. At least six months prior to decommissioning, the proponent shall prepare and subsequently implement a decommissioning and rehabilitation plan to the satisfaction of the Environmental Protection Authority.

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

Bob Pearce, MLA
MINISTER FOR THE ENVIRONMENT

SODIUM CYANIDE PLANT - EXPANSION TO 40 000 tpa (DEBOTTLENECKING)

SUMMARY OF MANAGEMENT COMMITMENTS

The commitments which the proponent has made to environmental management during the design, construction and operation of the expanded facilities are as follows:

1. Prior to implementing any modifications to the design of the existing plant, the following safety checks will be undertaken:

   (1) referral of the proposed modification to the process licensor, Boehm GmbH;

   (2) liaison with the risk consultant on the proposed changes if they are likely to affect the risk analysis; and

   (3) HAZOP analysis of the proposed modifications to the plant design.

2. Construction of the proposed expansion will be undertaken in accordance with a Construction Stage Management Report similar to that prepared for the existing plant, but recognising the potential hazards of the existing plant, together with relevant conditions imposed by the Environmental Protection Authority.

3. All construction materials and practices will be in accordance with the relevant Australian codes and international standards where appropriate.

4. The plant design will ensure that emissions of nitrogen oxides during normal operating conditions will be within the National Health and Medical Research Council (NH&MRC) recommended guidelines and will also comply with guidelines adopted by the Victorian Environment Protection Authority.

5. Safety features incorporated in the existing plant will be incorporated in the expanded facilities.

6. Wastewater from the plant will be managed according to the wastewater management strategy approved by the Environmental Protection Authority for the existing plant.

7. The process and storage areas will be sealed and bunded so that any washings, contaminated stormwater run-off or spills will be collected and directed to the wastewater treatment plant sump, and analysed and treated prior to disposal. Any discharge of treated wastewater into Cockburn Sound will comply with the criteria specified in Bulletin No. 103 or the terms of the Environmental Protection Authority licence.

8. Approval for any additional storage of sodium cyanide will be sought from the Chief Inspector, Explosives and Dangerous Goods, Department of Mines.

9. A fire protection system will be incorporated in the expanded facilities in accordance with the requirements of the plant design and the Western Australian Fire Brigades Board. CSBP works personnel will be trained in the appropriate fire-fighting techniques. In addition to the fire-fighting capability of CSBP's Kwinana works, the fire-fighting co-operative established by the industrial operators in the Kwinana district will be available for emergency assistance.

10. All employees will be trained in the safe work practices and emergency procedures appropriate to the operation of the plant and handling of all associated materials. The management structure for the expanded facilities will incorporate at least two tiers of personnel technically qualified to manage hazardous chemical operations.

11. On-site emergency facilities at CSBP's Kwinana works will continue to include a dedicated emergency response vehicle, fire tender and an ambulance at all times, and an occupational health sister will be in attendance during normal working hours.

12. A detailed operating manual has been prepared for the existing plant from information supplied by the licensor, covering all process work, including start-up, shut-down, plant testing, inspection and emergency action. The procedures manual will be amended as necessary to include the expanded facilities.

13. The proponent will arrange for observers from the licensor to be at the plant during commissioning of the expanded facilities if it is deemed necessary by the licensor and the proponent.

14. The expanded facilities and any interconnections to the existing plant will be subject to a full HAZOP study and follow-up prior to commissioning.

15. Stocks of neutralizing agent (ferrous sulphate) are located along the transport routes at agreed locations. They will be inspected regularly to ensure that they are kept in good order.

16. Emergency response practice sessions will take place on a basis agreed with the relevant authorities.

17. The plant operator will maintain a dedicated emergency response vehicle at the Kwinana works and this will be available to service any off-site incident involving the transport of sodium cyanide.

18. Upon commissioning, monitoring of the existing plant will be undertaken in accordance with a comprehensive Environmental Monitoring and Management Programme, and the proposed expansion will be incorporated into this Environmental Monitoring and Management Programme to the satisfaction of the Environmental Protection Authority.

19. Liaison with local Shires, the Environmental Protection Authority, the Department of Mines, Westrail and counter-disaster groups will occur as appropriate in regards to proposed changes to the agreed transport routes or the addition of new market areas.

20. The proponent will prepare a Total Hazard Control Plan to the satisfaction of the Chief Inspector, Explosives and Dangerous Goods, Department of Mines, for the sodium cyanide plant and the expanded facilities at Kwinana.

