Ammonium Nitrate Production Facility Expansion, Kwinana

CSBP LIMITED

Report and recommendations of the Environmental Protection Authority

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Perth, Western Australia
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Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
6/09/04	**Level of Assessment set (following any appeals upheld)**	
14/02/05	**Proponent Document Released for Public Comment**	**23**
14/03/05	**Public Comment Period Closed**	**4**
10/05/05	**Final Proponent response to the issues raised**	**8**
27/06/05	**EPA report to the Minister for the Environment**	**7**

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Summary and recommendations

CSBP Limited (CSBP) proposes to expand the capacity of its Ammonium Nitrate Production Facility (ANPF) at Kwinana from approximately 235,000 tonnes per annum (tpa) to approximately 580,000 tpa. This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal.

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

Relevant environmental factors

The EPA decided that the following environmental factors relevant to the proposal required detailed evaluation in the report:

(a) Atmospheric emissions;

(b) Greenhouse gas emissions;

(c) Noise; and

(d) Wastewater discharge.

Conclusion

The EPA has considered the proposal by CSBP to expand its ammonium nitrate production capacity to approximately 580,000 tpa by debottlenecking and duplicating its existing facilities.

The EPA notes that the proposed expansion of the ANPF is expected to lead to an increase in emissions of ammonia and oxides of nitrogen (NOx) and a significant decrease in emissions of ammonium nitrate particulates, once the existing prilling plant is decommissioned. Air quality modelling indicates that the proposal is not expected to have a significant impact on the ground level concentrations of nitrogen dioxide (NO_2) or ammonia and that cumulative impacts are not expected to exceed the NEPM standard or other relevant health criteria. The EPA notes that monitoring of PM_{10} particulates indicates that ambient concentrations currently approach the NEPM standard on some occasions in the Kwinana region. However, the ground level concentration of particulates is not expected to increase as a result of this proposal even under the worst case scenario of continued operation of the existing prilling plant (with scrubber retrofit) and the new prilling plant operating at reduced capacity.

The EPA notes that the proponent's greenhouse gas emissions are expected to initially increase by approximately 810,000 tpa of carbon dioxide equivalents (CO_2-e) mainly due to nitrous oxide (N_2O) emissions from the new nitric acid plant. The proposal will essentially duplicate the existing nitric acid plant to achieve operational efficiencies. The EPA also notes that the proposed new plant will be designed with a larger capacity boiler (compared to the existing plant) to reduce greenhouse gas emissions by 68,000 tpa CO_2-e. Subject to the larger boiler achieving the expected reduction in greenhouse gas emissions, it will also be retrofitted to the existing plant reducing

overall greenhouse gas emissions by approximately 136,000 tpa CO_2-e. However, based on the information provided, the EPA considers the proposed overall N_2O emission rate (approximately 10 kg N_2O per tonne of nitric acid) to be high for new plant and a significant source of greenhouse gas emissions.

The EPA notes that a number of new technologies are now available or under development to significantly reduce N_2O emissions from new nitric acid plants. However, the application and availability of the new N_2O reduction technologies varies between the technology providers for nitric acid manufacturing plants. As CSBP has an existing nitric acid plant at the site, it proposes to use the same technology provider (Grande Paroisse) for the new plant. CSBP has selected this technology based on plant efficiency, reliability, safety and the added benefits of duplication of existing technology and equipment. CSBP advised that Grande Paroisse is currently developing a process that uses a granular catalyst beneath the main platinum gauzes. The EPA considers it reasonable for the proponent to seek approval to duplicate an existing nitric acid plant that the proponent considers to be safe, efficient and reliable. The proponent has committed to design the new nitric acid plant to incorporate new N_2O abatement technology that is located in the reactor, once this technology becomes technically available and commercially viable. The EPA recommends that the proponent submit a Nitrous Oxide Emission Improvement Plan to the Department of Environment (DoE) each year, that includes a review of commercial trials of new low N_2O emission catalysts. The proponent should be required to install the new technology into the new nitric acid plant, when practicable.

The EPA notes that that noise impacts from the proponent's operations on the nearest residential premises have reduced significantly since the Kwinana Industries Council Noise Study (SVT, 2001) was conducted. The proponent has committed to comply with the *Environmental Protection (Noise) Regulations 1997* by the end of 2005. The EPA considers that the proposed expansion will have a negligible impact on existing noise levels at the nearest residences and that the proponent's recent noise control improvements are consistent with the EPA's long term objective to see an improvement in noise emissions from the whole of Kwinana industry.

The EPA notes that the nitrogen load in the wastewater discharge is expected to increase by approximately 600 kg per year. The proponent has commitment not to exceed its 2004 nitrogen discharge. The proponent has committed to commence discharging its wastewater to the Sepia Depression via the Water Corporation's (WC) Sepia Depression Ocean Outfall Line by the end of 2005. The EPA is satisfied that the Ministerial conditions and commitments made by the WC (Ministerial Statement No. 665) will contribute to achieving a High Level of Ecological Protection beyond the small zone around the Cape Peron outfall, as delineated in Perth Coastal Waters Environmental Values and Objectives (EPA, 2000a).

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 5, and summarised in Section 4.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for CSBP Limited to expand its ammonium nitrate production capacity to approximately 580,000 tpa by debottlenecking and duplicating its existing plant;
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 5, and summarised in Section 4, including the proponent's commitments; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 5 of this report.

Conditions

Having considered the proponent's commitments and information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by CSBP Limited to expand its ammonium nitrate production capacity at Kwinana to approximately 580,000 tpa is approved for implementation. These conditions are presented in Appendix 5. Matters addressed in the conditions include the following:

(a) that the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 5;

(b) preparation and implementation of a Greenhouse Gas Emissions Management Plan;

(c) preparation of a Nitrous Oxide Emissions Improvement Plan;

(d) prilling tower plant performance;

(e) nitric acid plant performance;

(f) wastewater discharge; and

(g) compliance with the *Environmental Protection (Noise) Regulations 1997*.

Contents

1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the environmental factors relevant to the proposal by CSBP Limited (CSBP), to expand the capacity of the Ammonium Nitrate Production Facility (ANPF) at its industrial complex in Kwinana.

CSBP manufactures and supplies fertilisers and a range of other chemical products. CSBP currently produces approximately 235,000 tonnes per annum (tpa) of ammonium nitrate as a prill for the explosives market or in a solution form for both the fertiliser and explosives market. CSBP proposes to expand its ammonium nitrate production capacity to approximately 580,000 tpa.

The proposal was referred to the EPA on 24 August 2004, and on 1 September 2004 the level was set at Public Environmental Review (PER) under Section 38 of the *Environmental Protection Act 1986*. The PER document was made available for a public review period of 4 weeks commencing on 14 February 2004 and closing on 14 March 2004.

The EPA's decision to assess the proposal at the level of PER was based on four main environmental factors, namely, atmospheric emissions, greenhouse gas emissions, noise and wastewater discharge.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the environmental factors relevant to the proposal. The Conditions and Commitments to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides Other Advice by the EPA, Section 6 presents the EPA's conclusions and Section 7, the EPA's Recommendations. Appendix 6 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process, and which have been taken into account by the EPA, appear in the report itself.

2. The proposal

CSBP currently produces approximately 235,000 tpa of ammonium nitrate at its Kwinana operations which are located within the Kwinana Industrial Area as shown in Figures 1 and 2. CSBP proposes to expand its ammonium nitrate production capacity to approximately 580,000 tpa by debottlenecking and duplicating its existing facilities. The expansion includes:

- duplication and/or debottlenecking of the existing 500 tpd nitric acid plant;
- duplication and/or debottlenecking of the existing 635 tpd ammonium nitrate reaction plant;
- construction of a new 90% ammonium nitrate solution storage tank (250 m^3);
- construction of a new prilling plant; and
- a review of ammonium nitrate storage facilities.

The main characteristics of the proposal and a comparison with the existing ANPF are summarised in Table 1 below. A detailed description of the proposal is provided in Section 4 of the PER (ATA Environmental, 2005).

Table 1: Summary and comparison of key proposal characteristics of the ANPF

Characteristic	Existing Facility	Description of Expanded Facility
Location	Kwinana Beach Road – Kwinana – Kwinana Industrial Area (KIA).	Kwinana Beach Road – Kwinana – Kwinana Industrial Area (KIA) – no change
CSBP Site Area	138 hectares	138 hectares – no change
Project Life	20-30 years	20-30 years
Plant Operating Hours	24 hour/day operation, 365 days per year except for maintenance shutdowns	24 hour/day operation, 365 days per year except for maintenance shutdowns – no change
Plant Commissioning	1968 – prilling plant 1996 – existing nitric acid plant and ammonium nitrate plant	Second nitric acid plant 2007 Second ammonium nitrate plant 2007 New prilling plant 2007
Production Plants	• Nitric acid plant; • Nitric acid storage tanks • Ammonium nitrate plant; • Ammonium nitrate (90% solution) storage tank of 730 m^3 capacity; • Prilling plant; • Packaging and despatch facilities; and • 14,000 tonnes bulk and bag storage.	• 2 Nitric acid plants; • Nitric acid storage tanks • 2 Ammonium nitrate plants; • New ammonium nitrate (90% solution) storage tank of 250 m^3 capacity; • Ammonium nitrate (70% solution) storage tank of 730m^3 capacity • New enlarged prilling plant (existing prilling plant will eventually be decommissioned but may need to be operated in parallel for several years and if so, appropriate pollution prevention will be fitted to existing plant; • Packaging and despatch facilities; and • 14,000 tonnes bulk and bag storage.

Characteristic	Existing Facility	Description of Expanded Facility
Production	• Nitric acid – average 187,000 tpa, maximum 200,000 tpa • Ammonium nitrate - average 235,000 tpa, maximum 254,000 tpa • Prilling plant – average 185,000 tpa, maximum 200,000 tpa	*Nitric Acid* • Debottleneck existing nitric acid – nominal 230,000 tpa; or • Duplicate existing nitric acid – double the current maximum to 400,000 tpa; or • Debottleneck existing and duplicate nitric acid facilities – 460,000 tpa nominal. *Ammonium nitrate* • Debottleneck existing ammonium nitrate – nominal 292,000 tpa; or • Duplicate existing ammonium nitrate – double the current maximum to 500,000 tpa; or • Debottleneck existing and duplicate ammonium nitrate facilities – 584,000 tpa nominal. *Prill* • New prilling plant – nominal 400,000 tpa (nominal 470,000 tpa if combined with existing plant).
Inputs	Ammonia, oxygen, and water	Ammonia, oxygen, and water
Outputs	Ammonium nitrate solution and prill plus air/water emissions (see below)	Ammonium nitrate solution and prill plus air/water emissions (see below)
Gaseous Emissions	Nitrogen oxides - 71 tpa Ammonium nitrate particulate – 104 tpa	Nitrogen oxides - 170 tpa Ammonia - 125 tpa Ammonium nitrate particulate: 79 tpa (proposed new plant at full rate) OR 103 tpa (proposed new plant at 50% rate, and existing plant retrofitted with scrubbing equipment and operating to a total output of 470,000 tpa).
Greenhouse Gas Emissions	667,394 tpa of net CO_2-e	1.5 million tpa of net CO_2-e

Characteristic	Existing Facility	Description of Expanded Facility
Liquid Effluent Discharges	Approx 1.5 ML/day of cooling tower blowdown water and stormwater to Cockburn Sound (to the SDOOL in February 2005 approx)	Approx 2ML/day effluent to the Sepia Depression Ocean Outfall Landline (SDOOL) from the total CSBP site, including the proposed AN expansion. Proposed nitrogen concentrations in effluent to Cockburn Sound/SDOOL will be less than or equal to that for June 2004 (3 monthly rolling average) i.e. no net increase in site emissions of nitrogen from this proposal.
Noise	CSBP industrial complex does not currently meet the industry to industry assigned level of the *Environmental Protection (Noise) Regulations*	Will comply with the Enviro*nmental Protection (Noise) Regulations 1997* or subsequent Ministerial Statements. CSBP will install a noise barrier at the northern boundary and/or other arrangements in 2005 to ensure this site achieves compliance with the *Environmental Protection (Noise) Regulations* at this location.
Net Power Generation	1.5MW	3 MW or equivalent steam production

The potential impacts of the proposal initially predicted by the proponent (ATA Environmental, 2005) and their proposed management are summarised in Appendix 4.

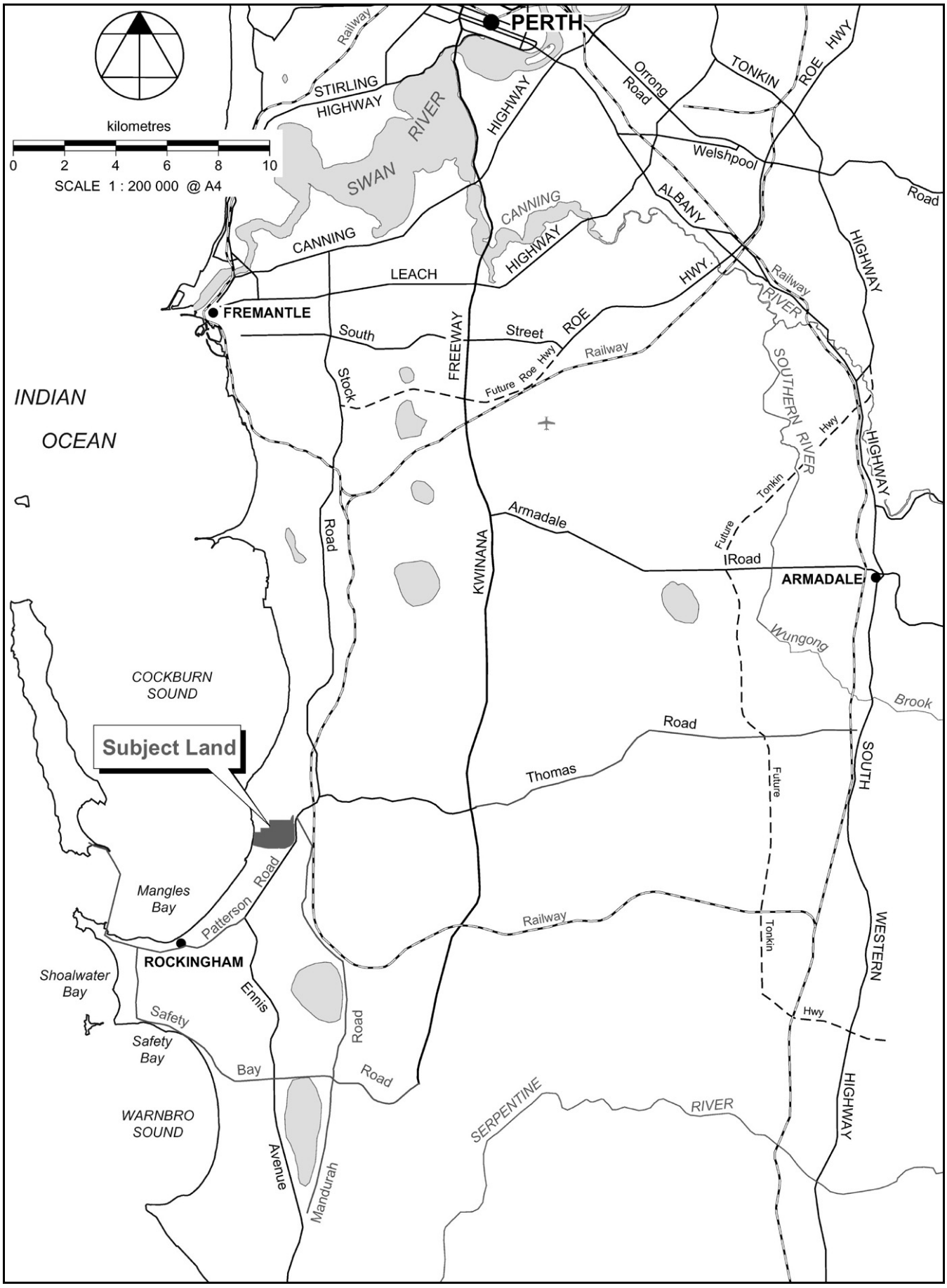

Figure 1: Regional Location (Source: Figure 1 SKM, 2005)

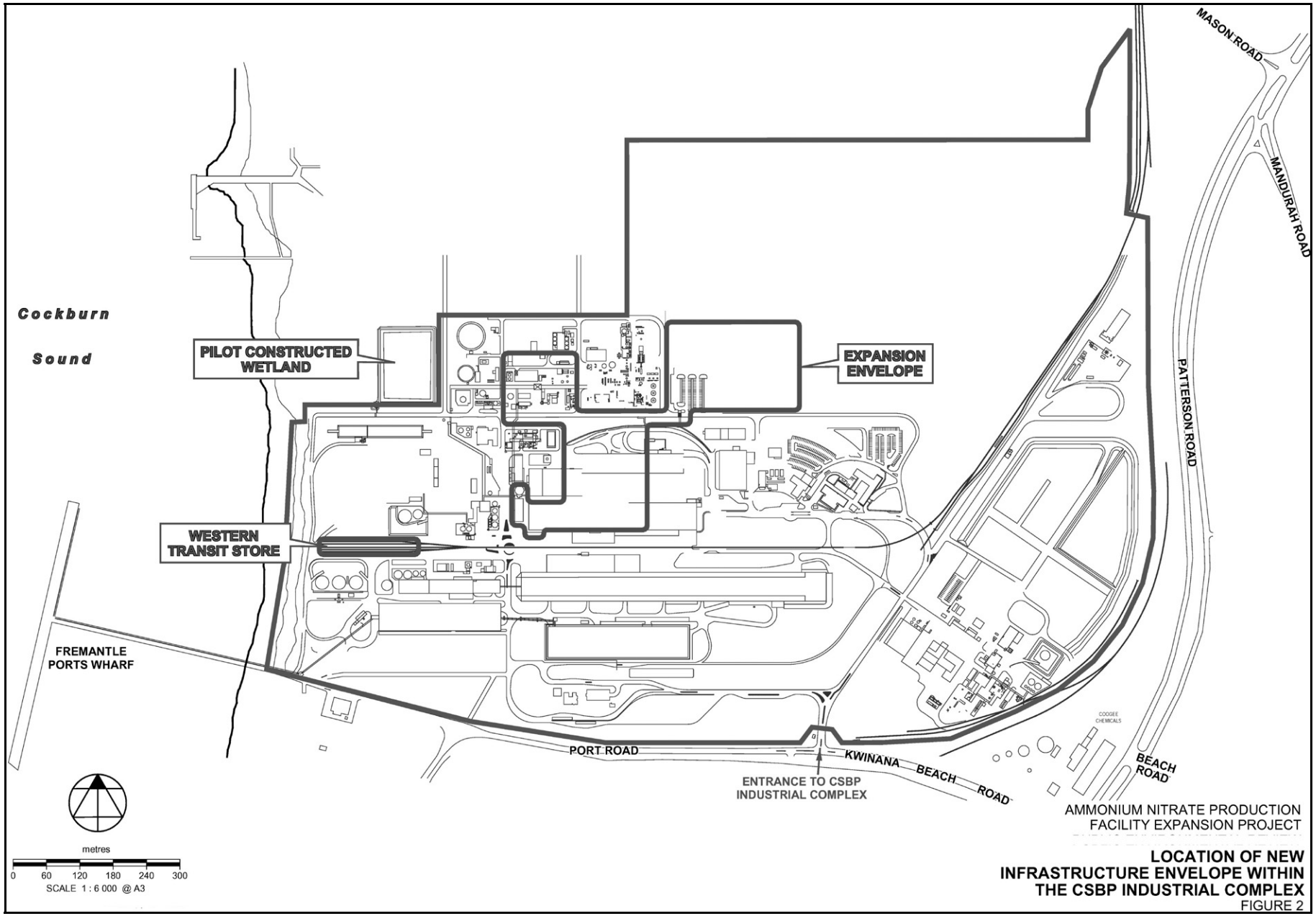

Figure 2: Plant location (Source Figure 2 SKM, 2005)

3. Relevant environmental factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the relevant factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as water resource, are relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

It is the EPA's opinion that the following environmental factors relevant to the proposal require detailed evaluation in this report:

(a) Atmospheric emissions;

(b) Greenhouse gas emissions;

(c) Noise; and

(d) Wastewater discharge.

The above relevant factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the relevant environmental factors and their assessment are contained in Sections 3.1 - 3.4. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

3.1 Atmospheric emissions

Description

The proposed expansion of the ANPF is expected to result in an increase in emissions of ammonia and oxides of nitrogen (NOx) as shown in Table 2. The proposal includes a new prilling plant with emissions control and therefore ammonium nitrate particulate emissions are expected to decrease. The particulate emissions (Table 2) are for the worst case scenario of continued operation of the existing prilling plant (with scrubber retrofit) and operation of the new plant at reduced capacity.

Table 2: Ammonium Nitrate Production Facility Emissions

Pollutant	Existing ANPF emissions (tpa)	Proposed ANPF emissions (tpa)	Increase in emissions (%)		
			ANPF[1]	CSBP[2]	KIA[3]
oxides of nitrogen	71	170	140	50	0.7
ammonium nitrate (particulates)	104	103[4]	no increase	-	-
ammonia	Nil	125	-	40	6.0

[1] ANPF – increase in CSBP's Ammonium Nitrate Production Facility emissions.
[2] CSBP – increase in CSBP's Kwinana emissions based on 2003/04 National Pollutant Inventory data.
[3] KIA - increase in Kwinana Industrial Area emissions based on the Kwinana Gap Emissions Study (Maunsell, 2004) data.
[4]Ammonium nitrate emissions represent the worst case scenario of continued operation of existing prilling plant with scrubber retrofit and the new prilling plant operating at 50% capacity on an annual basis.