WESTERN AUSTRALIA
MINISTER FOR THE ENVIRONMENT

STATEMENT TO AMEND CONDITIONS APPLYING TO A PROPOSAL (PURSUANT TO THE PROVISIONS OF SECTION 46 OF THE ENVIRONMENTAL PROTECTION ACT 1986)

PROPOSAL : SODIUM CYANIDE (LIQUID) PLANT-EXPANSION TO 40 000 tpa (DEBOTTLENECKING), KWINANA

CONDITIONS SET ON : 1 June 1990

Condition 5 has been amended to read as follows:

5. No approval or licence to commence the expanded operations which will increase production from 30 000 to 40 000 tonnes per annum shall be issued by any statutory authority (nor shall the proponent commence these expanded operations beyond 30 000 tonnes per annum) until the key emergency response provisions of the Kwinana Integrated Emergency Management System are in place to the satisfaction of the Minister for the Environment on advice from the Environmental Protection Authority.

The 'debottlenecking' of the stage 1 of Australian Gold Reagent's Sodium Cyanide Plant at Kwinana from 15 000 tonnes per annum to 20 000 tonnes per annum sodium cyanide is not constrained by this condition.

Bob Pearce, MLA
MINISTER FOR THE ENVIRONMENT

7 MAR 1991

Published on

15 MAR 1991

Ass # 846

Bull # 727

State # 347

WESTERN AUSTRALIA

MINISTER FOR THE ENVIRONMENT

STATEMENT TO AMEND CONDITIONS APPLYING TO A PROPOSAL (PURSUANT TO THE PROVISIONS OF SECTION 46 OF THE ENVIRONMENTAL PROTECTION ACT 1986)

PROPOSAL:	SODIUM CYANIDE (LIQUID) PLANT, EXPANSION TO 40 000 TPA (DEBOTTLENECKING), KWINANA (300 / 300-1 / 846)
CURRENT PROPONENT:	AUSTRALIAN GOLD REAGENTS PTY LTD
CONDITIONS SET ON:	1 JUNE 1990
CONDITIONS AMENDED ON:	7 MARCH 1991

Condition 1 is amended to read as follows:

1A Proponent Commitments
The proponent has made a number of environmental management commitments in order to protect the environment.

In implementing the proposal, including the modification to allow each plant to produce up to 35 000 tpa as reported on in Environmental Protection Authority Bulletin 727, the proponent shall fulfil the commitments made on 28 March 1990, provided that the commitments are not inconsistent with the conditions or procedures contained in this statement. (A copy of the commitments is attached).

1B Implementation
Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

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

Condition 5 concerning the Kwinana Integrated Emergency Management System is deleted.

The following condition and procedure are inserted following condition 10:

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

Published on

17 MAR 1994

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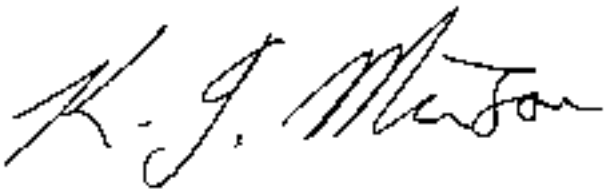
11-1 The proponent shall prepare periodic "Progress and Compliance Reports", to help verify the environmental performance of this project, in consultation with the Environmental Protection Authority.

Procedure

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

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



Kevin Minson MLA
MINISTER FOR THE ENVIRONMENT

15 MAR 1994

Appendix 3

Commitments from Wesfarmers CSBP

CSBP

17th August 2001

Our Ref: SCP Solids File

Chief Executive Officer
Department of Environment, Water and Catchment Protection
8th Floor, Hartley Poynton House
141 St. Georges Tce
Perth WA 6001

Attn: Mr. Graham Storey

Dear Graham,

AGR Pty Ltd proposal for a Solids Sodium Cyanide Plant

Our discussions at the EPA meeting of 16th August 2001 refer.

I am pleased to confirm my verbal advice to the meeting that Westarmers CSBP Ltd. is aware of the commitments made by AGR Pty Ltd. in respect to effluent management requirements for the proposed plant. Specifically these are as follows:

- Copper and cyanide discharge from the project will be lower than the trigger values for 90% species protection at the edge of the mixing zone related to our diffuser the E4/E3 boundary).

- The AGR Pty Ltd. plant will produce approximately 12 kg per day of nitrogen for discharge through our effluent system. We support the commitment for our average daily nitrogen loads to Cockburn Sound to be no higher from the end of 2002, than they were in our most recent EP Act licence period, and this will be achieved through our ongoing nitrogen reduction program
  We believe these should be measured in the same way as our EP Act licence i.e. average loads over a specified time period because it clearly will not be possible to achieve an average on every day.

I trust these comments meet your requirements, but if you require further clarification please do not hesitate to contact me on Ph: 9411 8232.

Yours sincerely,

Cameron Schuster

Cameron Schuster
Manager - Environment & Manufacturing Support
cc: P Wickham, R Paterson

WESFARMERS CSBP LIMITED ABN 81 008 668 327

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Appendix 4

Recommended Environmental Statement to Amend Conditions

RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT TO AMEND CONDITIONS APPLYING TO A PROPOSAL (PURSUANT TO THE PROVISIONS OF SECTION 46 OF THE ENVIRONMENTAL PROTECTION ACT 1986)

SODIUM CYANIDE (LIQUID) PLANT, EXPANSION TO 40 000 TPA (DEBOTTLENECKING), KWINANA (300 / 300-1 / 846 / 1390) (NOW KNOWN AS "ADDITION OF A DOWNSTREAM SOLIDS PLANT TO AGR'S LIQUID SODIUM CYANIDE PLANTS, KWINANA")

Proponent: Australian Gold Reagents Pty Ltd

Proponent Address: PO Box 345, Kwinana WA 6167

Assessment Number: 1390

Previous Assessment Numbers: 300, 300-1 and 846

Previous Statement Numbers: Statement No.099 published on 1 June 1990, Statement No. 129 published on 15 March 1991, and Statement No. 347 published on 17 March 1994.

Report of the Environmental Protection Authority: Bulletin 1028

Previous Reports of the Environmental Protection Authority: Bulletins 427, 450 and 727

The implementation of this proposal to which the above reports of the Environmental Protection Authority relate is subject to the conditions and procedures contained in Ministerial Statements Nos. 099 (1 June 1990), 129 (15 March 1991) and 347 (17 March 1994), as amended by the following:

Condition 1A (Proponent Commitments) of Statement No. 347 is deleted and the following condition is inserted:

1A Proponent Commitments

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

In implementing the proposal, including the modifications to allow each plant to produce up to 35, 000 tpa, and to produce solid sodium cyanide, as reported on in Environmental Protection Authority Bulletins 727 and 1028 respectively, the proponent shall fulfil the commitments made on 28 March 1990 and those made on 12 September 2001. (Copies of both the commitments of 28 March 1990 and those of 12 September 2001 are attached).

Proponent's Consolidated Environmental Management Commitments

28 March 1990

&

12 September 2001

SODIUM CYANIDE (LIQUID) PLANT, EXPANSION TO 40,000 TPA (DEBOTTLENECKING), KWINANA (300 / 300-1 / 846 / 1390)

AUSTRALIAN GOLD REAGENTS PTY LTD

SODIUM CYANIDE PLANT - EXPANSION TO 40 000 tpa (DEBOTTLENECKING)

SUMMARY OF MANAGEMENT COMMITMENTS

The commitments which the proponent has made to environmental management during the design, construction and operation of the expanded facilities are as follows:

1. Prior to implementing any modifications to the design of the existing plant, the following safety checks will be undertaken:

   (1) referral of the proposed modification to the process licensor, Roehm GmbH;

   (2) liaison with the risk consultant on the proposed changes if they are likely to affect the risk analysis; and

   (3) HAZOP analysis of the proposed modifications to the plant design

2. Construction of the proposed expansion will be undertaken in accordance with a Construction Stage Management Report similar to that prepared for the existing plant, but recognising the potential hazards of the existing plant, together with relevant conditions imposed by the Environmental Protection Authority.

3. All construction materials and practices will be in accordance with the relevant Australian codes and international standards where appropriate.

4. The plant design will ensure that emissions of nitrogen oxides during normal operating conditions will be within the National Health and Medical Research Council (NH&MRC) recommended guidelines and will also comply with guidelines adopted by the Victorian Environment Protection Authority.

5. Safety features incorporated in the existing plant will be incorporated in the expanded facilities.

6. Wastewater from the plant will be managed according to the wastewater management strategy approved by the Environmental Protection Authority for the existing plant.

7. The process and storage areas will be sealed and bunded so that any washings, contaminated stormwater run-off or spills will be collected and directed to the wastewater treatment plant sump, and analysed and treated prior to disposal. Any discharge of treated wastewater into Cockburn Sound will comply with the criteria specified in Bulletin No. 103 or the terms of the Environmental Protection Authority licence.

8. Approval for any additional storage of sodium cyanide will be sought from the Chief Inspector, Explosives and Dangerous Goods, Department of Mines.

9. A fire protection system will be incorporated in the expanded facilities in accordance with the requirements of the plant design and the Western Australian Fire Brigades Board. CSBP works personnel will be trained in the appropriate fire-fighting techniques. In addition to the fire-fighting capability of CSBP's Kwinana works, the fire-fighting co-operative established by the industrial operators in the Kwinana district will be available for emergency assistance.

10. All employees will be trained in the safe work practices and emergency procedures appropriate to the operation of the plant and handling of all associated materials. The management structure for the expanded facilities will incorporate at least two tiers of personnel technically qualified to manage hazardous chemical operations.

11. On-site emergency facilities at CSBP's Kwinana works will continue to include a dedicated emergency response vehicle, fire tender and an ambulance at all times, and an occupational health sister will be in attendance during normal working hours.