The proponent commissioned ENVIRON Australia Pty Ltd (ENVIRON) to undertake air dispersion modelling to predict the potential impacts of the gaseous emissions on the environment under normal and worst-case plant operating conditions (ENVIRON, 2005). The results of the air dispersion modelling are provided in Sections 6.3 - 6.5 and Appendix 2 of the PER (ATA Environmental, 2005).

Oxides of Nitrogen

The proposal includes a new nitric acid plant that essentially duplicates the existing plant. This is a Grande Paroisse mono-pressure nitric acid plant with selective catalytic reduction (SCR) technology to reduce NOx emissions. The NOx concentration in the tail gas is expected to be less than 100 mg/Nm^3 which is well below the European Environment Agency limit of 350 mg/Nm3 for new nitric acid plants (EEA, 2005). SCR technology is considered to be Best Available Technology (BAT) for NOx reduction (Infomil, 1999).

Modelling of the proposed NOx emissions, in isolation, predicts that the peak ground level concentration of nitrogen dioxide (NO_2) will occur near the source and be approximately 15% of the 1-hourly NEPM standard. The proponent did not model for cumulative impacts of NOx emissions. However, NOx emissions from existing industrial sources in the Kwinana area were recently modelled for the Kwinana Industries Council (KIC) by ENVIRON (*Atmospheric Emissions Screening Assessment of Kwinana Industries – Phase 1,* ENVIRON, 2004). The study found that the maximum ground level concentration of NO_2 from the industrial sources is likely to occur in the Beeliar area (approximately 10 km from the CSBP industrial complex) and be approximately 20% of the annual average NEPM standard.

The proponent conducted a qualitative analysis to assess the potential impact that elevated NOx emissions from the proposed nitric acid plant may have on photochemical smog levels in Perth. The Department of Environment (DoE) modelled the effects on ozone levels, over a full summer season, of a 50% change in NOx emissions from CSBP using the GRS-based photochemical model, AQM. The simulated change in the season's summed four-hour ozone maxima was found to be close to zero.

Ammonium Nitrate (particulates)

A new Uhde GmbH prilling plant incorporating a two stage wet scrubber is proposed. The plant will be designed to achieve particulate emissions of less than 50 mg/Nm^3 and a total mass emission of approximately 0.23 kg per tonne of product. BAT (for fertilizer grade prilling towers) is considered by the Netherlands Ministry of Housing, Spatial Planning and the Environment (Infomil, 2001) and the European Fertilisers Manufacturers Association (EFMA, 2000) to be 0.1 and 0.5 kg of particulates per tonne of product respectively. CSBP expects to decommission the existing prilling tower once the performance of the new plant has been proven. However, under the worst case scenario of continued operation of the existing prilling plant (with irrigated mesh scrubber retrofit) and operation of the new plant at reduced capacity (70% on an instantaneous basis and 50% on an annual basis), particulate emissions are not expected to increase beyond current levels.

The Kwinana Gap Emissions Study (Maunsell, 2004) concluded that there are insufficient data available to assess the potential impacts arising from industrial particulate emissions on public health and the environment. The air quality monitoring station that monitors PM_{10} particulates in the region (South Lake Monitoring Station) indicates that ground level concentrations approach NEPM levels on occasions. However, under the worst case scenario, CSBP's particulate emissions are not expected to increase following the expansion. Modelling of CSBP's emissions (in isolation) predicts that the PM_{10} ground level concentration should not be more than approximately 10% of the NEPM PM_{10} standard. The NEPM $PM_{2.5}$ advisory reporting standard is also expected to be met should all the particulates be less than 2.5 microns.

Ammonia

The long-term impacts of ammonia emissions from all major industries were assessed as part of the KIC study (ENVIRON, 2004). The maximum ammonia ground level concentration at a community location was predicted to occur at Wells Park and the annual average concentration was estimated to be approximately 50 µg/m^3 which is half the USEPA guideline value.

Air dispersion modelling (ENVIRON, 2005) of ammonia emissions from the proposed new source (in isolation) predicts the maximum ground level concentration of ammonia, at locations that are readily assessable to the public, to be approximately 20 µg/m^3 and 0.3 µg/m^3 for the hourly and annual averages respectively. The predicted ground level concentration of ammonia is well below the Victorian State EPP criterion of 600 µg/m^3 (3-minute average) and several orders of magnitude below the USEPA (annual average) and the Californian Office of Environmental Health Hazard Assessment (OEHHA) (1-hour average) guideline values (ENVIRON, 2005).

Additional modelling was undertaken to determine the cumulative impacts of ammonia emissions at Kwinana Beach, Medina and East Rockingham (ENVIRON, 2005a). Modelling inputs from other ammonia sources was based on NPI data. The maximum 1-hourly ground level concentration of ammonia at the above locations is predicted to be well below the OEHHA guideline value.

Submissions

The issues raised in the public submissions concerning atmospheric emissions were as follows:

- monitoring for PM_{10}, $PM_{2.5}$, NOx and ammonia emissions should be undertaken at all the monitoring stations in the Kwinana Industrial Area and the results should be publicly available;
- the suitability of models used for the air quality modeling was questioned;
- continuous on line monitors should be installed to monitor for ammonia, NOx and $PM_{2.5}$ emissions from the proposed and existing plants; and
- the new prilling plant should incorporate BAT to minimise particulate emissions.

Assessment

The area considered for assessment of this factor is the CSBP site and surrounding industrial and residential areas.

The EPA's environmental objective for this factor is to ensure that:

- Atmospheric emissions do not adversely affect the environment or health, welfare and amenity of nearby land users by meeting statutory requirements (including Section 51 of the *Environmental Protection Act 1986*) and acceptable standards;
- Atmospheric emissions, both individually and cumulatively, meet appropriate criteria and do not cause an environmental or human health problem; and
- All reasonable and practicable measures are used to minimise the discharge of atmospheric emissions.

The EPA considers the use of Dispmod to be an appropriate model to predict the impacts of NOx, ammonia and particulate emissions on the Kwinana region.

Oxides of nitrogen

The EPA notes that modelling of the proposed NOx emissions (from the ANPF in isolation) indicates that the peak ground level concentration of NO_2 is predicted to occur near the source and be approximately 15% of the hourly NEPM standard. Modelling results of the recent KIC study (ENVIRON, 2004) indicate that the peak hourly average NO_2 concentration for existing sources is about 20% of the NEPM standard and occurs in the Beeliar area. The EPA considers the omission of explicit modelling of cumulative effects to be acceptable in this case given that the modelled peaks from the proposal occur near the source and are expected to be less than 15% of the NEPM. Based upon the information provided, the EPA considers that the proposal is not likely to have a significant impact on regional NOx levels and that the ground level concentrations of NO_2 in the vicinity of the proponent's operations are likely to be well below the NEPM standard.

The EPA is satisfied that the proposed expansion is not likely to have a significant impact on ozone levels, based on the results of modelling work undertaken by the DoE.

Ammonium nitrate particulates

The EPA notes that the proposed new prilling plant will incorporate a scrubbing system and that particulate emissions are expected to be significantly lower following the expansion. The proponent has selected a two stage scrubbing unit rather than Uhde's standard single stage packed bed scrubber in order to further minimise emissions from the new prilling plant. The proponent advised that the scrubbing systems for low density (explosives grade) ammonium nitrate prills are generally different to the type commonly used in Europe for the production of fertilizer grade ammonium nitrate. However, the EPA notes that the proposed particulate emission rate is comparable with BAT emissions for fertilizer grade prilling plants in Europe (Infomil, 2001 and EFMA, 2000). Based on the information provided, the EPA considers that the proponent is proposing best practicable measures (BPM) to minimise particulate emissions consistent with the EPA's Guidance Statement No. 55 '*Implementing Best Practice in proposals submitted to the Environmental Impact Assessment process'* (EPA, 2003).

The DoE advised that particulate emissions from the existing prilling plant have been a long term source of complaints, mainly because of the visible plume. The DoE also advised that it considers the proposed discharge parameters for the new plant to be satisfactory.

The EPA notes that the proponent expects to decommission the existing prilling plant once the performance of the new plant has been confirmed. However, should the proponent consider it necessary to continue to operate the existing prilling plant for more than 12 months following commissioning of the new plant then a scrubber will be retrofitted to the existing plant. Particulate emissions are not expected to increase under this worst case scenario and modelling (of the proposal in isolation) shows that the ground level PM_{10} concentration is expected to be no more than 10% of the NEPM PM_{10} standard.

The EPA notes that the particulate emissions from the prilling plant will mostly be ammonium nitrate. The Health Department reviewed an assessment undertaken by BenchMark Toxicology Services entitled *Appropriateness of the PM10 standard for assessing health effects of ammonium nitrate particles in air*. The Health Department advised that in the absence of more robust scientific data, existing air quality criteria for particulates should be adopted to assess health impacts resulting from exposure to ammonium nitrate particles.

The EPA is satisfied that particulate emissions are not likely to increase beyond current levels and that impacts from the proposal (in isolation) are expected to be well below the NEPM PM_{10} standard. The EPA notes that monitoring indicates that the background concentration of PM_{10} particulates approaches the NEPM standard on occasions. The DoE is currently undertaking an air quality study that includes the monitoring of particulates in the Kwinana Region (see Other Advice).

Ammonia

The EPA notes that a relatively small emission of ammonia is expected from the new prilling plant. Based on the modelling results, the EPA considers the proposal is not likely to have a significant impact on the ground level concentrations of ammonia and that the USEPA and OEHHA guidelines values should be met.

Summary

Having particular regard to the:

a) air dispersion modelling that predicts that the relatively small increase in NOx and ammonia emissions is not likely to have a significant impact on the ground level concentrations of these pollutants and that relevant health criteria should be met;

b) proposed new prilling plant incorporating a wet scrubber which is expected to result in a significant reduction in ammonium nitrate particulate emissions; and

c) recommended conditions and proponent's commitment,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

3.2 Greenhouse gas emissions

Description

CSBP's total greenhouse gas emissions are expected to increase from approximately 1,270,000 tpa of carbon dioxide equivalents (CO_2-e) to approximately 2,080,000 tpa of CO_2-e following the proposed expansion of the ANPF. The major source of greenhouse gases will be emissions of nitrous oxide (N_2O) from the proposed duplicate nitric acid plant. N_2O emissions have a global warming potential of 310.

The proponent is proposing to adopt selective catalytic reduction (SCR) technology in the new nitric acid plant to minimise emissions of NOx. Although SCR is considered to be BAT to reduce NOx emissions it may actually lead to an increase in N_2O emissions (Infomil, Oct 2001). The N_2O emission from CSBP's existing nitric acid plant is approximately 11 kg N_2O per tonne of (100%) nitric acid.

Non-selective catalytic reduction (NSCR) systems are very effective in reducing both N_2O and NOx emissions. NSCR systems were widely installed during the 1970's, but are generally not preferred in modern plants because of high energy costs and associated high gas temperatures (Infomil, Oct 2001).

A number of new technologies are now available or under development to reduce N_2O emissions from new nitric acid plants in the order of 85% (i.e. to approximately 2 kg N_2O per tonne of nitric acid). These technologies include Homogeneous Decomposition, High Temperature Catalytic Decomposition, Combined Abatement Reactor – Uhde Process and Alternative Oxidation Catalysts. Details of the technologies are outlined in the *Draft Reference Document on Best Available Techniques in the large Volume Inorganic Chemicals, Ammonia, Acids and Fertiliser Industr*ies developed for the European Commission Integrated Pollution Prevention and Control (European IPCC, 2004) and the *Reduction of Nitrous Oxide (N_2O) in the Nitric Acid Industry* developed for the Netherlands Agency for Energy and the Environment (Infomil, Oct 2001).

The application and availability of the new N_2O reduction technologies varies between the technology providers for nitric acid manufacturing plants. As CSBP has an existing nitric acid plant at the site, it proposes to use the same technology provider (Grande Paroisse) for the new plant. CSBP has selected this technology based on

plant efficiency, reliability, safety and the added benefits of duplication of existing technology and equipment. CSBP advised that Grande Paroisse is currently developing a process that uses a granular catalyst beneath the main platinum gauzes. CSBP's preference is to await the commercial availability of catalyst based N_2O reduction technologies. CSBP has committed to design the new nitric acid plant to enable the technology to be retrofitted to the reactor.

CSBP has committed to install a large boiler in the new nitric acid plant which is expected to reduce greenhouse gas emissions by at least 68,000 tpa CO_2-e when compared to the existing plant i.e. from approximately 11 kg N_2O to approximately 10 kg N_2O per tonne of nitric acid. The proponent has also committed to replace the boiler in the existing nitric acid plant with a larger boiler within 3 years following commissioning of the new plant, reducing CSBP's greenhouse gas emissions by a further 68,000 tpa CO_2-e i.e. from approximately 2,080,000 tpa CO_2-e to approximately 2,010,000 tpa CO_2-e.

The proponent has committed to monitor the commercial trials of new low N_2O emission catalysts and regularly report on developments. CSBP advise that because of the technical, commercial, regulatory and inter-governmental elements of the technology development it is unlikely to be available within the next 3 to 4 years. CSBP has committed to retrofit the N_2O reduction technology in the new nitric acid plant once the technology is commercially viable. The proponent has also committed to install selected N_2O reduction technology in the existing nitric acid plant if it proves to be commercially successful in the new plant and after any Australian greenhouse gas emission laws and related carbon trading laws are known. The proponent plans to provide up to 80,000 tpa of carbon dioxide to Alcoa World Alumina Australia for injection into residue disposal areas to create carbonates to bind the carbon dioxide.

Submissions

The issues raised in the public submissions concerning greenhouse gas emissions were as follows:

- information was sought on the frequency and replacement criteria for catalyst gauzes in the existing nitric acid plant to minimise N_2O emissions;
- additional information was sought regarding BAT to reduce N_2O emissions from nitric acid plants;
- concerns were expressed about the proposed increase in greenhouse gas emissions and whether the emissions will meet appropriate standards;
- the need for specific greenhouse gas offsets should N_2O reduction technology not be commercially feasible within a given timeframe; and
- support was expressed for the proponent's commitment to report on the status of BAT for N_2O reduction to the EPA every year, or until the technology is adopted, or the EPA advises that the report is no longer required.

Assessment

The EPA considers that proposed expansion of the ANPF will result in a significant increase in Western Australia's greenhouse gas emissions.

The EPA's objectives for greenhouse gas management is to reduce emissions to a level which is as low as practicable. To achieve this the EPA's environmental assessment objective is to ensure that potential greenhouse gas emissions emitted from proposed projects are adequately addressed in the planning/design and operation of projects and that:

- best practice is applied to maximise energy efficiency and minimise emissions;
- comprehensive analysis is undertaken to identify and implement appropriate offsets; and
- proponents undertake an ongoing program to monitor and report emissions and periodically assess opportunities to further greenhouse gas emissions over time.

The Australian Government has committed to limit Australia's increase in greenhouse gas emissions in 2008-2012 to no more than 8% above 1990 levels which is estimated to be 543.2 million tpa CO_2-e using the Kyoto accounting provisions (AGO, 2003). The EPA notes that the proposed expansion of the ANPF is expected to initially increase CSBP's greenhouse gas emissions by approximately 810,000 tpa CO_2-e which represents 0.15% of Australia's 1990 baseline level for greenhouse gases and 1.6% of Western Australia's 1995 greenhouse gas emissions.

The EPA's Guidance Statement No. 12 *'Guidance Statement for Minimising Greenhouse Gas Emissions'* outlines the EPA's expectation regarding minimising greenhouse gas emissions from new proposals. The EPA expects proponents to use best practicable measures (BPM) to maximise energy efficiency and minimise greenhouse gas emissions to the lowest practicable level (EPA, 2002). BPM are defined in the EPA Guidance Statement No. 55 *'Implementing Best Practice in proposals submitted to the Environmental Impact Assessment process'* as follows:
"*BPM incorporate technology and environmental management procedures which are practicable having regard to, among other things, local conditions and circumstances (including costs), and to the current state of technical knowledge, including the availability of reliable, proven technology*."

The EPA notes that the proposed new plant will be designed with a larger capacity boiler (compared to the existing plant) to reduce greenhouse gas emissions by 68,000 tpa CO_2-e. Subject to the larger boiler achieving the expected reduction in greenhouse gas emissions, it will also be retrofitted to the existing plant reducing overall greenhouse gas emissions by approximately 136,000 tpa CO_2-e. However, based on the information provided, the EPA considers the proposed overall N_2O emission rate (approximately 10 kg N_2O per tonne of nitric acid) to be high for new plant. The EPA notes a large amount of research and development work is currently being undertaken in the nitric acid industry with the aim of reducing N_2O emissions without significantly impacting on plant performance, energy efficiency or product yield. The Netherlands "Ministry of Housing, Spatial Planning and The Environment" considers BAT for N_2O emissions reduction in new nitric acid plants to be an extended reaction chamber that reduces emissions by approximately 85% when compared to a standard oxidation chamber (Infomil, 1999).

The EPA considers it reasonable for the proponent to seek approval to duplicate an existing nitric acid plant that the proponent considers to be safe, efficient and reliable. The proponent has advised the EPA that new N_2O reduction technologies are

currently not commercially available for their Grande Paroisse nitric acid plant. The proponent also advised that Grande Paroisse is currently developing N_2O reduction technology, although the proponent advised that it will not necessarily be limited to installing Grande Paroisse's N_2O reduction technology. The proponent has committed to design the new nitric acid such that new technologies currently under development can be retrofitted to the plant. The proponent has also committed to monitor and report on the commercial trials of new low N_2O emission catalysts for new plants and to adopt the technology once it is commercially viable.

In previous assessments the EPA has adopted the position that where BPM are not proposed in a project, the proponent should implement greenhouse gas offset measures, for all or part of the differential between emissions achievable utilising BPM. However, in this case the EPA is of the view that the proponent's clear intention is to retrofit N_2O emissions reduction technology once the preferred technology is commercially viable. To better ensure that the selected N_2O reduction technology (or similar) will be retrofitted to the proposed new nitric acid plant as soon as practicable, the EPA recommends that the proponent be required to submit a Nitrous Oxide Emission Improvement Plan that includes an annual review of the commercial trials of new low N_2O emission catalysts. The proponent should be required to install the new technology into the new nitric acid plant, when practicable.

Summary

Having particular regard to the:

(a) potential environmental, safety and operational benefits of nitric acid plant duplication;

(b) large amount of research and development work currently being undertaken to reduce N_2O emissions from nitric acid plants;

(c) proponent's commitment to monitor and report on commercial trials of new low N_2O emission catalysts for new nitric acid plants and to adopt the technology once it is commercially viable;

(d) the proponent's commitment to install larger boilers in the new and existing nitric acid plants to reduce greenhouse gas emissions by at least 136,000 tpa CO_2-e; and

(e) recommended condition for a Nitrous Oxide Emissions Improvement Plan,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

3.3 Noise

Description

The proponent commissioned Herring Storer Acoustics (HSA) to develop an acoustic model to predict the potential impact of the proposed ANPF expansion on the nearest residences. Modelling predicts that noise levels will increase by approximately 0.1 to 0.6 dB(A) at the nearest residences following the expansion. CSBP's contribution to noise levels under worst-case night-time conditions is shown in Table 3.

Table 3: CSBP's contribution to noise levels at nearest residences

Location	Existing LA_{10}	Expansion LA_{10}
Medina	30.8	31.0
Calista	29.4	29.5
Leda	26	26.4
Hillman	22.2	22.0
North Rockingham (near CBH)	24.9	25.4
East Rockingham (coast)	19.5	20.1

Modelling shows that CSBP's operations currently meet the assigned noise levels at the nearest residential premises. However, under the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations), CSBP is considered to be a significant contributor to noise levels at Medina since the assigned noise levels are exceeded cumulatively and CSBP's contribution is within 5 dB(A) of the assigned level of 35 dB(A). However, CSBP's noise emissions are not expected to be audible at Medina given that its contribution is more than 15 dB(A) below the cumulative effect of all industry at this location (SVT, 2001).

CSBP's existing operations do not meet the industry to industry assigned noise level of 65 dB(A) at certain locations along its northern boundary (BP boundary). Measured noise levels ranged from 54 to 72 dB(A). The noise level along the section of the boundary adjacent to the proposed duplicate nitric acid plant is expected to increase from 62 dB(A) to 69 dB(A) following the expansion. The proponent has made a commitment to construct a noise barrier fence along the BP boundary and/or implement other arrangements in order to achieve compliance with the Noise Regulations by the end of 2005. The proponent has also committed to install acoustic enclosures around the nitric acid intercoolers (a significant noise source) for both existing and proposed duplicate plant.

CSBP has actively reduced noise emissions from its operations at Kwinana over the last 5 years. The noise reduction measures are outlined in Section 6.9.3 of the PER (ATA Environmental, 2005). The focus of the noise reduction measures has been on high sound power noise sources, including significant noise sources that are elevated relative to the surrounding topography. Modelling shows that CSBP has reduced its contribution to noise levels at Calista and Medina by approximately 9 and 7 dB(A) respectively during that period.

Submissions

The issues raised in the public submissions regarding noise were as follows:

- concerns regarding the potential contribution to the cumulative assigned noise level in Medina, north Rockingham, north east Rockingham and Hillman as a result of the expansion;
- the noise data associated with the proposed expansion should be made available for inclusion in the Kwinana Industries Council cumulative noise model;
- the proponent should develop a Noise Management Plan if one does not already exist;

- adjustments such as tone, frequency modulation, and impulsiveness need to be considered on predicted noise outputs; and
- concerns regarding the impact of noise associated with construction and traffic (shipping and road) on the Rockingham residents.

Assessment

The area considered for assessment of this factor is the CSBP site and surrounding industrial and residential areas.

The EPA's objective is to protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal, by ensuring the noise levels meet statutory requirements and acceptable standards.

The EPA notes that the proponent's existing operations do not currently comply with the Noise Regulations at the northern boundary fence and that the proponent has committed to achieve compliance by the end of 2005. Under the Noise Regulations the proponent's existing operations significantly contribute to noise levels at Medina. However, the EPA is satisfied that the proponent's noise emission is not likely to be audible at Medina given that its noise contribution is approximately 15 dB(A) below the cumulative noise level from all industry at that location. The EPA is also satisfied that the proposed expansion will not have a discernable impact on noise levels at any of the other nearby residential locations, including North Rockingham, given that modelling shows that CSBP's Kwinana operations do not significantly contribute to noise levels at these locations.

The EPA notes that the proponent has implemented a range of measures to reduce its noise emissions, particularly from elevated sources, and that modelling shows that noise impacts from this site on the nearest residential premises have reduced significantly since the Kwinana KIC Noise Study (SVT, 2001) was conducted. The EPA considers these recent noise control improvements to be consistent with the EPA's long term objective to see an improvement in noise emissions from the whole of Kwinana industry. The EPA considers that the expected overall noise contribution from CSBP's operations at nearby residential premises following expansion of this facility (31.0 dB(A) at Medina) will not compromise these efforts.

The EPA notes in the proponent's response to submissions that it currently has a Noise Monitoring and Improvement Plan. The proponent is currently contributing to the 2005 review of the Kwinana Industries Council cumulative noise model and advised that it will provide all relevant data into that process. The proponent has outlined the expected construction and operational traffic movements in the PER and advised in the response to submission that most of the CSBP generated traffic movements will be in a northerly direction. The proponent also advised that noise modelling was based on actual noise emissions from the existing plants and that all relevant factors were incorporated into the noise model.

Summary

Having particular regard to the:

d) modelling results that predict that the proposed expansion will have a negligible effect on residential noise levels;

e) proponent's commitment to comply with the assigned noise levels at its northern boundary by the end of 2005; and

f) proponent's commendable achievement in significantly reducing its noise impacts at the nearest residential areas,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

3.4 Wastewater discharge to the marine environment

Description

CSBP's Kwinana operations are located on the eastern foreshore of Cockburn Sound. CSBP currently discharges approximately 1.7 ML/day of wastewater (mainly cooling tower blowdown water and stormwater runoff) to Cockburn Sound via a submarine pipeline. CSBP's wastewater discharge is expected to increase to approximately 2.0 ML/day following the ANPF expansion.

The only wastewater leaving the ANPF is cooling tower blowdown water which contains minor amounts of phosphates, nitrogen and dispersants. The proposal is not expected to result in an increase in phosphate levels in the ANPF wastewater discharge, but the nitrogen load is expected to increase by approximately 600 kg/year. The ANPF wastewater is directed into CSBP's liquid effluent system where the combined wastewaters are treated and monitored prior to discharge to Cockburn Sound. Any ANPF wastewater that contains a high level of nutrients is reprocessed within the plant or consumed in CSBP's fertilizer plant.

CSBP's wastewater discharge is licensed under Part V of the *Environmental Protection Act 1986*. The proponent is not seeking any increase in the existing wastewater discharge licence limits as a result of this proposal. The proponent has committed not to exceed current nitrogen discharge levels from the site (3-month rolling average as at 30 June 2004 of 137 kg/day).

CSBP is currently reviewing the performance of its pilot nitrogen stripping wetland and plans to install three additional wetland cells if the trial proves to be successful. CSBP plans to dispose of its effluent to the Sepia Depression via the Water Corporation's (WC) Sepia Depression Ocean Outfall Line (SDOOL) in the near future.

Submissions

The issues raised in the submissions concerning wastewater management were:

- more detail on the quality and quantity of the wastewater discharge from the existing and proposed nitric acid plants should be provided; and
- the wastewater discharged to SDOOL should meet the criteria and standards set for this outfall.

Assessment

The area considered for assessment of this factor is Cockburn Sound and the marine environment in the vicinity of the Sepia Depression.

The EPA's objective is to maintain the ecological function, abundance, species diversity and geographic distribution of marine flora and fauna.

The EPA notes that the nitrogen load in the ANPF wastewater discharge is expected to increase by approximately 600 kg per year following the expansion. An additional 600 kg per year represents approximately 1 % of the estimated nitrogen inputs from all outfall discharges for the year 2000 (CSMC, 2005). The proponent has committed not to exceed 2004 nitrogen levels in its wastewater discharge and will not be seeking an increase in its existing wastewater discharge licence limits under Part V of the *Environmental Protection Act 1986*.

The EPA notes from the Cockburn Sound Management Council Report Card 2004 for Ecosystem Health that, both in the areas designated for moderate and high ecological protection, nutrient-related indicators did not meet the Environmental Quality Guidelines. Precautionary actions, including nutrient load reductions, were recommended by the Council (CSMC, 2005).

The EPA's expectation is that industries strive for continuous improvement and endeavour to reduce the level of nutrients and contaminants in their wastewater discharge. The proponent is currently conducting a pilot trial of a nutrient stripping wetland and plans to construct additional cells if the trial proves to be successful. The proponent expects to report on the performance of these trials next year and advised the EPA that it will make the results publicly available.

The proponent advised the EPA that its wastewater discharge system is now connected to the WC's SDOOL and has committed to commence discharging its wastewater to the Sepia Depression by the end of 2005. The EPA assessed the WC's proposal to discharge industrial wastewater, including from CSBP's Kwinana operations, to the Sepia Depression via the Cape Peron outlet and reported its findings and recommendations in EPA Bulletin No. 1135 (EPA, 2004). The EPA is satisfied that the Ministerial conditions and commitments made by the WC (Ministerial Statement No. 665) will contribute to achieving a High Level of Ecological Protection beyond the small zone around the Cape Peron outfall, as delineated in Perth Coastal Waters Environmental Values and Objectives (EPA, 2000a).

4. Conditions and Commitments

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal and, following discussion with the proponent, the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject, if it is to be implemented.

4.1 Proponent's commitments

The proponent's commitments as set in the PER and subsequently modified, as shown in Appendix 5, should be made enforceable. These include:

(a) construction;

(b) environmental management;

(c) air quality monitoring of oxides of nitrogen, ammonia and particulates;

(d) greenhouse gas emissions

(e) surface water quality;

(f) solid waste management;

(g) noise management;

(h) emergency response and environmental risk; and

(i) visual amenity.

4.2 Recommended conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by CSBP Limited to expand its ammonium nitrate production capacity at Kwinana to approximately 580,000 tpa is approved for implementation.

These conditions are presented in Appendix 5. Matters addressed in the conditions include the following:

(a) that the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 5;

(b) preparation and implementation of a Greenhouse Gas Emissions Management Plan;

(c) preparation of a Nitrous Oxide Emissions Improvement Plan,

(d) prilling tower plant performance;

(e) nitric acid plant performance;

(f) wastewater discharge; and

(g) compliance with the *Environmental Protection (Noise) Regulations 1997*.

It should be noted that other regulatory mechanisms relevant to the proposal are:

- Department of Environment Works Approval and licence.
- Department of Industry and Resources regulations

5. Other Advice

Individual Off-site Fatality Risk

The CSBP Kwinana industrial complex is classed as a Major Hazard Facility and therefore regulated under the *Explosives and Dangerous Goods Act 1961* and the *Explosives and Dangerous Goods (Dangerous Goods Handling and Storage) Regulations 1992* which are administered by the Department of Industry and Resources (DoIR). CSBP is required to develop a Safety Report that meets the requirements of the *National Standard for the Control of Major Hazard Facilities [NOHSC:1014(2002)]* to the satisfaction of the Chief Inspector of Explosives and Dangerous Goods.

CSBP's Kwinana operations currently do not meet the EPA's risk criteria at the BP boundary fence in the vicinity of the proposed ANPF expansion. The exceedance is historical and mainly due to the close proximity of the ammonia storage tanks to the site boundary. The proposed expansion includes transforming the existing 900 tonne high strength (90%) ammonium nitrate storage tank into a 70% ammonium nitrate liquid tank (for fertiliser manufacture) which will significantly reduce the "knock on" potential of any incident. A 310 tonne high strength ammonium nitrate storage tank is to be constructed further away from the ammonia storage tanks. The Preliminary Risk Assessment (PRA) shows that there will be a slight reduction in the level of off-site individual fatality risk following the expansion. DoIR reviewed the PRA and advised that it does not demonstrate that the level of risk has been reduced "as low as reasonably practicable (ALARP). DoIR advised that the proponent has separately submitted an ALARP demonstration for the Ammonium Nitrate business unit to DoIR, but that it did not include the proposed expansion. DoIR also advised that a societal risk assessment has not been provided, nor a rationale for its exclusion.

The EPA considers that matters that specifically relate to plant safety, emergency planning and preparedness, and the storage of ammonia and other dangerous goods are more appropriately managed by DoIR under its legislation. DoIR advised that the proponent is required to update its Safety Report to DoIR's satisfaction prior to commissioning new plant associated with the ANPF expansion. Based on DoIR's advice, the EPA is satisfied that the limitations in the PRA can be addressed during DoIR's revision of CSBP's Safety Report.

DoIR advised that under the *Dangerous Goods (Transport) (Dangerous Goods in Ports) Regulations 2001*, the handling or transport of ammonium nitrate above a certain threshold is only allowed at a declared Special Berth. DoIR is the Competent Authority for declaring Special Berths in Western Australia. Special Berth status has been given to the Kwinana Bulk Cargo Jetty's Berth Operator based on information provided by the berth operator including a Quantitative Risk Assessment. DoIR advised that any increase in shipping quantities, frequencies or other modification of activities outside the current Special Berth approval conditions would require the berth operator to lodge an application for the proposed change, and this would undergo further assessment by DoIR to determine acceptability.

Background Air Quality (Air Toxics) Study

The DoE has commenced a 12 to 18 month study into the levels of hazardous air pollutants within the Perth metropolitan region. The original aim of the study was to

establish baseline levels for the following range of air toxics, volatile organic compounds, carbonyls, heavy metals and polycyclic aromatic compounds. However, the DoE advised that the study is now being extended to give a greater focus on the Kwinana and Rockingham areas and that monitoring will include ammonia (at Wells Park), NOx and $PM_{2.5}$ particulates.

6. Conclusions

The EPA has considered the proposal by CSBP to expand its ammonium nitrate production capacity to approximately 580,000 tpa by debottlenecking and duplicating its existing facilities.

The EPA notes that the proposed expansion of the ANPF is expected to lead to an increase in emissions of ammonia and oxides of nitrogen (NOx) and a significant decrease in emissions of ammonium nitrate particulates, once the existing prilling plant is decommissioned. Air quality modelling indicates that the proposal is not expected to have a significant impact on the ground level concentrations of nitrogen dioxide (NO_2) or ammonia and that cumulative impacts are not expected to exceed the NEPM standard or other relevant health criteria. The EPA notes that monitoring of PM_{10} particulates indicates that ambient concentrations currently approach the NEPM standard on some occasions in the Kwinana region. However, the ground level concentration of particulates is not expected to increase as a result of this proposal even under the worst case scenario of continued operation of the existing prilling plant (with scrubber retrofit) and the new prilling plant operating at reduced capacity.

The EPA notes that the proponent's greenhouse gas emissions are expected to initially increase by approximately 810,000 tpa of carbon dioxide equivalents (CO_2-e) mainly due to nitrous oxide (N_2O) emissions from the new nitric acid plant. The proposal will essentially duplicate the existing nitric acid plant to achieve operational efficiencies. The EPA also notes that the proposed new plant will be designed with a larger capacity boiler (compared to the existing plant) to reduce greenhouse gas emissions by 68,000 tpa CO_2-e. Subject to the larger boiler achieving the expected reduction in greenhouse gas emissions, it will also be retrofitted to the existing plant reducing overall greenhouse gas emissions by approximately 136,000 tpa CO_2-e. However, based on the information provided, the EPA considers the proposed overall N_2O emission rate (approximately 10 kg N_2O per tonne of nitric acid) to be high for new plant and a significant source of greenhouse gas emissions.

The EPA notes that a number of new technologies are now available or under development to significantly reduce N_2O emissions from new nitric acid plants. However, the application and availability of the new N_2O reduction technologies varies between the technology providers for nitric acid manufacturing plants. As CSBP has an existing nitric acid plant at the site, it proposes to use the same technology provider (Grande Paroisse) for the new plant. CSBP has selected this technology based on plant efficiency, reliability, safety and the added benefits of duplication of existing technology and equipment. CSBP advised that Grande Paroisse is currently developing a process that uses a granular catalyst beneath the main platinum gauzes. The EPA considers it reasonable for the proponent to seek approval to duplicate an existing nitric acid plant that the proponent considers to be safe, efficient and reliable. The proponent has committed to design the new nitric acid plant

to incorporate new N_2O abatement technology that is located in the reactor, once this technology becomes technically available and commercially viable. The EPA recommends that the proponent submit a Nitrous Oxide Emission Improvement Plan to the Department of Environment (DoE) each year, that includes a review of commercial trials of new low N_2O emission catalysts. The proponent should be required to install the new technology into the new nitric acid plant, when practicable.

The EPA notes that that noise impacts from the proponent's operations on the nearest residential premises have reduced significantly since the Kwinana Industries Council Noise Study (SVT, 2001) was conducted. The proponent has committed to comply with the *Environmental Protection (Noise) Regulations 1997* by the end of 2005. The EPA considers that the proposed expansion will have a negligible impact on existing noise levels at the nearest residences and that the proponent's recent noise control improvements are consistent with the EPA's long term objective to see an improvement in noise emissions from the whole of Kwinana industry.

The EPA notes that the nitrogen load in the wastewater discharge is expected to increase by approximately 600 kg per year. The proponent has commitment not to exceed its 2004 nitrogen discharge. The proponent has committed to commence discharging its wastewater to the Sepia Depression via the Water Corporation's (WC) Sepia Depression Ocean Outfall Line by the end of 2005. The EPA is satisfied that the Ministerial conditions and commitments made by the WC (Ministerial Statement No. 665) will contribute to achieving a High Level of Ecological Protection beyond the small zone around the Cape Peron outfall, as delineated in Perth Coastal Waters Environmental Values and Objectives (EPA, 2000a).

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 5, and summarised in Section 4.

7. Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for CSBP Limited to expand its ammonium nitrate production capacity to approximately 580,000 tpa by debottlenecking and duplicating its existing plant;
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 5, and summarised in Section 4, including the proponent's commitments; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 5 of this report.

Appendix 1

List of submitters

Organisations:

Department of Environment

Fire and Emergency Services Authority

Kwinana Progress Association

The Town of Kwinana

The City of Rockingham

Appendix 2

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Appendix 3

Summary of identification of relevant environmental factors

Summary of Identification of Relevant Environmental Factors

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
BIOPHYSICAL			
Terrestrial flora	The site has been previously cleared and there will be no impact on terrestrial flora.	No concerns were raised	No impact on the environment.
Terrestrial fauna	The site has been previously cleared and there will be no impact on terrestrial flora	No concerns were raised	No impact on the environmental
POLLUTION			
Atmospheric emissions	The ANPF expansion will emit the following additional estimated quantities of atmospheric emissions: • Nitrogen oxides – 170 tpa • Ammonia - 125 tpa • Ammonium nitrate particulate – 79 tpa (proposed new plant at full rate) or 103 tpa (proposed new plant at 50% rate, and existing plant retrofitted with scrubbing equipment and operating to a total output of 470,000 tpa).	**The City of Rockingham** • raised concerns about atmospheric emissions given the proximity of the proposal to residential areas. • considers that it is important that atmospheric emissions are regularly monitored and that the results be publicly available. **The Town of Kwinana** • notes that proposed emissions meet NEPM and other relevant criteria. **Kwinana Progress Association** • requests an update of the Kwinana Environmental Protection Policy to include oxides of nitrogen and fine particulate matter. • recommends a ban on the development of all potentially polluting proposals in the Kwinana Industrial Area until the details of the industries cumulative emissions and health impacts are local communities are known. • is concerned that information on the cumulative level of fine particulates ($PM_{2.5}$) in the Kwinana Air Shed is currently not known. • considers that all KIC and DoE monitoring stations in the Kwinana Industrial Area should monitor for ammonia, oxides of nitrogen and PM_{10} and $PM_{2.5}$ particulates. • questions the use of DISMOD to predict the ground level concentrations of $PM_{2.5}$ particulates.	Considered to be a relevant factor

		• Requests that continuous on line monitors be installed to monitor for ammonia, oxides of nitrogen and PM2.5 particulates.	
Greenhouse gas emissions	The ANPF expansion will generate up to an additional 875,000 tonnes of CO_2 per year.	**The City of Rockingham** • raised concerns about the additional greenhouse gases to be emitted. • seeks confirmation that proposed emission levels meet EPA standards. • seeks clarification on mitigatory actions intended to offset proposed increases in greenhouse gas emissions. **The Town of Kwinana** • supports the proposal that CSBP provide a "Best Available Techniques" (BAT) report every two years and recommends a new condition for all new or renewed DoE licences that requires a BAT report on the entire site every 5 years. **Department of Environment** • advises that fertiliser dust emissions are the main environmental impact from the existing prilling plant. • considers that the PER provides limited technical information on the existing and proposed pollution control equipment. • considers that more information is required to show how problems with the existing plant will be overcome.	Considered to be a relevant factor.
Liquid waste disposal	Approx 2ML/day effluent to the Sepia Depression Ocean Outfall Landline (SDOOL). From the total CSBP site, including the proposed AN expansion Proposed nitrogen concentrations in effluent to Cockburn Sound/SDOOL will be less than or equal to that for June 2004 (3 monthly rolling average) i.e. no net emission of nitrogen from this proposal.	**The City of Rockingham** • considers that any wastewater discharge into Cockburn Sound should be minimized and meet the requirements of the State Environmental (Cockburn Sound) Policy 2005 and relevant water quality guidelines. • recommends that Wastewater discharged into the Sepia Depression Ocean Outfall Line should meet the criteria and standards set for this outfall by the State Government. **Department of Environment** • Seeks more detailed information on the quantity and quality of the wastewater discharge from the existing and proposed nitric acid plants.	Considered to be a relevant factor
Surface water quality and		**The Town of Kwinana**	High nutrient wastewater is

water resources		• CSBP should investigate the collection and use of stormwater in their processes.	collected and reprocessed on site. CSBP's preferred option for the additional water requirement is recycled water from the Kwinana Water Reclamation Plant, otherwise it can be sourced from the groundwater without exceeding the existing water licence extraction limits. No further assessment by the EPA is required.
Noise	Construction and operation of the ANPF expansion will result in a small increase in noise emissions. Noise levels at the nearest residence are predicted to increase by up to 0.2 dB(A).	**The City of Rockingham** • raised concerns about the potential noise impacts of residents of North-east Rockingham and Hillman. • referred to the Kwinana Industries Council report "Cumulative Noise Model of the Kwinana Industrial Area" that indicated that the cumulative noise at North-east Rockingham exceeded the allowed levels. • consider that the impact of the proposed expansion of the Ammonium Nitrate Production Facility on North-east Rockingham and Hillman should be modeled. • consider that a Noise Management Plan for the CSBP Industrial Complex should be developed. • advised that the PER does not mention adjustments for tonal, impulse etc. • raised concerns about additional noise associated with construction and traffic (shipping and road). **The Town of Kwinana** • notes that CSBP's operations will comply with the Noise Regulations if the proposal to increase industry to industry limits from 65 dB(A) to 70 dB(A) is adopted under the review of the regulations. The Town of Kwinana notes that the review has been ongoing since June 2000 and considers sufficient time has lapsed to complete the review. • advises that there is no mention of noise impacts at North	Considered to be a relevant factor

		Rockingham which is closer to the site than Medina. • considers that noise emissions from the proposal should be included in the KIC cumulative Kwinana. **Kwinana Progress Association** • questions approving new development in the Kwinana Industrial Area given that the noise levels at some residential areas exceed the Noise Regulations. considers noise levels in the area will only get worse as a result of the proposed expansion.	
Construction		**The City of Rockingham** • requests the opportunity to comment on the Construction Environmental Management Plan (CEMP).	CSBP will offer the City of Rockingham the opportunity to comment on the CEMP during its preparation.
SOCIAL SURROUNDINGS			
Accident and Emergency Response		**The City of Rockingham** • advised that it is important that CSBP has strategies and actions in place to minimize any potential hazards associated with the operation. • requests that CSBP fully inform the City of strategies and actions beng taken to minimize hazards associated with the expansion of the facility and that it maintains a close liaison with the City's Fire and Emergency Administration Officer in this regard. **The Town of Kwinana** • recommends that the proposal, and all subsequent proposals be assessed against the New South Wales Department of Planning "Risk Criteria for Land Use Planning – Hazardous Industry Advisory Paper No. 4" as well as the EPA risk criteria. **Fire and Emergency Services** • advised that it works closely with CSBP with respect to emergency response arrangements.	The CSBP Kwinana industrial complex is classed as a Major Hazard Facility and is regulated under legislation administered by the Department of Industry and Resources (DoIR). DoIR advised that prior to commissioning the Ammonium Nitrate Production Facility expansion project, the proponent is required to update its Safety Report to DoIR satisfaction. The Preliminary Risk Assessment (PRA) shows that there will be a slight reduction in the level of off-site individual fatality risk following the expansion. No further assessment by the EPA is required (See Other Advice).
Social Responsibility		**The Town of Kwinana** • welcomes the sustainability assessment and considers that it should	CSBP completed the initial sustainability assessment to the

		be a requirement for all environmental impact assessments. • Corporate social responsibility should be included into the sustainability assessmen. as to how CSBP will provide real environmental and social gains to offset the environmental impacts.	requirements of the EPA. CSBP as part of the Wesfarmers group, publishes an Annual Social Responsibility Report which details achievements and progress in environmental, safety and community programs. NO further assessment by the EPA is required.