12. A detailed operating manual has been prepared for the existing plant from information supplied by the licensor, covering all process work, including start-up, shut-down, plant testing, inspection and emergency action. The procedures manual will be amended as necessary to include the expanded facilities.

13. The proponent will arrange for observers from the licensor to be at the plant during commissioning of the expanded facilities if it is deemed necessary by the licensor and the proponent.

14. The expanded facilities and any interconnections to the existing plant will be subject to a full HAZOP study and follow-up prior to commissioning.

15 Stocks of neutralizing agent (ferrous sulphate) are located along the transport routes at agreed locations. They will be inspected regularly to ensure that they are kept in good order.

16. Emergency response practice sessions will take place on a basis agreed with the relevant authorities.

17. The plant operator will maintain a dedicated emergency response vehicle at the Kwinana works and this will be available to service any off-site incident involving the transport of sodium cyanide.

18. Upon commissioning, monitoring of the existing plant will be undertaken in accordance with a comprehensive Environmental Monitoring and Management Programme, and the proposed expansion will be incorporated into this Environmental Monitoring and Management Programme to the satisfaction of the Environmental Protection Authority.

19. Liaison with local Shires, the Environmental Protection Authority, the Department of Mines, Westrail and counter-disaster groups will occur as appropriate in regards to proposed changes to the agreed transport routes or the addition of new market areas.

20. The proponent will prepare a Total Hazard Control Plan to the satisfaction of the Chief Inspector, Explosives and Dangerous Goods, Department of Mines, for the sodium cyanide plant and the expanded facilities at Kwinana

Proponent's Consolidated Supplementary Commitments of 12 September 2001 –Sodium Cyanide (Liquid) Plant, Expansion to 40,000 TPA (debottlenecking), Kwinana (Assessment No. 1390)

No	Topic	Action	Objective	Timing	Advice
1	Risk	1) Provide a revised QRA of the "as constructed" 25,000 tpa solid sodium cyanide plant in conjunction with the existing liquids plants. 2) Determine cumulative individual off-site risk contours for the liquids and 25,000 tpa sodium cyanide plants. 3) Undertake the required plant modifications if the revised QRA indicates that the combined plants will not meet the EPA risk criteria.	To demonstrate that the EPA's Guidance Statement No. 2, Off-site Individual Risk from Hazardous Plants criteriawill be met.	Pre-commissioning Pre-commissioning Pre-commissioning	DMPR
2	Risk	1) Submit a Construction Safety Management Plan. 2) Amend the Safety Report.	To meet DMPR's requirements.	Pre-construction	DMPR
3	Noise	1) Develop a Noise Reduction Management Plan for the site. The plan will be comp rehensive and will specify the noise reduction measures and the time frame for implementation of the measures. 2) Reduce irregular noise emissions from the Peter Brotherhood turbine by the installation of a silencer on a start-up vent.	To achieve compliance with the Environmental Protection (Noise) Regulations 1997 or to reduce noise emissions to as low as reasonably practicable.	Within 6 months after the review of the Noise Regulations. Pre-commissioning of solid sodium cyanide plant.	
4	Groundwater Protection	1) The plant will be fully bunded to DMPR and DEP requirements, and all pipelines containing cyanide solutions that are located outside of the bund will be double- contained. 2) The sea container storage area to be designed and constructed to meet AS 4452. 3) Develop and implement a "contingency and emergency plan".	To protect soil and groundwater from contamination and to deal with the onsite spillage of solid sodium cyanide.	Pre-commissioning Pre-commissioning Pre-commissioning	DMPR

5	Wastewater Discharge	Prepare a wastewater discharge plan to control emissions in the wastewater leaving the site, that includes: • Continuous on-line monitoring of the cyanide concentration. • The concentration of cyanide and copper to be less than 1 ppm. • The emission of nitrogen to be no greater than 14 kg/day on average.	To protect marine flora and fauna.	Pre-commissioning	
6	Atmospheric Emissions	Operate the liquids and solids plants to cumulatively meet the existing DEP licence limits for total cyanide (as CN) and ammonia emissions from the site.	To maintain the existing level of protection to public health and the environment.	On going.	
7	Approvals	Request a Section 46 review of the existing Ministerial Conditions for the production, storage and transport of sodium cyanide, with the intention of including the transport and storage of solid sodium cyanide off-site	To clarify existing conditions and incorporate transport of solid sodium cyanide.	Complete review prior to off-site transport of solid sodium cyanide.	DMPR

Abbreviations
EPA = Environmental Protection Authority
DEP = Department of Environmental Protection
DMPR = Department of Mineral and Petroleum Resources
QRA = Quantitative Risk Assessment
AS = Australian Standard
ppm = parts per million
tpa = tones per annum