Appendix 4

Summary of Relevant Environmental Factors and Issues in Relation to Management

Summary of Relevant Environmental Factors and Issues in Relation to Management

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
Biophysical					
Surface Water Quality – Marine Environment	The main environ-mentally sensitive water body within close proximity to the CSBP complex is Cockburn Sound.	Ensure that any impacts on marine communities are avoided and to ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards (EPA, 2002a).	There are no permanent natural surface water bodies within the CSBP Kwinana industrial complex. The main environmentally sensitive water body within close proximity to the industrial complex is Cockburn Sound. The CSBP industrial complex process wastewater, in the form of cooling tower blowdown and stormwater runoff, is directed to Cockburn Sound via a submarine pipeline at the average rate of 1.5 ML/day. Wastewater from plant wash down and process condensate is generally recycled within the plant or used in the superphosphate manufacturing plants. The only exception being some wash down waters from the prilling plant which cannot currently be captured in a form that is suitable for recycling and are therefore discharged into the CSBP liquid effluent system and subsequently discharged currently to Cockburn Sound after treatment and monitoring. The main source of process water requiring offsite disposal is from the ammonia plant cooling tower blow down water, which is currently generated at approximately 1 ML/day. This cooling tower blow down water, together with any wash down water that cannot be recycled is routinely directed to the submarine pipeline and then discharged (currently –December 2004) to Cockburn Sound. Blowdown water can also be directed to the environmental ponds. Manual analysis of water quality in the blowdown water is undertaken on a weekly basis by a contracted third party. A series of online samplers continuously analyse effluent from the submerged pipeline for pH, nitrogen, and phosphorus. Where elevated levels are detected, an automated system ensures that the environmental pond pumps will trip halting discharge to Cockburn Sound.	CSBP plan to discharge process water (consisting mainly of cooling blowdown water) from the site via the SDOOL. The EPA assessed the cumulative impacts of discharges to the SDOOL, which include those from CSBP, and recommendations for approval were presented to the Minister for the Environment in Bulletin 1135 (EPA, 2004c). The Minister for the Environment gave final approval to WAWC to dispose of industrial effluent through the SDOOL on the 28 November 2004. It is expected that disposal of industrial effluent through the SDOOL will commence in February 2005 (this approval included CSBP's effluent stream using the existing CSBP Environmental Protection Licence, which is itself protective of Cockburn Sound values).	The nitrogen effluent emissions from the CSBP industrial complex will not exceed the existing site's 3-month rolling average as at 30 June 2004 (which is itself historically low, and well within the ambient loads foreshadowed by the *Draft State Environmental (Cockburn Sound) Policy 2004*).

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
			Drainage for stormwater runoff is independent of the process water streams. Stormwater is directed to a collection sump via a series of box drains. This is then directed to the ocean outfall only if contaminant concentrations are within acceptable trigger levels. Nitrogen, pH, and phosphorus concentrations in the stormwater are monitored using a series of online analysers strategically located at key points along the stormwater drains. Where levels exceed trigger levels (nominally 30% of licence limits), drawdown pumps at the collection sump 'cut off' thereby preventing further discharge of contaminants to the outfall. Other than cooling tower blow down water, process wastewater generated from the nitric acid plant (as well as other plant facilities) is directed to dedicated collection sumps. This water is pumped to the environmental storage tanks and may be reused in the CSBP granulating plant or discharged to Cockburn Sound. Despite the robust nature of the site surface water management system, CSBP recognises there is always a potential for accidental releases of process fluids or effluent that could lead to a discharge of contaminants. Accordingly, emergency response plan and management procedures have been developed to address a range of potential incidents such as spills, fire, transport accidents etc that could result in the release of pollutants to surface waters and Cockburn Sound. Additionally, CSBP is committed to the KIMA agreement including various local industries within the Kwinana industrial estate, established to provide a combined industry response to emergency situations, as part of its leadership of the Kwinana Industries Public Safety group.	Despite the robust nature of the site surface water management system, CSBP recognises there is always a potential for accidental releases of process fluids or effluent that could lead to a discharge of contaminants in the form of liquid ammonia, nitric acid or hydrocarbons. Accordingly, an emergency response plan and management procedures have been developed to address a range of potential incidents such as spills, fire, transport accidents etc that could result in the release of pollutants to surface waters and Cockburn Sound. Additionally, CSBP are committed to the Kwinana Industries Mutual Aid (KIMA) agreement including various local industries within the Kwinana industrial estate, established to provide a combined industry response to emergency situations, as part of its leadership of the Kwinana Industries Public Safety group.	

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
				CSBP will design the proposed plants to initially reduce wastewater generation, and then to capture and recycle as far as possible all wastewater in the plant, or in the rest of CSBP's site. The existence of the pilot nutrient stripping constructed wetland and CSBP's other water recycling initiations will aid this endeavour.	
Water Resources	Ammonium Nitrate Facility.	Minimise the impact on natural water resources by minimising consumption and reusing wastewater where feasible and to maintain the quantity of water so that existing and potential environmental values, including ecosystem maintenance, are protected	The exact mixture of water sources for the nitric acid plant cooling tower is difficult to predict now, because even with a treated source like (KWRP) other waters have to be blended to prevent corrosion damage to the cooling tower. However, given the uncertainties the volume ranges above will provide sustainable resources for the project – in the event that KWRP water is used then the artesian water harvested could reduce further dependent upon the supply to Tiwest. CSBP currently utilises over 3,000 ML/year of water for plant processes at Kwinana. The use of potable scheme water for plant processes is minimised wherever possible. Scheme water usage at CSBP has continued to decrease over recent years through the application of reuse options onsite and with neighbouring industry. In 2003, CSBP was selected by the WAWC to be part of their "Water Hero" campaign in recognition of initiatives to reduce scheme water usage.	The proposed expansion will result in an increase in annual water consumption to meet process demands. CSBP believes that the preferred outcome for this project is to use recycled water from the KWRP, subject to satisfactory negotiations with the WAWC to extend CSBP's off take of KWRP water. In the event this source is not feasibly available, then CSBP believes it has sufficient access to sustainable groundwater (superficial and artesian aquifers) to resource the water needs of this proposed project (estimated at 0.7GL to 1.3GL per year depending on water source). The use of scheme water is CSBP's least preferred alternative.	CSBP is confident that viable options exist to ensure adequate supply of water. As part of CSBP's commitment to the KWRP, the use of treated industrial grade water sourced from the KWRP is considered the most preferable source of water for the project, subject to environmental, technical and commercial factors.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
			CSBP is also a foundation client of the KWRP. The KWRP will supply (tertiary treated) high quality industrial grade water following treatment of wastewater from the Woodman Point wastewater treatment plant. Water from the KWRP will be supplied to purchasers in the KIA to replace potable scheme water use in industrial processes (Water Corporation, 2003). Approximately, 730 ML/year of water will be sourced by CSBP, predominantly for cooling towers, from the KWRP. CSBP holds a water abstraction licences which permits the extraction of 4,300 ML. Annual abstraction from these bores, whilst consistently below licence limits, has gradually increased over the years. This is mainly due to scheme water saving initiatives between CSBP and it's neighbours where a significant volume of artesian water is sent 'across the fence' to industries such as Tiwest. The initiative has seen a net benefit of reduced scheme water use by our neighbouring industries of up to 1,500 ML/yr based on 2002/3 abstraction data (Wesfarmers Limited, 2003).	Despite the current abstraction rates of groundwater from the Yarragadee aquifer to supply both CSBP and neighbouring industry with water, there is sufficient capacity within the aquifer to ensure that process water requirements can be met without exceeding licence limits. Accordingly, whilst CSBP's preference would be to utilise recycled water from the KWRP, CSBP is confident that alternative water sources are available to satisfy projected plant water demands. This alternative would require additional treatment chemicals and the installation of a dedicated (Reverse Osmosis) treatment plant onsite. Such a treatment plant would also generate additional liquid and solid wastes such as backwash water requiring disposal to SDOOL (the wastewater will meet the SDOOL standard levels as part of CSBP's total effluent stream).	This would be supplemented with water abstracted from sub-artesian wells in the Yarragadee aquifer. CSBP plans to continue to supply neighbouring industries with this water to offset their use of potable water, where practicable.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
Pollution Management					
Air Quality – Gaseous (oxides of nitrogen)	Ammonium Nitrate Facility.	Ensure that gaseous emissions do not adversely affect the environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards (EPA, 2002a).	process in the world (USEPA, 1991), to produce nitric acid. The absorption tower, common to all ammonia-oxidation nitric acid production facilities, is the primary source of NO_X (waste/tail gas) emissions. Besides the NO_X emissions there may also be some fugitive emissions of ammonia and nitric acid vapours but it is expected that the quantities emitted will not be significant (InfoMil, 1999). The NO_X emissions are continuously vented to the atmosphere through a stack on the absorption tower. The emission of NO_X occurs because the absorption section of a nitric acid plant – where NO_X are absorbed in water to form nitric acid – is not 100% efficient. Research has shown that NO_X emissions from nitric acid plants range from 100 to 3,500 ppmv (parts per million by volume), with an average of 200 to 500 ppmv (van den Brink et el., 2002; EFMA, 2000a). The European Fertilizer Manufacturers' Association (EFMA) (2000a) recommends extended absorption and SCR as best available technology (BAT). The EFMA provides BAT emission levels for a nitric acid plant as 100 ppmv (parts per million by volume) which is equivalent to 0.65kg NO_X (expressed as NO2) per tonne of 100% nitric acid product, achieved either by use of SCR or extended absorption. For medium pressure plants such as that used by CSBP the normal NO_X reduction technology used is SCR. The European Environment Agency (EEA) sets a limit value for new nitric acid plants of 350 mg/Nm^3 (equivalent to 170 ppmv if all NO_X is present as NO_2) (EEA, 2005). The new nitric acid plant will operate at the same performance standards as the existing plant. This plant, operating since 1996, has consistently achieved NO_X concentrations of 100 mg/Nm^3 (50 ppmv), well below current BAT standards.	CSBP's existing nitric acid pant, using SCR typically emits at NO_X at approximately 50 ppmv, which is below the accepted standards for these plants (Environmental Protection Licence limit for the existing plant is 974 ppm). The duplicated nitric acid plant will emit NO_X at similar quantities therefore no management strategies other than the SCR are being considered.	The results of the air dispersion modelling in relation to NO_X emissions indicate that there should be no significant impacts associated with the expansion of the Ammonium Nitrate Production Facility. Ground level concentrations of NO_x are predicted to be higher than the current operating scenario, but the increases will not result in an exceedance of the NEPM guideline.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
			CSBP uses the ammonia-oxidation process, the most commonly used When planning the existing nitric acid plant in 1993, CSBP staff undertook a world tour inspecting operating nitric acid plants to determine what technologies were available. The objective, in terms of NO_x, was to achieve a colourless stack. At this time it was accepted that the best available technology was the recently developed SCR route, and plants were operating with this system at NO_x concentrations of 200 ppm and above. From the plant inspections CSBP realised that the stack emission was still visible at 200 ppm, and hence this did not meet the objective. Following detailed technical discussions with potential nitric acid technology providers, it was determined that the new plant could be designed to achieve 50 ppm NO_X and this was specified in the plant design contract. The plant continues to operate at this NO_x concentration, which is still well below accepted European standards. The basis of the SCR technology is the addition of ammonia to the process gas in the presence of a selective catalyst. The ammonia converts the NO_X (both NO_2 and NO) to nitrogen but there is a practical limit to this reaction and to achieve very low NO_X concentrations risks having significant free ammonia in the exit gases. This is not a desirable outcome and hence CSBP operates the plant at the 50 ppm NO_X level.		Ozone monitoring studies completed by the DoE suggest that industry emissions from the Kwinana industrial area are not a defining factor in photochemical smog production in the Perth airshed. Based on a qualitative analysis, the following factors suggest that the increased emission of NO_X due to the Ammonium Nitrate Production Facility expansion will not be significant: • In relative terms, the increase NO/NO_2 emissions are minor when compared with existing background levels in Kwinana and the greater Perth airshed.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
					• NO/NO_2 are present at o ne to one (1:1) molar ratio in the tail gases from the nitric acid plant and therefore should not upset the existing equilibrium in the main photochemical smog reactions. • Recent studies suggest motor vehicle emissions, not industrial emissions are the principal cause of photochemical smog in Perth.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
Air Quality – Particulate Emissions	Ammonium Nitrate Facility.	Ensure that emissions do not adversely affect the environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards (EPA, 2002a).	The nearest sensitive residential premises, are located approximately 3km to the east of the site in Medina and Calista. The nearest sensitive marine environment is Cockburn Sound, which is immediately adjacent to the CSBP industrial complex western boundary. The primary source of particulate emissions from the existing Ammonium Nitrate Production Facility is the prilling plant (includes both the prill tower and drying train) where liquid ammonium nitrate is converted into small drops, which when cooled form a solid sphere referred to as 'prill'. EFMA (2000b) provides BAT emissions for the prill drying train as 30 mg/Nm^3 particulate and for the prilling tower, as 15 mg/Nm^3 particulate. However, it should be noted that this refers to fertiliser grade prilling towers, which have a high emission of fine particulate without abatement measures. Without abatement the particulate can be up to 200 mg/Nm^3. To achieve the low particulate concentration for a prilling tower under BAT it is necessary to fit very specialised aerosol filter systems. To CSBP's knowledge such systems are not fitted to low-density (porous grade ammonium nitrate) prilling towers as the unabated emissions are at a much lower level due to the different prilling conditions. For the total prilling plant EFMA (2000b) indicates that BAT emissions are 0.5 kg of particulate per tonne of product.	CSBP aims to ensure that particulate emission concentrations from the new plant will not exceed 50% of those prescribed in current licence limits with maximum emission concentrations from the prilling plant of 0.05 g/Nm^3. The current licence prescribes a particulate limit of 0.25 g/Nm^3 for the prilling tower and pre-dryer, and 0.35 g/Nm^3 from the dryer. It is anticipated that even with increased prill production, the new plant will decrease current emission loads through the implementation of appropriate technology for particulate control. Should the decision be made to continue to run the existing prilling plant CSBP will retrofit appropriate pollution prevention equipment on the existing prilling plant to meet a target particulate emission goal of 100 mg/m^3.	Offsite ground level concentrations of PM_{10} are not predicted to change significantly and particulate deposition rates over Cockburn Sound are predicted to decrease as a result of the implementation of the proposal. CSBP's proposed modifications to the existing prilling plant will see a net reduction in the total particulate emissions but it is assumed that the fine (PM_{10}) fraction of the emission from the existing prilling plant will remain unchanged.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
			The technologies being offered to CSBP for the new prilling tower do not have the specialized aerosol filter systems, but use air re-circulation through the prilling tower via a particulate scrubber. A bleed of air from the tower is passed through the main plant scrubber prior to discharge to atmosphere. This results in a large decrease in the total volume of air discharged compared with a conventional plant design. The system proposed for the CSBP plant will be designed to achieve a particulate emission of less than 50 mg/ Nm^3 and a total mass emission of 0.23 kg/tonne of product. It should be noted that this mass emission rate is less than 50% of the European BAT standard.		The concurrent operation of the upgraded existing plant and the proposed new plant is predicted to result in a small increase in the ambient PM_{10} concentrations but these ambient concentrations are only a small fraction of the NEPM PM_{10} standard. As such it is unlikely that the emission of fine particulate from the existing and prop osed ammonium nitrate plants will have any significant environmental or health impacts. Even if the total particulate emission is assumed to be $PM_{2.5}$ the proposal is still well within the (lower) interim NEPM values.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
					The particulate deposition on Cockburn Sound under either expansion scenario for the Ammonium Nitrate Production Facility is predicted to be lower than the deposition from the existing Facility.
Air Quality – Ammonia Emissions	Ammonium Nitrate Facility.	Ensure that emissions do not adversely affect the environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards (EPA, 2002a).	The KIC Phase 1 Screening Assessment assessed the long-term impacts of ammonia emissions from all major industries in Kwinana. The study predicted that the highest predicted ammonia ground level concentration at a community location would be at Wells Park, to the south of the CSBP site, and that the annual average concentration at this location would be approximately 50 $\mu g/m^3$, half the USEPA ambient air criterion. Industry was considered to be the dominant contributor to ammonia at this location, with the CSBP contribution from all of its plants being approximately 6% of the total. The major emissions expected from the proposed new prilling plant are ammonium nitrate particulate and ammonia. CSBP commissioned ENVIRON to undertake a detailed modelling study to determine the significance of the impact from ammonia emissions under normal and worst-case plant operating conditions. The scope of this study was to model the dispersion characteristics and subsequent ground level concentrations of ammonia from the prilling plants in the existing and expanded scenarios.	The predicted maximum ground level concentrations of ammonia at locations that are readily accessible to the public are in the order of 20 $\mu g/m^3$ (1 hr average) and 0.3$\mu g/m^3$ (annual average). These are well below the ambient air quality criteria of 3,200 and 100$\mu g/m^3$ respectively. CSBP will monitor ammonia emissions from the new prilling plant and report the results to the DoE.	As the annual average ground level concentration of ammonia at Wells Park from all Kwinana industries is predicted to be approximately 50$\mu g/m^3$ (half the USEPA ambient air criterion). The predicted increase of 0.3$\mu g/m^3$ (annual average) associated with the construction of the new prilling plant is therefore not considered to be significant in a regional context.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
Greenhouse Gas Emissions	Ammonium Nitrate Facility.	To minimise emissions to levels as low as practicable on an on-going basis and consider offsets to further reduce cumulative emissions (EPA, 2002a).	The manufacture of ammonium nitrate at the CSBP Kwinana industrial complex contributes to the overall greenhouse inventory of the premises. Greenhouse gases are generated from the consumption of electricity and from emissions of N_2O from the nitric acid plant. In 2003/04, the existing Ammonium Nitrate Production Facility produced approximately 667,394 tonnes of net CO_2-e. The nitric acid plant emissions comprised approximately 97% of the total facility emissions, with the remainder associated with power consumption at the prilling plant and ammonium nitrate plant (the overall Ammonium Nitrate Production Facility actually exported electricity to the remainder of the CSBP Kwinana industrial complex to create a net saving of power generation emissions of CO_2-e of 15,413 tonnes CO_2-e). The existing nitric acid/ammonium nitrate plants are considered 'state of the art' in terms of energy efficiency. The nitric acid plant is a nett producer of electricity as a result of the exothermic nature of many of the chemical reactions used in the production of nitric acid. Worst-case greenhouse gas emissions from the expanded Facility have been estimated and the estimations are based on data weighted using the current production and design capability scenario to determine emissions from the expanded facility under maximum expected throughput. Based on this, the overall greenhouse emissions from the Ammonium Nitrate Production Facility will be over 1.5 Mtpa of CO_2-e (without taking into consideration the abatement and other commitments CSBP has made in this PER to reduce the greenhouse impact of this proposal). This represents an increase by approximately 132% of current (2003/04) emissions. Under the expansion, the nitric acid plant contribution to facility emissions will remain at approximately 97%. Notwithstanding, the greenhouse savings from nett power generation will increase by 137% from 15,412 tonnes CO_2-e to 36,579 tonnes CO_2-e. In comparison to the greenhouse inventory for the CSBP business as a whole, the contribution from the	N_2O emissions are highly dependent upon catalyst gauze conditions, which convert N_2O to NO_X. CSBP is examining a range of measures at the design stage of the new nitric acid plant including the gauze system (size, shape and detailed design) and the boiler design with a view to reducing the N_2O emissions. At this stage it is not possible to make any definite commitments in relation to the impact of these changes but it is confidently asserted that some reduction will be achieved; i.e following the expansion, it is expected that the performance of the Ammonium Nitrate Facility will be equal to or better than that achieved in 2003/2004. The major benefit that will be achieved in this area in the near future will be the use of new catalyst materials, which could result in very large reductions in N_2O emissions. Pilot trials, at a commercial scale, of the new catalysts have commenced in Europe and it is unlikely that they will be sufficiently proven to be released prior to 2008. The preliminary indications are that	The overall greenhouse emissions from the expanded Ammonium Nitrate Production Facility will be over 1.5 Mtpa of CO_2-e (without taking into consideration the abatement and other commitments CSBP has made in this PER to reduce the greenhouse impact of this proposal).

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
			Ammonium Nitrate Production Facility will increase from 53% to 72% (assuming no change in contribution from other business units). Emissions of N_2O will continue to constitute the largest greenhouse emission component, contributing 74% of the total CSBP business emissions. In the absence of technological improvements that substantially reduce N_2O emissions, the expansion of the Ammonium Nitrate Production Facility will more than double the quantity of greenhouse emissions as CO_2-e, in the worst-case scenario of debottlenecking the existing plants and building the new plants. The published data on N_2O emissions from nitric acid plants suggests that emissions of N_2O are typically in the range of 3-10 kg N_2O/tonne of nitric acid produced (0.93 – 3.1 CO_2 –e/tonne of AN) produced (InfoMil, 1999). In 2003/04, CSBP's nitric acid plant emitted N_2O at the rate of 11kg N_2O/ tonne of nitric acid produced although the N_2O concentrations in the tailgas from CSBP's current nitric acid plant (1040 to 1580 ppm) are in line with the range of concentrations quoted in the same reference. The plants producing the lower N_2O concentrations are high dual pressure plants, which are not commercially viable when compared to the medium mono pressure plants now being constructed around the world.	N_2O emissions could be reduced by more than 50% but much more testing is required before these claims could be translated to a plant operating on commercial basis. CSBP has discussed this issue with several European technology providers and at present no N_2O reduction technologies for plants of the kind operated by CSBP are commercially proven or available. CSBP will closely monitor the commercial trials of new 'low N_2O emission' catalysts for nitric acid plants and will adopt the new catalyst technology once it has been proven to be feasible in the setting of plant competing on a commercial basis. The new nitric acid plant will be designed to operate with these potential catalyst technologies. CSBP will submit a report to the EPA three months prior to the commissioning of the new ammonium nitrate facility reviewing the current state of testing of low N_2O emission catalysts. An update of this report will be submitted every two years until the new technology is adopted or the EPA advises that the report is no longer required.	

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
				Notwithstanding the above, N_2O emissions from the existing and new nitric acid plants will continue to be monitored. A key initiative that will be undertaken in the existing and proposed nitric acid plant is the installation of on-line N_2O monitoring to better quantify emissions of this nature.	
Noise	Ammonium Nitrate Facility and immediate surrounding area.	To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring that noise levels meet the *Environmental Protection (Noise) Regulations 1997 (As Amended).*	The nearest non-industrial noise sensitive premises is located approximately 3km east of the site at Medina. Noise attenuation measures implemented in various areas of the Ammonium Nitrate Production Facility to date have included installation of acoustic lagging on pipe work and intercoolers, silencers on plant boiler blowdown vents, lining of the compressor house with acoustic absorbent material to name but a few initiatives. Generally, these attenuation measures were implemented to reduce the area of high intensity noise (>100dBA) within the Facility, and achieve noise levels in occupancy areas within the CSBP industrial complex to less than 85dBA where practicable. The existing noise emissions fail to comply with the Regulation industrial receiver 'assigned level' of 65 L_{A10} mainly along the northern boundary of the ammonia plant. It is noted that were the Regulation 'assigned levels' to be changed in accordance with the recommendations of the "Noise Regulations Review: Outcomes of the Working Group Programme, June 2000", or the proposed regulation changes as currently being proposed by DoE, then the existing noise levels at the BP Refinery boundary would be in compliance with the Regulations except for a small section next to the ammonia plant. Construction of a barrier fence (solid) could enable compliance at this location.	Noise level propagation to the surrounding noise sensitive areas has been modelled for plant operation noise and assessed against the *Environmental Protection (Noise) Regulations 1997*. The sound power levels used in the predictive minimize were based on measurements of existing plant and calculation of the likely sound power increases due to the AGR plant upgrade. The proposed expansion incorporates noise control by means of the acoustic enclosure of the existing and proposed nitric acid plant compressor intercooler heat exchangers and associated pipe-work from and to the compressors.	Noise emissions for the proposed new nitric acid, ammonium nitrate and prilling plants comply with the Regulation requirements at the nearest residential receiver locations. The acoustic minimize shows that the predicted noise emissions from the CSBP site (existing with proposed expansions) are well within the Regulation 'assigned level' of 35 L_{A10} for residential premises under 'worst case' night weather conditions.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
			The acoustic model under 'worst case' daytime conditions of wind towards the BP Refinery at 4 m/s have slightly higher predicted noise levels than measured (due to the wind effect on propagation of noise). CSBP commissioned Herring Storer Acoustics to develop an acoustic model to predict noise emission from the proposed Ammonium Nitrate Production Facility expansion at the CSBP Kwinana industrial complex. The acoustic model also includes the cumulative effect of other proposed expansions within the industrial complex, namely an upgrade of the sodium cyanide solids plant and sodium cyanide plant No.2 plants by Australian Gold Reagents (AGR). The AGR facility is located on land leased from CSBP but still within the industrial complex.	CSBP will monitor the plants for compliance with the industry to industry noise limits in the Regulations, as they are currently planned to be amended. In the event the Regulations for this industry to industry noise level are not amended CSBP will comply with the existing Regulations within 6 months of the Regulation review process ceasing (it is relevant that the small area of the BP Refinery currently potentially subject to exceedance is not a permanent workplace for any person) CSBP will commit to constructing a noise barrier or similar on the northern boundary of the site to mitigate the slight exceedance onto BP's land created by our ammonia plant in 2005.	In combination with other industrial noise emitters, the noise from CSBP is not a significant contributor for all locations except Medina. At Medina the noise from CSBP operations is predicted to be 31.0 L_{A10}, which is 'just' significantly contributing to an exceedance of the assigned level of 35 L_{A10}. The predicted CSBP noise contribution of 31 L_{A10} is significantly less than the KIC predicted level of 48 L_{A10} (due to cumulative effect of all industry) and at a level of at least 15 dB(A) less than the KIC (SVT, 2001) predicted overall noise level, would be inaudible at Medina.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
					The predicted noise levels at the nearest industrial premises (BP Refinery) currently exceeds the Regulation 'assigned level' of 65 L_{A10}. The predicted noise emissions are expected to increase up at the BP Refinery boundary. Both existing and predicted noise emissions are expected to comply with the proposed Regulation Review level of 70 L_{A10} (no characteristic adjustment required) criteria being pursued by the DoE. CSBP will commit to constructing a noise barrier or similar on the northern boundary of the site to mitigate the slight exceedance onto BP's land created by our ammonia plant in 2005.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
Solid Wastes		To achieve waste reduction, re-use and recycling outcomes which are environmentally, socially and economically sustainable (Waste 2020 TaskForce, 2001).	Solid wastes produced on site as a part of the manufacturing process are held on site, assessed, and disposed of in accordance with the CSBP Waste Management Plan and procedures. Any wastes deemed as controlled wastes conform to DoE regulations for licensed disposal. The proposed expansion will result in the generation of additional wastes, during both the construction and operational phases. This is considered to be a minor impact and the additional waste volumes will be managed under the CSBP's modified (to include construction waste management) Waste Management Plan and procedures. Solid waste from the existing ammonium nitrate and prilling plants is negligible and this is not expected to change with the construction of the new ammonium nitrate and prilling plants. There is however some solid waste produced by the operation of the existing nitric acid plant and the new nitric acid plant will duplicate this.	Solid wastes produced on site as a part of the manufacturing process are held on site, assessed, and disposed of in accordance with the site Waste Management Procedures. Any wastes deemed as Controlled Wastes conform to DoE regulations for licensed disposal. CSBP implements a waste recycling program that focuses on reducing waste to local landfill by re-cycling, re-use or reduction of waste. CSBP recycle or re-use steel, paper, oil, grease, pallets, batteries, rubber conveyor belts, drums, paper, plastics and grain waste from customers. CSBP is an active member of the Kwinana Industry Committee (KIC) Ecoefficiency Group. Through participation in the group, CSBP is involved in reviewing the potential for synergies between industry in the areas of waste and energy to take advantage of potential improvements in efficiency and contribute to sustainability in the region.	Given the nature of the expansion and the activities involved, the volume of solid waste generated will be insignificant with respect to the entire CSBP Kwinana industrial complex and will be managed according to the CSBP Waste Management Plan and relevant procedures.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
Social Surrounds					
Risk		To ensure that risk from the proposal is as low as reasonably achievable and complies with acceptable standards and EPA criteria including Guidelines and Criteria for EIA No. 2, Guidance for Risk Assessment and Management: Offsite Individual Risk from Hazardous Industrial Plant (EPA, 2000).	A Quantitative Risk Assessment (QRA) of the ammonium nitrate plant was conducted in March 2002 to determine a base case for current risk levels from this facility (DNV, 2002). The main risk contributors identified in the QRA were related to potential releases of liquid ammonia from ammonia supply pipelines. The existing QRA studies show that risk profiles for the Ammonium Nitrate Production Facility are within the EPA guidelines. The one exception to this is the historical exceedance onto the BP refinery land to the west of the CSBP's industrial complex, created by the very close alignment of some facilities previously owned by BP to the remaining BP landholdings. CSBP has addressed this to an extent through leasing some land from BP for a wetland and is in the process of creating an agreement with BP for training their limited number of staff who work in the area subject to elevated risk levels. As part of this proposal, the existing 900 tonne high strength (90%) ammonium nitrate liquid tank is being transformed to a 70% ammonium nitrate liquid tank (for fertiliser manufacture), and this in turn will significantly reduce the "knock on" potential of any incidents, and hence the modelled risk of the facilities. The 900 tonne ammonium nitrate liquid tank is to be replaced by a 310 tonne (approx.) tank; the design of which will include all contemporary safety factors. CSBP have had Qest Consulting revise the previous QRA of the current Ammonium Nitrate Production Facility using updated tools and minimize methods. The updated model shows that the Ammonium Nitrate Production Facility complies with the EPA risk criteria and exhibits a slightly reduced risk profile when compared to the previous model. The reasons for this are detailed in the Kwinana Works Total Site Quantitative Risk Assessment, which for security reasons, is not included in this PER.	Safety features already incorporated into the existing Ammonium Nitrate Production Facility will be incorporated into any new facilities. All plant operators and maintenance 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. Prior to commissioning the operating manual and procedures covering all process work, including start-up, and shut-down, plant testing, maintenance, inspection and emergency action will be updated. The potential hazards identified will be reviewed and appropriate contingency measures incorporated into existing on-site and off-site emergency procedures for the Kwinana works.	The changes proposed as a part of the Ammonium Nitrate Production Facility expansion reduce the cumulative risk profile for the Kwinana industrial complex. This is due to the proposed reduction in size and eastward relocation of the ammonium nitrate solution storage tank. This action prevents any ammonium nitrate solution storage tank explosions damaging the refrigerated ammonia storage tanks and causing subsequent ammonia releases, hence reducing the risk profile for the whole industrial complex.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
			On the Ammonium Nitrate Production Facility, the main risk contributors are release gases from streams containing ammonia or mixed nitrous oxides. The one explosion event that has offsite effects (the explosion of the ammonium nitrate solution storage tank) only generated low levels of risk. These results demonstrate that the risks exhibited by the current Ammonium Nitrate Production Facility, considered on its own, lie within the tolerable As Low As Reasonably Practicable (ALARP) region according to the EPA criteria. It should be noted that the EPA criteria refer to cumulative risk.	CSBP maintains a close working relationship with the Fire & Emergency Services Authority (FESA) and has a service agreement. FESA provides backup to CSBP personnel in emergency response situations and regularly visits the CSBP industrial complex for training and familiarisation purposes. On-site emergency facilities at CSBP's Kwinana works will continue to include a dedicated emergency response vehicle, fire tender and a patient transfer vehicle at all times, and an occupational health nurse during normal working hours. The emergency response vehicles and resources will be available to service any off-site incident.	
Traffic and Shipping		To ensure that any increases in traffic and shipping do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.	Both employees and movements of feedstock and manufactured products in and out of the CSBP Kwinana industrial complex generate traffic movements. A summary of the published traffic volume data from 1992 to 1999 collected by Main Roads WA for Kwinana Beach Road and Patterson Road is presented in Table 28. The Main Roads data shows that in 1998/99 there were almost 6,000 traffic movements per day at the railway crossing on Kwinana Beach Road. It is expected that there has been an increase in traffic movement on Kwinana Beach Road in the last five years and even if this increase is conservatively estimated at 10% this would mean that the current traffic movement on Kwinana Beach Road is approximately 6,600. This data has been confirmed as being representative of current traffic levels by a 3 day traffic count at the entrance of the CSBP industrial complex completed by CSBP over the period 23-25 November 2004.	As there is not expected to be an environmental impact related to traffic and shipping no mitigation or management measures are proposed.	There will be a slight increase in the number of road traffic and shipping movements as a result of this proposal being implemented. The increases are relatively small in the context of the exiting traffic movements and are therefore not expected

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
			Based on this traffic movement count there are approximately 1400-road traffic movements per (usual business) day from the CSBP Kwinana industrial complex at present. During periods of construction activity there are periods of increased traffic movements as a result increased workforces on the site and movements of equipment and waste to and from the CSBP industrial complex. Currently there are few shipping movements into or out of Cockburn Sound as a result of the operation of the Ammonium Nitrate Production Facility. There are approximately 8 shipping movements per year associated with the import of liquid fertiliser (Flexi –N). In the last 2 years there have been four shipping movements associated with the import or export of ammonia from the expanded ammonia business. These shipments are conducted in accordance with the requirements of an environmental approval, which allows up to nine shipments of ammonia into or out of the CSBP facility per year. The potential ongoing traffic increase resulting from this proposal are likely to be attributable to 30 light vehicles, and 10 heavy vehicles per day, which is insignificant in the context of traffic movements on Kwinana Beach Road and Patterson Road. During the construction phase, which will extend over approximately 15 months, there will be an increase of approximately 150 light vehicles, and 10 heavy vehicles per day, which again is insignificant in the context of current traffic movements on Kwinana Beach Road and Patterson Road.		to aversely impact on environmental values. It is important to note that the shipments of ammonia will continue to conform to the limits imposed under previous environmental approvals.

Environmental Factor	Relevant Area	Environmental Objective	Potential Environmental Impacts/ Proposal Characteristics	Proposed Mitigation and Management Strategies	Predicted Outcome
			As a result of the implementation of this proposal there will modest overall increase of approximately 50 shipping movements per year into Cockburn Sound. The increase will be comprised as follows: • a reduction approximately 8 to 10 shipping movements (4 to 5 shipments) per year as a result of imported liquid fertiliser shipments being replaced by production at Kwinana; • a potential increase of approximately 50 shipping movements from 25 export shipments of ammonium nitrate per year (at present ammonium nitrate shipments are very infrequent); and • there will be an increase of about 10 shipping movements (5 shipments) to cater for the need for sufficient ammonia feedstock during peak production periods. These changes are not regarded as significant in the context of the overall annual average number of shipping movements in Cockburn Sound which total approximately 1,900 per year (D.A. Lord & Associates, 2001, p85).		
Visual Amenity and Light Overspill		Ensure that aesthetic values are considered and measures are adopted to reduce visual impacts on the landscape as low as reasonable practicable (EPA, 2002a). To avoid or manage potential impacts from light overspill and comply with acceptable standards (EPA, 2002a).	The existing ammonium nitrate facility is located within the centre of the CSBP industrial complex. The premises are currently not visible from publicly accessible areas other than for the prilling tower and absorber stack. Nonetheless, a range of industries surrounds the site. A new prilling tower and stack will be a maximum 65m in height. A view-shed analysis was conducted to assess the likely visual intrusion of the expanded Ammonium Nitrate Production Facility taking into account surrounding land use and topography. Results of view-shed analyses of the "expanded Ammonium Nitrate Production Facility" and suggest that the visual impact of the expanded Facility will be minimal in the context of the surrounding land use.	In terms of the potential for light overspill, impacts will be minimised through strategic positioning of light poles and towers, and utilisation of directional lighting. Where any additional light sources are be installed, these will be in accordance with AS4282 for the control of light overspill. No other specific mitigation or management strategy is proposed for this factor.	The relatively small footprint (compared to existing industrial facilities at the CSBP industrial complex), implementation of sympathetic colour schemes together with the use of screening where possible, will ensure that the EPA's objectives in relation to visual amenity are met.

Appendix 5

Recommended Environmental Conditions and Proponent's Consolidated Commitments

Statement No.

RECOMMENDED ENVIRONMENTAL CONDITIONS

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

AMMONIUM NITRATE PRODUCTION FACILITY EXPANSION, KWINANA

Proposal: To increase the capacity of the CSBP Ammonium Nitrate Production Facility from approximately 235,000 tonnes per annum to approximately 580,000 tonnes per annum by debottlenecking and duplicating the existing facilities. The facility is within the CSBP Kwinana site in the Kwinana Industrial Area, Town of Kwinana, as documented in Schedule 1 of this statement.

Proponent: CSBP Limited

Proponent Address: PO Box 345
KWINANA WA 6966

Assessment Number: 1537

Report of the Environmental Protection Authority: Bulletin 11xx

The proposal referred to above may be implemented by the proponent subject to the following conditions and procedures:

1 Implementation

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.

2 Proponent Commitments

2-1 The proponent shall implement the environmental management commitments documented in schedule 2 of this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.

3-3 The nominated proponent shall notify the Department of Environment of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

4-1 The proponent shall substantially commence the proposal within five years of the date of this statement or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment will determine any dispute as to whether the proposal has been substantially commenced.

4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

1. the environmental factors of the proposal have not changed significantly;

2. new, significant, environmental issues have not arisen; and

3. all relevant government authorities have been consulted.

Note: The Minister for the Environment may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

5 Compliance Auditing and Performance Review

5-1 The proponent shall prepare an audit programme and submit compliance reports to the Department of Environment which address:

1. the status of implementation of the proposal as defined in schedule 1 of this statement;

2. evidence of compliance with the conditions and commitments; and

3. the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environment is empowered to monitor the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement.

5-2 The proponent shall submit a performance review report every five years following the formal authority issued to the decision-making authorities under section 45(7) of the *Environmental Protection Act 1986*, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority, which addresses:

1. the major environmental issues associated with implementing the project; the environmental objectives for those issues; the methodologies used to achieve these;

and the key indicators of environmental performance measured against those objectives;

2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best practicable measures available;

3. significant improvements gained in environmental management, including the use of external peer reviews;

4. stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and

5. the proposed environmental objectives over the next five years, including improvements in technology and management processes.

5-3 The proponent shall submit a report prepared by an auditor approved by the Department of Environment under the "Compliance Auditor Accreditation Scheme" to the Chief Executive Officer of the Department of Environment on each condition or commitment of this statement which requires the preparation of a management plan, programme, strategy or system, reporting on the fulfilment of the requirements of each condition or commitment.

6 **Greenhouse Gas Emissions**

6-1 Prior to commencement of construction of the expanded Ammonium Nitrate Production Facility, the proponent shall prepare a Greenhouse Gas Emissions Management Plan to:

- ensure that through the use of best practice, the total net "greenhouse gas" emissions and/or "greenhouse gas" emissions per unit of product from the project are minimised; and

- manage "greenhouse gas" emissions in accordance with the *Framework Convention on Climate Change 1992*, and consistent with the National Greenhouse Strategy;

to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

This Plan shall include:

1 calculation of the "greenhouse gas" emissions associated with the proposal, as advised by the Environmental Protection Authority;

Note: The current requirements of the Environmental Protection Authority are set out in: *Minimising Greenhouse Gas Emissions, Guidance for the Assessment of Environmental Factors, No. 12* published by the Environmental Protection Authority (October 2002). This document may be updated or replaced from time to time.

2 specific measures to minimise the total net "greenhouse gas" emissions and/or the "greenhouse gas" emissions per unit of product associated with the proposal using a combination of "no regrets" and "beyond no regrets" measures;

Note: In (2) above, the following definitions apply:

1. "no regrets" measures are those which can be implemented by a proponent and which are effectively cost-neutral.
2. "beyond no regrets" measures are those which can be implemented by a proponent and which involve additional costs that are not expected to be recovered.

3 estimation of the "greenhouse gas" efficiency of the project (per unit of product and/or other agreed performance indicators) and comparison with the efficiencies of other comparable projects producing a similar product, both within Australia and overseas;

4 implementation of thermal efficiency design and operating goals consistent with the Australian Greenhouse Office Technical Efficiency Guidelines in design and operational management;

5 actions for the monitoring and annual reporting of "greenhouse gas" emissions and emission reduction strategies;

6 a target set by the proponent for the reduction of total net "greenhouse gas" emissions and/or "greenhouse gas" emissions per unit of product and as a percentage of total emissions over time, and annual reporting of progress made in achieving this target. Consideration should be given to the use of renewable energy sources such as solar, wind or hydro power; and

7 consideration by the proponent of entry (whether on a project-specific basis, company-wide arrangement or within an industrial grouping, as appropriate) into the Commonwealth Government's "Greenhouse Challenge" voluntary cooperative agreement program. Components of the agreement program include:

i. an inventory of emissions;
ii. opportunities for abating "greenhouse gas" emissions in the organisation;
iii. a "greenhouse gas" mitigation action plan;
iv. regular monitoring and reporting of performance; and
v. independent performance verification.

6-2 The proponent shall implement the Greenhouse Gas Emissions Management Plan required by condition 6-1.

6-3 Prior to the commencement of construction, the proponent shall make the Greenhouse Gas Emissions Management Plan required by condition 6-1 publicly available.

7 Nitrous Oxide (Greenhouse Gas Emissions) Improvement Plan

7-1 The proponent shall design and construct the new nitric acid plant with a larger boiler than is currently in the existing nitric acid plant to achieve a reduction of carbon dioxide equivalent emissions (from nitrous oxide) by approximately 68,000 tonnes per annum when compared with the existing nitric acid plant (for equivalent capacity).

7-2 The proponent shall:

1. monitor world-wide commercial-scale trials and application of new 'low nitrous oxide emission' catalysts for nitric acid plants;

2. prepare and submit a Nitrous Oxide Emissions Improvement Plan which reviews the current state of trialling and application of low nitrous oxide emission catalysts to the requirement of the Minister for he Environment on advice of the Environmental

Protection Authority at least 3 months prior to commissioning the new nitric acid plant;

3. update the above mentioned Nitrous Oxide Emissions Improvement Plan every year until new technology is adopted for the plant or until the Minister for the Environment advises that it is no longer required; and

4. make the Nitrous Oxide Emissions Improvement Plan required by condition 7-2 publicly available, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

8 Prilling Tower

8-1 The proponent shall design and construct the new prilling plant to incorporate a scrubbing and emission control system to maintain particulate emissions concentration less than 50 mg/Nm^3 and particulate emissions rate less than 0.23 kg per tonne of product.

8-2 The proponent shall not operate the existing prilling tower for more than 15 months beyond the commencement of operation of the new prilling plant tower without the incorporation of scrubbing and emission control equipment which meets the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

9 Nitric Acid Plant

9-1 The proponent shall design and construct the new nitric acid plant such that oxides of nitrogen emissions from the exit stack shall not exceed 100 mg/Nm^3.

9-2 The proponent shall design and construct the new nitric acid plant to incorporate continuous monitoring of oxides of nitrogen emissions from the exit stack.

10 Wastewater Discharge

10-1 The proponent shall design and construct the new Ammonium Nitrate Production Facility such that the nitrogen load in the wastewater discharge from the site shall not exceed the 3 month rolling average to June 2004 (137 kg/day).

11 Noise

11-1 Prior to 31 December 2005, the proponent shall construct a noise barrier on the northern site boundary and/or implement other arrangements to ensure that noise levels at the BP boundary fence meet the assigned noise levels under the *Environmental Protection (Noise) Regulations 1997*.

12 Decommissioning Plans

12-1 Within 6 months following the date of publication of this statement, the proponent shall prepare a Preliminary Decommissioning Plan for the Ammonium Nitrate Production Facility, which provides the framework to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The Preliminary Decommissioning Plan shall address:

1 conceptual plans for the removal or, if appropriate, retention of plant and infrastructure;

2 a conceptual rehabilitation plan for all disturbed areas and a description of a process to agree on the end land use(s) with all stakeholders;

3 a conceptual plan for a care and maintenance phase; and

4 management of noxious materials to avoid the creation of contaminated areas.

12-2 At least 12 months prior to the anticipated date of decommissioning, or at a time agreed with the Environmental Protection Authority, the proponent shall prepare a Final Decommissioning Plan designed to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The Final Decommissioning Plan shall address:

1 removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders;

2 rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s); and

3 identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.

12-3 The proponent shall implement the Final Decommissioning Plan required by condition 12-2 until such time as the Minister for the Environment determines, on advice of the Environmental Protection Authority, that the proponent's decommissioning responsibilities have been fulfilled.

12-4 The proponent shall make the Final Decommissioning Plan required by condition 12-2 publicly available.

Procedures

1 Where a condition states "to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority", the Environmental Protection Authority will provide that advice to the proponent.

2 The Environmental Protection Authority may seek advice from other agencies, or organisations as required, in order to provide its advice.

3. Where a condition lists advisory bodies, it is expected that the proponent will obtain the advice of those listed as part of its compliance reporting to the Department of Environment.

Notes

1. The Minister for the Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment over the fulfilment of the requirements of the conditions.

2. The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986.*

Schedule 1

The Proposal (Assessment Number 1537)

The proposal is to increase the capacity of the Ammonium Nitrate Production Facility from approximately 235,000 tonnes per annum to approximately 580,000 tonnes per annum by debottlenecking and duplicating the existing facilities. The upgrade facilities will be located near the existing plant at the CSBP site, within the Kwinana Industrial Area as shown in Figures 1 and 2.

The expansion includes:

- Duplication and/or debottlenecking of the existing 500 tpd nitric acid plant;
- Duplication and/or debottlenecking of the existing 635 tpd ammonium nitrate reaction plant;
- Construction of a new 90% ammonium nitrate solution storage tank (250 m^3);
- Construction of a new replacement prilling plant; and
- A review of ammonium nitrate storage facilities.

The key characteristics of the proposal are described in Table 1 below.

Table 1: Summary and comparison of key proposal characteristics of the ANPF

Characteristic	Existing Facility	Description of Expanded Facility
Location	Kwinana Beach Road – Kwinana – Kwinana Industrial Area (KIA).	Kwinana Beach Road – Kwinana – Kwinana Industrial Area (KIA) – no change
CSBP Site Area	138 hectares	138 hectares – no change
Project Life	20-30 years	20-30 years
Plant Operating Hours	24 hour/day operation, 365 days per year except for maintenance shutdowns	24 hour/day operation, 365 days per year except for maintenance shutdowns – no change
Plant Commissioning	1968 – prilling plant 1996 – existing nitric acid plant and ammonium nitrate plant	Second nitric acid plant 2007 Second ammonium nitrate plant 2007 New prilling plant 2007
Production Plants	• Nitric acid plant; • Nitric acid storage tanks • Ammonium nitrate plant; • Ammonium nitrate (90% solution) storage tank of 730 m^3 capacity; • Prilling plant; • Packaging and despatch facilities; and • 14,000 tonnes bulk and bag storage.	• 2 Nitric acid plants; • Nitric acid storage tanks; • S Ammonium nitrate plants; • New ammonium nitrate (90% solution) storage tank of 250 m^3 capacity; • Ammonium nitrate (70% solution) storage tank of 730m^3 capacity; • New enlarged prilling plant (existing prilling plant will eventually be decommissioned but may need to be operated in parallel for several years and if so, appropriate pollution prevention will be fitted to existing plant; • Packaging and despatch facilities; and • 14,000 tonnes bulk and bag storage.

Characteristic	Existing Facility	Description of Expanded Facility
Production	• Nitric acid – average 187,000 tpa, maximum 200,000 tpa • Ammonium nitrate - average 235,000 tpa, maximum 254,000 tpa • Prilling plant – average 185,000 tpa, maximum 200,000 tpa	*Nitric Acid* • Debottleneck existing nitric acid – nominal 230,000 tpa; or • Duplicate existing nitric acid – double the current maximum to 400,000 tpa; or • Debottleneck existing and duplicate nitric acid facilities– 460,000 tpa nominal. *Ammonium nitrate* • Debottleneck existing ammonium nitrate – nominal 292,000 tpa; or • Duplicate existing ammonium nitrate – double the current maximum to 500,000 tpa; or • Debottleneck existing and duplicate ammonium nitrate facilities– 584,000 tpa nominal. *Prill* • New prilling plant – nominal 400,000 tpa (nominal 470,000 tpa if combined with existing plant).
Inputs	Ammonia, oxygen, and water	Ammonia, oxygen, and water
Outputs	Ammonium nitrate solution and prill plus air/water emissions (see below)	Ammonium nitrate solution and prill plus air/water emissions (see below)
Gaseous Emissions	Nitrogen oxides - 71 tpa Ammonium nitrate particulate – 104 tpa	Nitrogen oxides - 170 tpa Ammonia - 125 tpa Ammonium nitrate particulate: 79 tpa (proposed new plant at full rate) OR 103 tpa (proposed new plant at 50% rate, and existing plant retrofitted with scrubbing equipment and operating to a total output of 470,000 tpa).
Greenhouse Gas Emissions	667,394 tpa of net CO_2-e	1.5 million tpa of net CO_2-e
Liquid Effluent Discharges	Approx 1.5 ML/day of cooling tower blowdown water and stormwater to Cockburn Sound (to the SDOOL in February 2005 approx)	Approx 2ML/day effluent to the Sepia Depression Ocean Outfall Landline (SDOOL) from the total CSBP site, including the proposed AN expansion Proposed nitrogen concentrations in effluent to Cockburn Sound/SDOOL will be less than or equal to that for June 2004 (3 monthly rolling average) i.e. no net increase in site emissions of nitrogen from this proposal.
Noise	CSBP industrial complex does not currently meet the industry to industry assigned level of the *Environmental Protection (Noise) Regulations*	Will comply with the Environmental *Protection (Noise) Regulations 1997* or subsequent Ministerial Statements. CSBP will install a noise barrier at the northern boundary and/or other arrangements in 2005 to ensure this site achieves compliance with the *Environmental Protection (Noise) Regulations* at this location.
Net Power Generation	1.5MW	3 MW or equivalent steam production

Figures attached

1. Regional location
2. Plant location

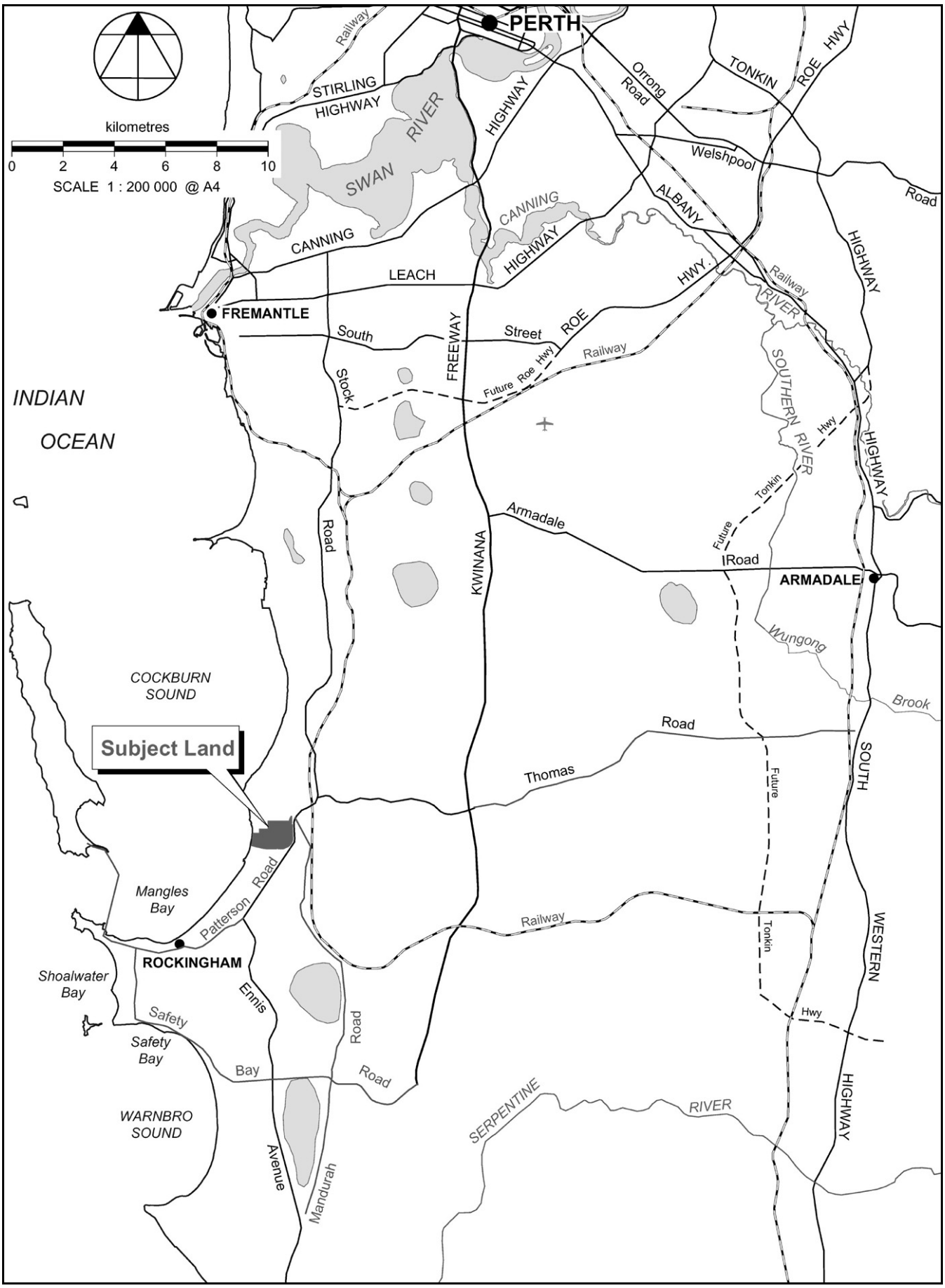


Figure 1: Regional Location (Source: Figure 1 SKM, 2005

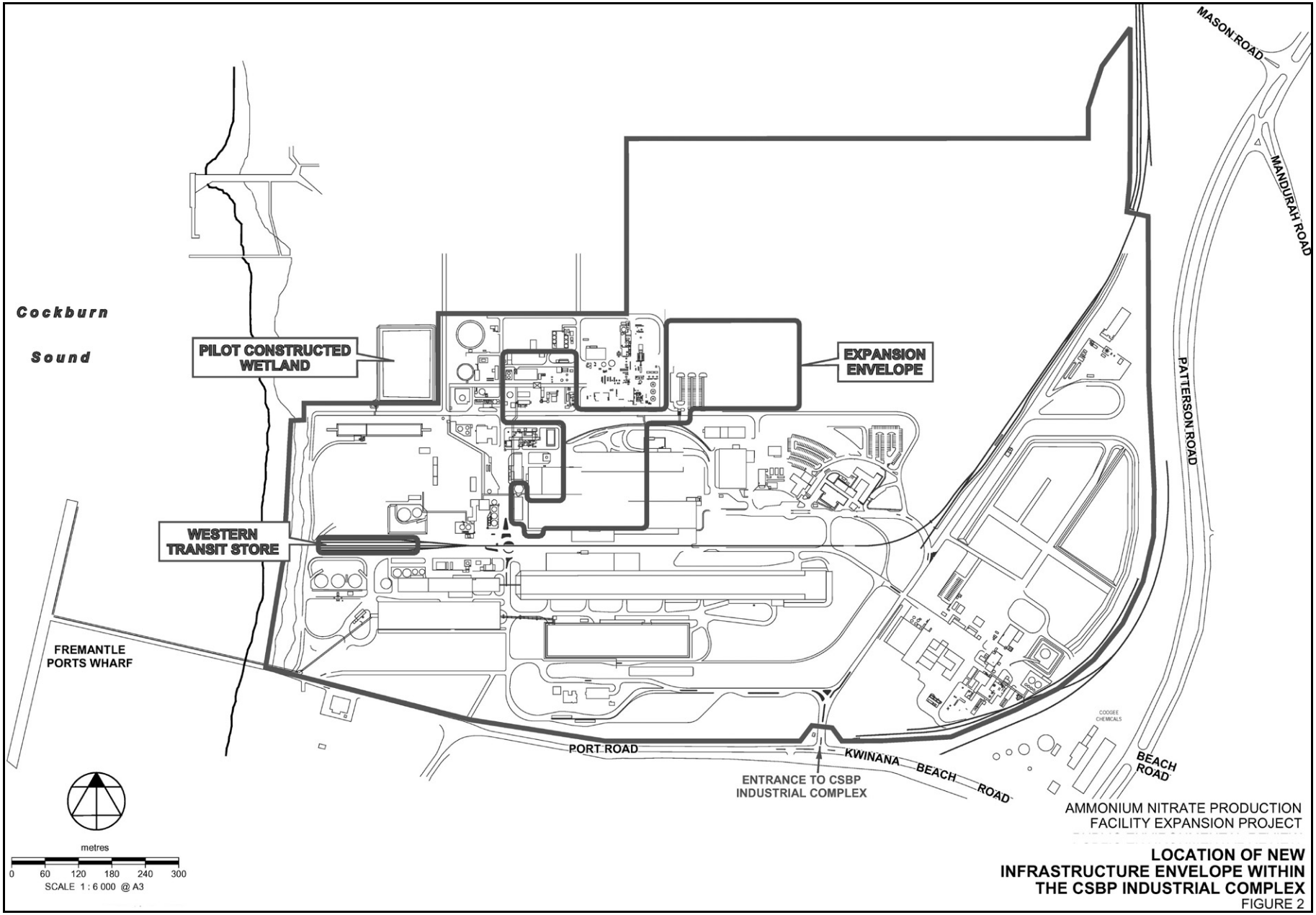


Figure 2: Plant location (Source Figure 2 SKM, 2005

Schedule 2

Proponent's Environmental Management Commitments

16 June 2005

AMMONIUM NITRATE PRODUCTION FACILITY EXPANSION, KWINANA

(Assessment No. 1537)

CSBP LIMITED

Proponent's Environmental Management Commitments – June 2005

Ammonium Nitrate Production Facility Expansion (Assessment No. 1537)

Note: The term "commitment" as used in this schedule includes the entire row of the table and its six separate parts as follows:

- a commitment number;
- a commitment topic;
- the objective of the commitment;
- the 'action' to be undertaken by the proponent;
- the timing requirements of the commitment; and
- the body/agency to provide technical advice to the Department of Environment.

Proponent's Consolidated Environmental Management Commitments (Assessment No. 1537)

NO	TOPIC	ACTIONS	OBJECTIVE/S	TIMING	ADVICE
1	Construction	Develop a Construction Environmental Management Plan for the construction phase of the expansion. The issues addressed in the Construction Environmental Management Plan will include but not be limited to: • construction noise; • construction dust; • construction waste; and • transport of infrastructure.	To ensure all aspects of project construction are conducted such that environmental impacts are minimised as far as practicable, and that regulatory requirements are complied with.	The Construction Environmental Management Plan will be submitted to the Department of Environment for approval prior to the commencement of construction.	DoE
2	Construction	Implement the Construction Environmental Management Plan referred to in commitment 1 throughout the construction period of the expansion.	To ensure all aspects of project construction are conducted such that environmental impacts are minimised as far as practicable, and that regulatory requirements are complied with.	At commencement of construction.	
3	Environmental Management	Update the CSBP Environmental Management System and related Procedures, which details procedures for the management and monitoring of the Ammonium Nitrate Production Facility.	To protect the environment in the event of an incident.	Prior to commissioning.	

NO	TOPIC	ACTIONS	OBJECTIVE/S	TIMING	ADVICE
4	Environmental Management	Implement the updated CSBP Environmental Management System and related Procedures referred to in commitment 3, which details procedures for the management and monitoring of the Ammonium Nitrate Production Facility.	To protect the environment in the event of an incident.	Update prior to commissioning.	
5	Air Quality – Oxides of Nitrogen	Update the Environmental Management Procedure: Continuous NO_X Monitoring on the Nitric Acid Plant Procedure.	To ensure that best practicable measures are taken to minimise discharges of oxides of nitrogen emissions to the atmosphere.	Update prior to commissioning.	
6	Air Quality – Oxides of Nitrogen	Implement the Environmental Management Procedure: Continuous NO_X Monitoring on the Nitric Acid Plant Procedure.	To ensure that best practicable measures are taken to minimise discharges of oxides of nitrogen emissions to the atmosphere.	Update prior to commissioning	
7	Air Quality – Ammonia	Monitor ammonia emissions from the existing and new prilling tower in accord with standards and techniques required by the Environmental Protection Licence.	To ensure that best practicable measures are taken to minimise discharges of ammonia emissions to the atmosphere.	As specified in the Environmental Protection Licence.	DoE
8	Air Quality – Ammonia	Report the results of the ammonia monitoring as required by the Environmental Protection Licence.	To ensure that best practicable measures are taken to minimise discharges of ammonia emissions to the atmosphere.	As specified in the Environmental Protection Licence.	DoE
9	Greenhouse Gases	Retrofit a larger boiler to the existing nitric acid plant.	To reduce greenhouse gas emissions by approximately 68,000 tpa of CO_{2e}.	Within 3 years following commissioning of the new nitric acid plant.	
10	Greenhouse Gases	Retrofit N_2O reduction technologies in the existing nitric acid plant.	To ensure that best practicable measures and technologies are used to minimise Western Australia's greenhouse gas emissions.	If the technology proves commercially successful in the new plant, and after any Australian greenhouse gas emission laws and related carbon trading schemes are known (CSBP does not wish to be penalised for early action in this regard and recognises the EPA's view that the EPA can not commit beyond Western Australian laws).	

NO	TOPIC	ACTIONS	OBJECTIVE/S	TIMING	ADVICE
11	Greenhouse Gases	Provide up to 80,000 tpa of CO_2 to Alcoa World Alumina Australia for injection into residue disposal areas to create carbonates to bind the CO_2 subject to the satisfactory contractual arrangement.	To ensure that best practicable measures and technologies are used to minimise Western Australia's greenhouse gas emissions.	Subject to the satisfactory contractual arrangement.	
12	Surface water Quality	Maintain commitment to dispose of effluent to the Sepia Depression (and CSBP has a contract with WAWC).	To manage the potential effects of the proposal on surface water quality.	When the WAWC ocean outfall pipeline is available for use.	
13	Surface water Quality	Review the performance of its pilot nitrogen stripping wetland, and determine whether to proceed with the planned 3 additional wetland cells.	To manage the potential effects of the proposal on surface water quality.	February 2006.	
14	Surface water Quality	Continue, through KIC, to contribute to the State's ambient monitoring of Cockburn Sound waters.	To manage the potential effects of the proposal on surface water quality.	Ongoing.	
15	Solid Waste Management	Review and update the Solid Waste Management Plan, which details procedures for the management of solid waste disposal from the industrial complex. This plan will include but not be limited to: • recyclable wastes will be removed by an approved contractor; • general refuse (domestic and industrial solid waste) will be disposed of at an appropriate landfill; • solid waste storage requirements; and • reporting and review requirements.	To ensure that waste is relocated to the correct locations to minimise potential contamination to the receiving environment.	Already implemented.	
16	Solid Waste Management	Continue to implement the Solid Waste Management Plan referred to in commitment 25.	To ensure that waste is relocated to the correct locations to minimise potential contamination to the receiving environment.	Every 3 years or as required by the Document Management System.	
17	Noise Management	Design, construct and operate the plants to ensure that *Environmental Protection (Noise) Regulations 1997* noise limits are met at residential premises to the extent CSBP's operations contribute to the noise levels.	To ensure compliance with prescribed standards and minimise where practicable noise impacts.	At design and during operation.	

NO	TOPIC	ACTIONS	OBJECTIVE/S	TIMING	ADVICE
18	Noise Management	Monitor the plants for compliance with the industry to industry noise limits in the *Environmental Protection (Noise) Regulations 1997*, as they are currently planned to be amended.	To ensure compliance with prescribed standards and minimise where practicable noise impacts.	In the event the Regulations for this industry to industry noise level are not amended, CSBP will comply with the existing Regulations within 6 months of the Regulation review process ceasing.	
19	Water Resources	Source water for this project from either KWRP, or sustainable ground water supplies under licence.	To ensure use of scheme water is minimized.	At commissioning.	
20	Water Resources	WA Water Corporation scheme water will not be used except in emergency or supply disruption situations.	To ensure use of scheme water is minimized.	At commissioning.	
21	Water Resources	Continue internal programs directed at increasing water use efficiency, and source protection.	To ensure use of scheme water is minimized.	Ongoing.	
22	Public Safety	Maintain a Safety Report as described under the National Standard “Control of Major Hazard Facilities”, as required by the facility’s Dangerous Goods Licence or other relevant legislation.	To provide the framework to ensure that the facility emergency response is appropriate to respond to all scenarios.	Prior to construction.	DoIR
23	Environmental Risk	Relocate and decrease the size of the high strength ammonium nitrate solution tank.	To reduce off site risk potential.	At construction.	DoIR
24	Shipping	Limit the number of shipments of ammonia to a maximum of 9 shipments per year.		Ongoing.	
25	Shipping	Limit potential ammonium nitrate exports to no more than 25 ships each up to 4,000 tonnes per ship.		Ongoing.	

NO	TOPIC	ACTIONS	OBJECTIVE/S	TIMING	ADVICE
26	Visual Amenity	Undertake the following management strategies where appropriate: • buildings will be coloured in accordance with CSBP's usual standards for industrial plant; • good housekeeping practices will be maintained at all times; and • lighting will comply with Australian Standard AS 4282.	To improve the visual amenity of the proposed expansion	At construction	

Abbreviations
DoE – Department of Environment
DoIR – Department of Industry and Resources
KIC – Kwinana Industries Council
KWRP – Kwinana Water Reclamation Plant

Appendix 6

Summary of Submissions and
Proponent's Response to Submissions

Ammonium Nitrate Production Facility Expansion Project, Kwinana (Assessment No. 1537)

Summary of Submissions and CSBP Limited responses

1. INTRODUCTION

CSBP Limited (CSBP) propose to expand the existing Ammonium Nitrate Production Facility, located within the CSBP Kwinana industrial complex, through a combination of options involving debottlenecking of existing plants, duplication of plants and replacement of plants.

In accordance with the Environmental Protection Act, a Public Environmental Review (PER) was prepared which described this proposal and its likely effects on the environment. The PER was available for a public review period of 4 weeks from 14 February 2005 closing on 14 March 2005.

This report provides a summary of the submissions received by the EPA, and the proponent's responses to each of the issues raised.

2. SUBMISSIONS AND PROPONENT RESPONSES

The EPA received 28 submissions on various aspects of the Ammonium Nitrate Production Facility Expansion Project during the public review period for the PER.

The submissions received are according to the environmental factor each submission addresses. The wording for each submission presented below in italics is the wording as provided to CSBP by the Environmental Protection Authority Services Unit (EPASU). The submission number below corresponds to the identification number assigned to each individual submission by the EPASU prior to providing the list to CSBP.

2.1 General

Submission 1

Has CSBP now selected the technology provider for the proposed new plants? If so, it should now be in a position to provide more detailed information about the process (including process flow charts) and plant performance.

Proponent Response

Nitric Acid Process Description

The nitric acid process to be used in the new nitric acid plant will be the same as is currently used in the existing nitric acid plant. This technology is licensed from Grande Paroisse of France and has been successfully operated in the existing plant since 1996. Together with the ammonium nitrate solution plant constructed at this time, the original project won the 1996 Society of Chemical Industry of Victoria's Plant of the Year award and also the 1996 Plastics and Chemicals Industries Association's Environment Award. A recent review of competing technologies has indicated that the Grande Paroisse technology is still CSBP's preferred route in terms of environmental impact, energy efficiency, capital and operating costs.

Figure 1 shows a simplified process flow diagram for the nitric acid plant.

Liquid ammonia is vaporised using cooling water then superheated using low-pressure steam. Air is drawn into the air compressor through an inlet filter. The air is compressed to around 680 kPa gauge and leaves the compressor at about 270°C. This air compressor has integral intercoolers where cooling water removes heat generated in compressing the air. The air is split into secondary air for the absorption bleacher and primary air for the reactor. The air leaving the compressor is first heated in the primary air heater before being mixed with the ammonia. The primary air heater warms the air using heat from the main nitrous gas stream.

The ammonia and air are converted to nitrous gas in the plant reactor. This reaction occurs at 920°C and relies on the use of catalyst gauzes consisting of platinum and rhodium. The reaction is:

$$4\ NH_3 + 5\ O_2 \quad \rightarrow \quad 4\ NO + 6H_2O + \text{heat}$$

The nitric oxide is then oxidised to nitrogen dioxide:

$$2\ NO + O_2 \rightarrow 2\ NO_2 + \text{heat}$$

The first item of equipment in the process heat exchanger train is a vertical waste heat boiler (including a steam superheater). The boiler and superheater produce around 29 tonnes/h of 500°C steam at a pressure of 6 MPa, which is sent to the steam turbine to provide energy to turn the machine set. The machine set consists of an air compressor, tail gas expander, steam turbine and motor/generator. The machine set operates at a fixed speed, with the generator synchronised with the Western Power's electricity network. Steam at approximately 700 kPa is extracted from this steam turbine to supply the plant's low-pressure steam requirements. The remaining steam is condensed in a condenser using cooling water.

The nitrous gas leaving the waste heat boiler then enters tail gas heater No 2 followed by the primary air heater and economiser. The economiser pre heats boiler feed water on its way to the waste heat boiler. The nitrous gas then enters the cooler condenser before entering the absorption tower. The cooler condenser uses cooling water to cool the gas as far as practicable. The nitrous gas is absorbed in water in the absorption tower to form nitric acid, with cooling water again being used to control the gas temperature:

$$3\ NO_2 + H_2O \rightarrow 2\ HNO_3 + NO$$

The residual gas leaving the tower has a concentration of approximately 800 ppm NO_X. A bleacher is incorporated in the base of the main absorption tower. Secondary air passes through this section of the tower and bleaches the acid, which has been produced in the main body of the absorption tower. Bleaching removes the absorbed NO from the acid, which is then converted to NO_2 and absorbed in the upper sections of the tower to form nitric acid.

The bleached 62% acid leaving the tower is cooled using cooling water before being sent to storage.

Tail gas leaving the absorption tower passes through a tail gas separator before being heated in two heat exchangers. The first exchanger, tail gas heater No 1, uses boiler feed water supplied from the de-aerator. The second tail gas heater, No 2, uses nitrous gas from the main process stream. Before being exhausted to atmosphere, the tail gas NO_X content is reduced in a selective catalytic reactor. This reactor uses superheated ammonia from the main plant evaporator, which is mixed with the tail gas. The ammonia and tail gas react in the abatement system to form nitrogen according to the following reactions:

$$6\ NO_2 + 8\ NH_3 \rightarrow 7\ N_2 + 12\ H_2O$$
$$6\ NO + 4\ NH_3 \rightarrow 5\ N_2 + 6\ H_2O$$

The tail gas, with a NO_X concentration of less than 50 ppm, is then passed through the tail gas expander to recover the process pressure energy and is then expelled to atmosphere through the stack, which is mounted alongside the absorber tower.

During normal operation, the power delivered by the steam turbine and tail gas expander is more than sufficient to drive the main air compressor and results in around 3.5 - 4.0 MW of excess energy. This excess energy is converted into electrical power by a motor/generator connected to the end of the machine set. After allowing for internal electricity requirements, including the prilling plant and cooling water systems, about 1.5 MW of surplus electricity is exported from the project.

During start up of the nitric acid plant, steam is supplied to the steam turbine from other sources on site and the motor/generator is used in motor mode to supply the energy needed until the plant is able to produce sufficient internal steam from the waste heat boiler.

Ammonium Nitrate Solution Process Description

As is the case with the nitric acid plant, the technology to be used for the ammonium nitrate solution plant is licensed from Grande Paroisse of France and has been successfully operated in the existing plant since 1996.

Figure 2 shows a simplified process flow diagram for the ammonium nitrate solution plant. The ammonium nitrate plant uses liquid nitric acid and gaseous ammonia as raw materials. Gaseous ammonia is supplied from the ammonia vaporiser on the nitric acid plant and 62% nitric acid is pumped from storage and heated using low-pressure process steam. The nitric acid and ammonia react immediately in the pipe reactor to form ammonium nitrate solution, which flows into the reactor separator. The reaction is as follows:

$$NH_3 + HNO_3 \rightarrow NH_4NO_3 + \text{heat}$$

Scrubber solution is also added to the pipe reactor to provide a bleed from the scrubber and to control the ammonium nitrate temperature.

Nearly all of the water in the nitric acid and scrubber solutions is evaporated by the heat of the reaction and flows from the top of the reactor separator vessel as process steam. Product ammonium nitrate solution, with a strength of 96% w/w, leaves the bottom of the separator and flows under gravity to the ammonium nitrate solution tank. This tank operates at atmospheric pressure. The solution is cooled to a temperature of approximately 160°C with the heat recovered in a steam generator to produce low-pressure steam. Ammonium nitrate solution is pumped from the solution tank to the prilling plant, where it is converted into solid ammonium nitrate product.

The process steam leaving the top of the reactor separator (containing some entrained contaminants) is scrubbed and acidified and then passes to a separator/demister vessel. Approximately 40% of the process steam flows to a number of heat exchangers, all of which return the condensate to the concentrated process condensate tank. The remaining 60% of the process steam flow passes to the process condensate evaporator where it is used to evaporate a portion of the concentrated process condensate and produce steam. The concentrated condensate, containing contaminants, is pumped to the nitric acid plant absorber. The pH of the circulating liquid is controlled by the addition of 62% w/w nitric acid.

Clean steam from the process condensate evaporator passes to various heat exchangers and a condenser, where the steam is condensed as clean process condensate. The clean condensate is sent to the cooling water system and/or to the top of the nitric acid plant absorber.

All wastewater generated in the process is collected and tested before recycling or discharge into the site wastewater disposal system.

Prilling Process Description

The prilling process to be used for the new plant will be the Low Density Ammonium Nitrate technology licensed from Uhde GmbH of Germany. This technology was selected to take advantage of Uhde's long experience in designing plants specifically for the low-density grade prill, which is required as an input to the manufacture of explosive grade ammonium nitrate/fuel oil (ANFO) mixtures used in the Western Australian mining industry. It is to be noted that manufacture of ANFO is not undertaken by CSBP, but it is necessary for CSBP's product to meet the specific requirements of this end use. Fertiliser grade ammonium nitrate is not suitable for the ANFO market.

The Uhde process has also been developed to provide emissions standards which are better than the requirements of the European Fertiliser Manufacturers Association (EFMA).

Figure 3 shows a simplified process flow diagram for the prilling process. A 96% ammonium nitrate solution will be pumped from both the existing plant and the new (duplicate) Grande Paroisse solution plant and discharged into a common ammonium nitrate feed tank located at the prilling plant. Weak ammonium nitrate solution from the plant scrubbers is also fed to this tank.

The ammonium nitrate solution is fed into the top of the falling film evaporator. Condensing 700 kPa (gauge) steam delivers the heat for concentration up to the conditions required for prilling.

The concentrated ammonium nitrate solution (AN melt) flows into the AN melt tank. The AN melt is then pumped by the AN melt pump to the head tank on top of the prilling tower.

In the head tank the AN melt and a proprietary internal additive are thoroughly mixed by an agitator. The mixture flows by gravity to the spraying showers and is then discharged into the free space in the tower. The droplets solidify in the prilling tower and are collected at the slotted conical bottom.

The accumulated hot prills are extracted by the tower belt conveyor and transported to the pre-dryer.

Treated air enters through the slots in the tower bottom into the prilling tower and heats up to about 70 - 75°C. The prilling air passes through air channels at the top, allowing operators free access to the spraying showers.

Any vaporised ammonia and entrained fine particles are scrubbed off in the prilling air scrubber. Ammonia is caught by slightly acidified and pH-controlled dilute ammonium nitrate solution. The scrubber solution is cooled using plant cooling water in order to maintain the required air temperatures in the prilling tower.

After scrubbing the prilling air is recycled to prilling tower bottom by the prilling air scrubber fan.

The hot but moist prills are co-currently dried in the pre-dryer and counter-currently dried in the dryer. By evaporation of the contained water, the necessary porosity of the prills is achieved.

Part of the air from the fluidised bed cooler (see later in the process) is mixed with some ambient air and serves as the drying medium after being heated by low-pressure steam in the pre-dryer air heater.

Final drying takes place in the dryer at an elevated temperature in order to get the final water content of 0.12 %. Only air from the fluidised bed cooler is used and is heated in the air heater.

The waste air from pre-dryer and dryer is sent to the drying air scrubber to be washed to remove ammonium nitrate dust and ammonia. Bleed air from the prilling tower air circulation system is also passed to the drying air scrubber. The details of this scrubber are still to be finalised in discussions between CSBP and Uhde. CSBP has decided to use a unit with two stages of scrubbing rather than Uhde's standard single stage packed bed scrubber in order to further reduce emissions of particulates and ammonia.

After treatment, the waste air is discharged to atmosphere via the drying air scrubber fan to the stack, which runs to a height above the top of the prilling tower.

The hot but dry prills pass to the screening and cooling section.

A bucket elevator (or the alternative of an inclined belt conveyor) lifts the hot and dry prills to the screen. Oversize material and the fines are separated from the on-size product and recycled to the AN melt tank at the start of the process where it is dissolved for reprocessing.

The on-size material flows by gravity to the fluidised bed cooler to be cooled from 70 - 80°C to less than 30°C by means of cooled and dehumidified air. The fluidising air blower feeds the air from the air conditioning unit into the bottom of the fluidised bed cooler. The resulting warm cooling air is re-used in the drying section, thus reducing the energy requirement and the total quantity of air to be discharged to atmosphere.

A special coating agent will be used to prevent caking and moisture pick-up during storage and transport. The coating agent is heated and sprayed onto the rolling bed of prills in the coating drum. The prilled product is conveyed by a belt system to a storage building.

Prilling Plant Scrubber System

The scrubbing system on the new prilling plant consists of the following:

- A packed scrubber on the prilling tower air, which both scrubs and cools the air recycled around the prilling tower. A small proportion of this circulating air is taken as a bleed from this system to the drying air scrubber.

- A two stage packed scrubber on the air from the pre-dryer and dryer drums, which also includes the bleed air from the prilling tower. Air from this scrubber is discharged to atmosphere via a stack which runs to the top of the prilling tower. This stack is the only emission point for the plant.

This design incorporates components of the schemes described in the European Fertilizer Manufacturers' Association (EFMA) booklet "Production of Ammonium Nitrate and Calcium Ammonium Nitrate" but is not directly comparable as the EFMA Best Available Technique (BAT) standards are not based on the use of air recycle for the prilling tower. EFMA refers to a single plant (p13) which recycles the prilling tower air, but notes that this concept is not in general use. The prilling tower is the source of sub-micron sized aerosol which is the major contributor to the plume from CSBP's existing prilling plant. EFMA proposes BAT based on the use of candle filters, while acknowledging that these filters are expensive to install – "a significant proportion of the total plant cost". Use of candle filters results in a particulates concentration of 15 mg/Nm^3, but the mass emission rate is still relatively high as the tower airflow is a significant proportion of the total discharge to atmosphere in the conventional plant design. The BAT level for emission points in the drying section of the plant is given as 30 mg/Nm^3, with a total mass load for the plant of 0.5 kg per tonne of product.

The process design proposed by Uhde for the new CSBP prilling plant avoids the need for expensive candle filters by recycling the prilling tower air. It is also relevant that the prilling conditions used in the manufacture of low density "porous" ammonium nitrate, as used in the existing CSBP plant and the proposed Uhde technology, result in a significantly lower aerosol concentration than with the more common fertilise grade material on which the EFMA standards are based. Approximately 10% of the prilling tower air is taken as a bleed from the recycle system after the tower scrubber and passed to the inlet of the drying air scrubber. This concept results in a significant decrease in the total airflow to atmosphere compared with the conventional plant design, but with a somewhat higher particulate concentration of 50 mg/Nm^3. The benefit of this concept is that the expected mass load emitted is 0.23 kg per tonne of product, or less than half the BAT emission rate of 0.5 kg/t.

As provided in the PER document, the stack airflow will be approximately 200,000 Nm^3/h or 225,700 m^3/h at actual stack conditions. At 50 mg/Nm^3 this equates to an emission rate of 2.8 g/s. This compares with the total emission from the existing prilling plant (which has a production capacity of approximately 50% of the new plant) of 4.67 g/s.

The other aspect of public concern with particulates emissions is the visibility of the aerosol plume from the existing prilling tower. By adopting the air recycle concept for the new plant, and combining all airflows into a single stack, the aerosol

contribution to the plant stack will be minimised. However, it is acknowledged that the use of a wet scrubber prior to discharge will, in periods of high humidity, result in a visible vapour plume. This vapour plume will rapidly disperse in normal weather conditions, and in fact for most of the time should be barely visible.

2.2 Air Emissions

Submission 2

The PER states "At present only one monitoring station (South Lake) is used to monitor PM_{10} concentrations and this indicates that the highest measured 24-hour average concentration is in the order of 45 ug/m3 which is below the NEPM standard of 50 ug/m3." South Lake is a long way from Kwinana Industries, what are the PM_{10} concentrations at residential area's (sic) around the Kwinana Industrial Strip? KIC/Industries should urgently commence monitoring for PM_{10} and $PM_{2.5}$ at all KIC ambient monitoring stations. The monitoring stations should also monitor for oxides of nitrogen and ammonia.

Proponent Response

Whilst the South Lake monitoring station is a "long way" from CSBP our understanding is that the station was located there specifically to address any area of particulate emissions, albeit not directly related to CSBP (South Lake is downwind of the predominant wind direction for on shore winds in the Kwinana Industrial Area).

The State has just commenced a major monitoring program reviewing air borne contaminants in the Kwinana/Rockingham air shed, with the actual monitoring including particulates and NO_X. CSBP, through the Kwinana Industries Council (KIC) is making a significant financial contribution to this study.

The planned regular public reports of progress with this monitoring is, in CSBP's view, the best way to determine if there are any health related issues in the Kwinana air shed.

Submission 3

The last paragraph no page 55 of the PER discusses modelling and says because Dispmod is not capable of modelling deposition of particulate, ISC3 from USEPA was used. However, given that this model does not consider coastal fumigation effects, does this mean that monitoring done for particulate impact/concentrations at locations inland of the plant are not accurate? Why is it stated on page 58, 6th paragraph The Dispmod model was used to predict the annual average ground level concentrations of $PM_{2.5}$ when the above statement from PER says Dispmod is not capable of monitoring particulate?

Proponent Response

The primary purpose of the particulate deposition modelling was to determine the likely load of nitrogen deposited into Cockburn Sound after implementation of the proposal. Since coastal fumigation effects are only relevant to locations inland of the emission source, the failure of ISC3 Prime to consider these effects is not significant.

Dispmod, which does consider coastal fumigation effects, was used to determine PM_{10} and $PM_{2.5}$ impacts inland of the emission source. An assumption was made that particulates of this size act as gaseous contaminants, and the model's limitation of being unable to account for deposition was therefore irrelevant. Treating small particles as gaseous contaminants is a well-documented acceptable procedure in air dispersion modelling.

Submission 4

Continuous on line monitors should be installed to monitor for Ammonia, oxides of nitrogen and $PM_{2.5}$ for the proposed and existing plant

Proponent Response

It is CSBP's plan to install continuously operating instruments for the monitoring of oxides of nitrogen in the new plant similar to that installed in the existing nitric acid plant.

In our existing prill plant we do not detect any ammonia emissions through the stacks. In the new plant we will test for ammonia during normal stack testing and based upon the results consider installing a continuous system in consultation with the regulating authority.

We have been in contact with the prill plant technology supplier about continuous equipment for monitoring $PM_{2.5}$ in the stack, however, the supplier is not aware of any system capable of monitoring in the stack. As with the existing plant regular stack tests to measure total particulates will be conducted in agreement with the environmental license issued by the Department of Environment.

Submission 5

The PER states that at the time of the PER preparation the proposed scrubbing technology for new prilling tower was still being discussed with the technology providers. Is CSBP now in a position to outline the preferred technology? Does CSBP currently manufacture some fertiliser grade ammonium nitrate which is reported to have higher emissions of particulates than the low density grade ammonium nitrate? CSBP should adopt Best Available Technology for the new prilling tower given that emissions from the exiting plant have been a long-term source of complaints.

Proponent Response

The waste air from pre-dryer and dryer is sent to the drying air scrubber to be washed to remove ammonium nitrate dust and ammonia. Bleed air from the prilling tower air

circulation system is also passed to the drying air scrubber. The details of this scrubber are still to be finalised in discussions between CSBP and Uhde. CSBP has decided to use a unit with two stages of scrubber rather than Uhde's standard single stage packed bed scrubber in order to further reduce emissions of particulates and ammonia.

After treatment, the waste air is discharged to atmosphere via the drying air scrubber fan the stack, which runs to a height above the top of the prilling tower.

The drying air scrubber will be designed to have a particulates concentration below the level of 50 mg/Nm^3 specified in the PER and to achieve a total mass emission rate better than 0.23 kg per tonne of product ammonium nitrate. The European Fertilizer Manufacturing Association's Best Available Techniques for prilling plants sets a maximum total mass emission of 0.5 kg per tonne of product. The scrubber to be provided by Uhde, in conjunction with Uhde's concept of air circulation for the prilling tower, will achieve less than half the BAT emissions rate. A high level of reliability will result from the use of two beds in this scrubber.

CSBP no longer manufactures fertiliser grade ammonium nitrate, and does not intend to do so in the future. Hence, there is no need to consider emissions resulting from this product. More detail on this matter is included in our response to Submission 1.

Submission 6

The City of Rockingham has concerns about airborne emissions, such as oxides of nitrogen and ammonia given the proximity to residential areas. The City notes the findings of the PER that the emission levels for both these gases are to be within acceptable levels. It is important that these and other emissions are regularly monitored and that the results be made available to the community.

Proponent Response

The results of the air shed modelling reported in this PER clearly indicate that all of the relevant contaminant emissions are well below relevant health guidelines at residential locations, either in Rockingham or Kwinana.

Aside from the State sponsored ambient air shed modelling that CSBP is contributing to through KIC, CSBP will monitor emissions from these proposed plants in accord with our strict EP Act Licence. This monitoring information, like the licence requiring it, is available publicly through DoE, although CSBP now provides it on request.

2.3 Greenhouse Gas Emissions

Submission 7

The European Commission recommends that catalyst gauzes be replaced regularly (at least 2-4 times per year) to maintain a high nitric oxide yield and minimise nitrous oxide emissions. How frequently are the platinum gauzes relaced in the existing nitric acid plant and what triggers their replacement. CSBP should commit to replacing gauzes in the proposed new plant as soon as performance starts to deteriorate

Proponent Response

Nitric acid plants are designed to operate at different pressures, temperatures and catalyst gas loadings. Different operating conditions in different nitric acid plants result in catalyst change-out frequencies that vary from a few weeks in some plants to over a year in others. Ammonia conversion efficiency is generally stable over most of the design life of a charge of catalyst. Deterioration in conversion efficiency is used as the trigger to replace the catalyst pack. The catalyst charge in the nitric acid plant at CSBP is changed out every four to five months.

Submission 8

The European IPCC (2004) paper referenced in the PER refers to a Hydro Agri 2000 t/day plant that was constructed in Norway in 1992. The tail gas abatement reactor is now reported to reduce nitrous oxide emissions by 90% (NOXCONF 2001). The reactor apparently has no effect on the nitric oxide yield and the oxides of nitrogen concentration. It is noted that the technology cannot be adapted to the low temperature tail gas technology that is proposed by Grande Paroisse. Why not adopt the Hydro Agri technology for the proposed new nitric acid plant?

Proponent Response

A number of nitrous oxide abatement technologies are currently being developed and trialled for nitric acid plants. CSBP has selected the technology for nitric acid production based on a number of factors including plant efficiency, reliability, safety and the added benefits of a duplication of existing technology and equipment. CSBP's second nitric acid plant will be designed to incorporate new nitrous oxide abatement technology that is located in the ammonia reactor once this technology becomes technically and commercially viable.

Submission 9

CSBP should commit to undertake specific greenhouse gas offsets should nitrous oxide reduction technology not be commercially feasible and available within a given timeframe, say 5 years)

Proponent Response

CSBP views the issues of greenhouse gas mitigation as a national and international issue. The EPA's view on greenhouse gas mitigation is developing, but it remains the case that Western Australia acting independently in this area could dramatically affect

the competitiveness of import replacement industries such as CSBP's proposed ammonium nitrate expansion project.

There is also a need for national consistency because a similar environmental review document recently published for an ammonium nitrate plant proposed for Gladstone in Queensland did not address greenhouse gas emissions (Sinclair Knight Merz, 2004).

The technologies for N_2O will be included in its next round of greenhouse gas mitigation policies (due 2008), so the European based technology providers are all developing specific systems (including Grand Paroisse, our technology provider, which operates its own nitric acid plants in Europe).

CSBP has put forward a realistic greenhouse gas management position – our intention is to fit these N_2O reduction technologies to the new plant when they are commercially viable, which CSBP believes will be only a few years away.

Submission 10

The proposal that CSBP provide a Best Available Technology (BAT) report to the EPA every 2 years or until the new technology is adopted or the EPA advises that the report is no longer required, is supported by the Town of Kwinana.

Proponent Response

CSBP made the commitment to report on nitrous oxide abatement technologies regularly to the EPA because this field of technology is rapidly developing, and has a mixture of technical, commercial, regulatory and inter governmental elements to it that will be unlikely to settle into an established pattern in the next 3 or 4 years.

Given this situation, regular status reports to the EPA provide both an update of CSBP's own perspective and progress, and the international development and deployment of these technologies.

CSBP's position remains that it should not be forced to adopt technologies that may not be commercially or technically viable, when so much development in this field is currently subject to commercial in confidence agreements, or is only at pilot scale.

Submission 11

The City of Rockingham is concerned about the additional greenhouse gases emitted due to the expansion of the Ammonium Nitrate Production facility. The PER notes that due to the absence of technological improvements in reducing nitrous oxide emissions, a worse case scenario could see a doubling in nitrous oxide emitted from the facility, producing a total of over 1.5 Mega tonnes per annum of carbon dioxide equivalent (1.5 Mtpa CO_2-e). The City seeks confirmation that these emission levels meet appropriate Environmental Protection Authority (EPA) standards.

Proponent Response

CSBP is aware that the EPA's position on greenhouse gas emissions is developing and, in the proposal we have made, the stated EPA policy positions are addressed. The proposed technology solution for N_2O, when commercially viable, provides large reductions in greenhouse gas emissions.

In these deliberations it is important to ensure that Australian industry is not disadvantaged compared to international suppliers, because the potential for a trend to off shore manufacture does exist whilst still creating the same (or higher) greenhouse gas emissions.

Submission 12

Given the increase in greenhouse gas emissions, it is unclear in the PER just what mitigatory actions are intended to offset these increases. Mitigation for the increased emissions from the proposal should be fully detailed and reported.

Proponent Response

Please note the proponent response to submissions 9, 10 and 11, which also address this point.

2.4 Noise

Submission 13

The noise from CSBP current operations is a significant contribution to an exceedance of the cumulative assigned noise level in Medina. Surely this will only get worse with additional plant?

Proponent Response

(Response below extracted from pages 85 - 86 of PER)

The 2001 KIC noise study (SVT, 2001) and Kwinana acoustic model predicted noise levels at residential receiver locations under a range of weather conditions. A summary of the predicted and measured noise levels from the KIC report, together with the current predicted CSBP noise emissions are provided in Table 23 for comparison purposes. The significant noise reductions achieved at CSBP since the original study are reflected in the much lower predicted noise levels at the residential receiver locations.

TABLE 23
COMPARISON OF OPERATIONAL NOISE AT RESIDENTIAL PREMISES

Residential Receiver Location	Wind Direction / Speed Inversion Lapse Rate	KIC Overall Level 2001 (L_{A10})	KIC CSBP Contribution 2001 (L_{A10})	CSBP Expansion Contribution 2005 (L_{A10})
Calista (predicted)	W 3 2	43.5	38.9	29.5

Calista (KIC measured)	W 2 0	36		
Medina (predicted)	NW 3 2	48.0	38.0	31.0
Medina (KIC measured)	NW 2 0	44		

The above figures show that has been a reduction in predicted noise level at Calista due to CSBP operations from 38.9 to 29.5 L_{A10}. At a level of 29.5 L_{A10} the CSBP noise emissions are not technically classified as 'significantly contributing' and comply with the Regulation 'assigned level' of 35 L_{A10} at Calista residences. The contributing source ranking from the KIC report (SVT, 2001) changes from 1st ranked contributor to 4th ranked contributor (assuming other industry noise emissions are unchanged).

For Medina, the figures show that there has been a reduction in predicted noise level due to CSBP operations from 38.0 to 31.0 L_{A10}. At a level of 31.0 L_{A10} the CSBP noise emissions are technically classified as 'significantly contributing' to the Regulation 'assigned level' of 35 L_{A10} at Medina residences. However at 31.0 L_{A10}, the noise contribution from CSBP would be more than 5 dB(A) less than the overall noise level (based on KIC measured / predicted levels (and unlikely to be audible. The contributing source ranking from the KIC report changes from 1st ranked contributor to 5th ranked contributor (assuming other industry noise emissions are unchanged).

The reductions in noise received at residential locations over recent years (since the 2001 KIC acoustic report (SVT, 2001)) are due to noise control measures implemented by CSBP. The high initial noise emission levels were due in part to a newly commissioned plant that was emitting more noise than anticipated due to contractor design issues. The proposed Ammonium Nitrate Production Facility expansion is expected to have a negligible effect on noise emissions from the CSBP industrial complex.

Submission 14

CSBP has reduced noise levels from some items of equipment on the site since the Kwinana Industries Council (KIC) cumulative noise model was published in 2001. Additional noise from the proposed upgraded plant is not predicted to be audible in Medina but there is no mention regarding North Rockingham which is closer to the site than Medina. The noise should be required to be included in the KIC cumulative noise model to ensure that all residential noise sensitive properties are not adversely impacted upon in the long term from industrial developments.

Proponent Response

Herring Storer Acoustics when undertaking the noise emission study for the proposed expansion modelled all relevant residential locations including North Rockingham. Medina will be the closest residential area to the proposed facility, which will be located towards the north of the CSBP industrial complex.

The PER document makes reference to Medina being the only location where noise from the expanded facility could be a significant contributor to overall noise at residential premises, but the conclusion reached is that other sources impacting on that location are such that CSBP's contribution would be "inaudible at Medina".

CSBP is contributing to the current (April/May 2005) review of the KIC noise model, which will take into account changes in all heavy industry since the previous study.

See also Proponent Response to Submission 13.

Submission 15

The City of Rockingham considers the impacts of the proposal on the residents of North-east Rockingham and Hillman are of most concern. The KIC produced the report 'Cumulative Noise Model of the Kwinana Industrial Area' which modelled the cumulative noise levels from the existing industries at Kwinana in 2001. That study indicated that the cumulative noise at North-east Rockingham exceeded the allowed levels between 8% and 30% of time at night-time depending on season (winter being the worst). Cumulative modeling for noise impacts was undertaken as part of the PER the expansion of the Ammonium Nitrate Facility for Medina and Calista but not for North-east Rockingham or Hillman. This appears to be because the former areas are marginally closer to CSBP's plant. This doesn't take into account the finding that the 2001 KIC study demonstrated that North-east Rockingham experienced the worst cumulative noise exceedances in the region. The impact of the expansion of the Ammonium Nitrate Facility on North-east Rockingham and Hillman for cumulative noise should be modeled and reported.

Proponent Response

Please refer to the Proponents Response to Submissions 13 and 14, which address the points raised in this submission.

Submission 16

The Town of Kwinana recommends that CSBP include all noise data from the proposed development/s within the KIC cumulative noise model for maintaining the industry noise emission levels acceptable for noise sensitive residential areas.

Proponent Response

CSBP is currently participating in the review of the KIC noise model, and will provide all relevant data into that process.

Submission 17

It is unclear whether a Noise Management Plan (prepared in conjunction with the Department of Environment) currently exists for the CSBP Industrial Complex. If not, then such a management plan should be introduced as part of the expansion of the Ammonium Nitrate Facility.)

Proponent Response

There is currently no CSBP Noise Management Plan for the CSBP Kwinana industrial complex, as CSBP has dealt with issues as they are identified. CSBP will cooperate with any DoE request to develop such a plan, but for our own purposes will continue with our monitoring and improvement program for noise, both for occupational health and safety and environmental protection reasons.

Submission 18

The PER does not mention adjustments tonal, frequency modulation, impulse, etc on predicted noise outputs.

Proponent Response

All of the factors relating to modelling of industrial noise emissions were incorporated into the model used for this project. Should the submitter wish to be informed about the actual data used he/she can contact C. Schuster at CSBP, and a meeting with the consultant will be arranged.

There is expected to be a very high level of accuracy for this modelling because it was based on actual noise emissions from the existing plants within the Ammonium Nitrate Production Facility on the CSBP Kwinana industrial complex.

Submission 19

The City of Rockingham is concerned that additional noise associated with construction and traffic (both shipping and road) will impact on Rockingham residents.

Proponent Response

CSBP has detailed both expected construction, and expected operational traffic movements from this proposal in the PER. All are well within the capacity of the road system, and in reality most of the traffic will move to and from CSBP to the north, apart from workers who may live in Rockingham or points south, and contractors/suppliers who operate from Rockingham.

2.5 Risk

Submission 20

The Town of Kwinana recommends that risk be assessed against the New South Wales Department of Planning "Risk Criteria for land use planning – Hazardous Industry Advisory Paper No. 4" to the satisfaction of DoIR.

Proponent Response

The existing CSBP Ammonium Nitrate Production Facility is classified as a major hazard facility under the *Control of Major Hazard Facilities National Standard,*

which is administered in Western Australia by DoIR and therefore CSBP requires DoIR's approval for the expansion of this facility.

CSBP is aware that DoIR is considering the *New South Wales Department of Planning "Risk Criteria for land use planning – Hazardous Industry Advisory Paper No. 4* and its application in Western Australia. DoIR may therefore take into account the *New South Wales Department of Planning "Risk Criteria for land use planning – Hazardous Industry Advisory Paper No. 4"* when considering the CSBP application for approval of the proposed expansion.

CSBP has designed the proposed expansion to have a very positive impact on reducing the already acceptable risk profiles on the CSBP Kwinana industrial complex, to meet the EPA criteria, using modelling techniques known and understood by DoIR.

It is CSBP's view that the proposal should be assessed under the current Western Australian provisions, not withstanding CSBP's application of the continuous improvement policy and practice.

Submission 21

Given the nature of CSBP's industrial complex and the various chemicals stored on site, it is important that CSBP have strategies and actions in place to minimise any potential hazards associated with the operation and expansion of the Ammonium Nitrate facility. The City of Rockingham is an important stakeholder and as such, requests that CSBP fully inform the City of such strategies and actions being taken to minimize hazards associated with the expansion of the facility, and that it maintain a close liaison with the City's Fire and Emergency Administration Officer in this regard.

Proponent Response

CSBP, as detailed in the PER, adopts a progressive approach to public safety, and the relevant regulators. CSBP operates its Major Hazard Facilities under Safety Cases, and Safety Management Systems endorsed by DoIR, and maintains a strong and positive relationship with FESA.
CSBP will arrange for the City of Rockingham to receive the briefing requested, while at the same time maintaining our existing links to the Rockingham Local Emergency Management Committee.

2.6 Water Management

Submission 22

The Town of Kwinana recommends that given the vast areas of sealed land on the site, CSBP should investigate the collection and use of stormwater in their processes based on sustainable principles.

Proponent Response

CSBP captures and reuses the industrial effluents created in its business that are highest in nutrient content for recycling into fertilisers. The Kwinana site has an extensive area of buildings and sealed surfaces, which create large and immediate flows when it rains – the storage required to capture these initial flows is beyond the capacity of our site to construct and manage. The only rainfall reuse available will come from a current plan to use our concrete holding ponds for nutrient rich wastewaters destined for recycling – some rainfall will be captured with this water.

Submission 23

The PER provides details on the total existing and proposed water usage for the ammonium nitrate production facility. What is the quantity and quality of the waste water discharge for the existing and proposed nitric acid plants i.e. What chemical additives, such as phosphates, will be in the discharge?

Proponent Response

All high nutrient wastewater will be collected within the plant boundaries and be re-processed either within the facility itself or consumed in CSBP's fertiliser plant. Wastewater leaving the plants is limited to cooling tower blow down with only minor amounts of phosphates (10 - 15 mg/l) and dispersant polymer (approximately 15 ppm). The total amount of cooling tower blow down is about 0.18 Gl/year from the existing nitric acid plant cooling tower. With the second plant and the switch to combine the existing water source with a new one from the Kwinana Water Recycling Plant it is expected that the total amount of blow down will be reduced to 0.14 Gl/year, with the additive concentrations remaining similar to now. Some of the clean process condensate from the ammonium nitrate plant is utilised as cooling tower makeup. The nitrogen load in this stream is approximately 600 kilograms per year and this is expected to double when the new plant is in production.

Submission 24

Any wastewater discharge into Cockburn Sound should be minimized and meet the requirements of the State Environmental (Cockburn Sound) Policy 2005 (and respective water quality guidelines). Wastewater discharged into the Sepia Depression Ocean Outfall Line (SDOOL) should meet the criteria and standards set for this outfall by the State Government

Proponent Response

The comments are noted, and CSBP agrees. Our internal processes, EP Act License and agreement with WAWC to discharge effluent to SDOOL (including the Ministerial approval for this) all required the comments in the submission to be met.

2.7 Construction Environmental Management Plan

Submission 25

The City of Rockingham requests the opportunity to comment on the Construction Environmental Management Plan for the expansion of the Ammonium Nitrate facility during the preparation of the management plan.

Proponent Response

CSBP will offer the City of Rockingham the opportunity to comment on a draft of the Construction Management Plan when it is prepared.

2.8 Sustainability

Submission 26

The Town of Kwinana welcomes the sustainability assessment and recommends that it be a requirement for all environmental impact assessment.

Proponent Response

CSBP believes the sustainability initial assessment we prepared is an EPA requirement for all major projects in Western Australia, and believes this is a positive initiative by the EPA.

Submission 27

The Town of Kwinana recommends that the sustainability process includes the proponents Corporate Social Responsibility within the sustainability assessment and checklist and includes the manner in which CSBP will meet its local component of satisfying its Corporate Social Responsibility (AS 8003 2003) so as provide real environmental and social gains for the community ie contributions to the development, rehabilitation and maintenance of Long Swamp or similar projects, for the increase in environmental emissions created by their industrial activities at Kwinana Beach.

Proponent Response

CSBP completed the initial sustainability assessment to the requirements of the EPA, which CSBP believes are appropriate for the current legal structures in Western Australia.

Outside this process CSBP, as part of the Wesfarmers group, publishes an Annual Social Responsibility Report, which details our achievements and progress in environmental, safety and community programs. In particular, CSBP is a strong supporter of local community activities in the Kwinana/Rockingham area, and is of course a major employer and user of contracts and services from the Region.

Submission 28

The Town of Kwinana recommends that each development should have an identified environmental and social gain as part of the social responsibility to offset the environmental emissions that the community receives from the proposed development for the life of the project.)

Proponent Response

Please refer to response to Submission 27.

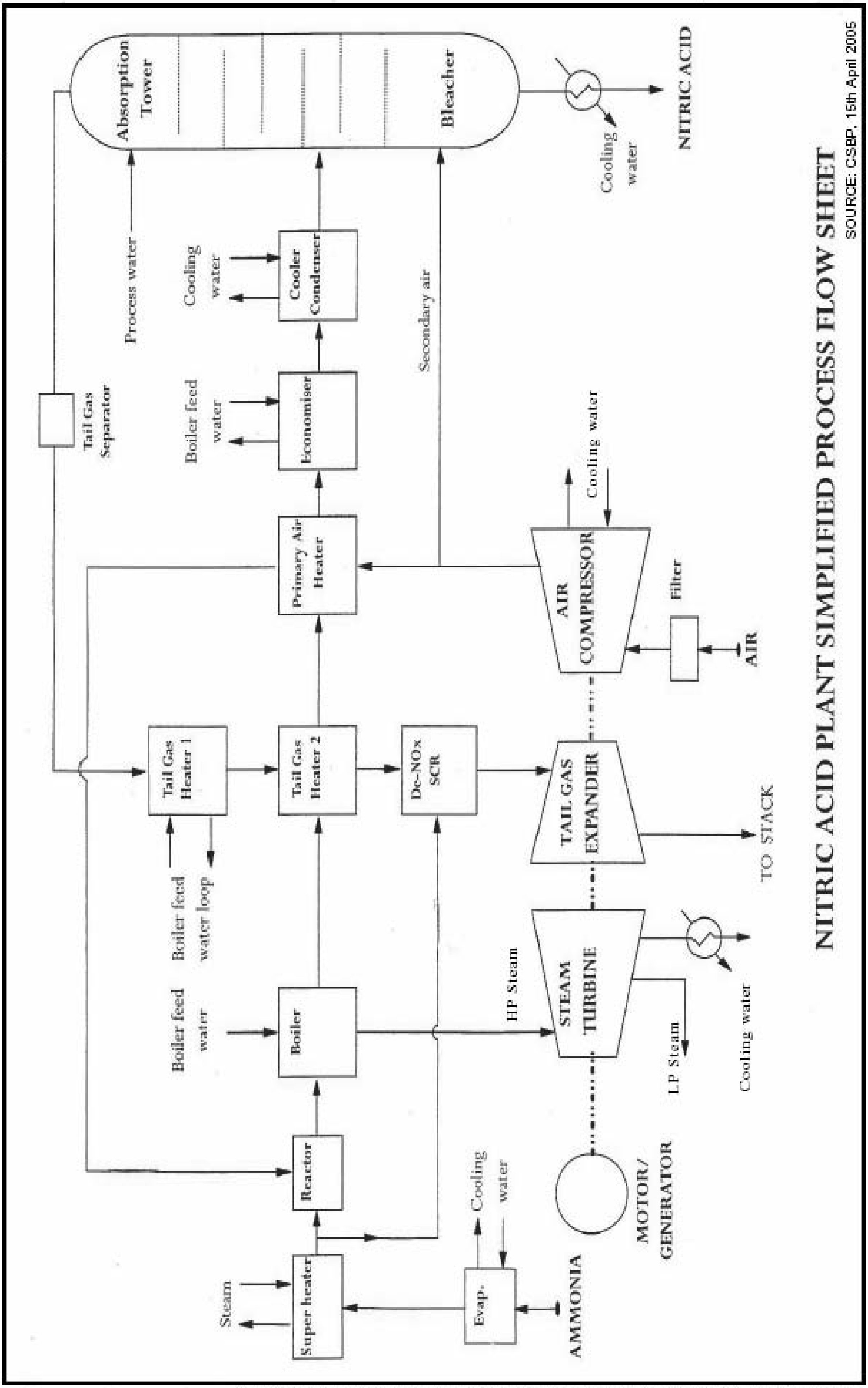
3. REFERENCES

SVT (2001) *Cumulative Noise Model of the Kwinana Industrial Area for Kwinana Industries Council*. November 2001.

Sinclair Knight Merz (2004) *Environmental Impact Statement – Orica Ammonium Nitrate Complex – Yarwun Upgrade to 600KTPA*. December 2004.

FIGURES

CSB-2004-005/LIAI/25_61F1.dgn DATUM: Not Applicable DRAWN BY: GLM 20-4-05 CHECKED BY: LM 20-4-05 PRINTED: Wed 20 Apr 05



NITRIC ACID PLANT SIMPLIFIED PROCESS FLOW SHEET

SOURCE: CSBP, 15th April 2005

ATA Environmental
environmental scientists

AMMONIUM NITRATE PRODUCTION FACILITY EXPANSION PROJECT
RESPONCES TO SUBMISSIONS (EPA Assessment No. 1537)

SIMPLIFIED PROCESS FLOW DIAGRAM FOR THE NITRIC ACID PLANT

FIGURE 1

CSB-2004-005/LIAI/25_61F2.dgn DATUM: Not Applicable DRAWN BY: GLM 20-4-05 CHECKED BY: LM 20-4-05 PRINTED: Wed 20 Apr 05

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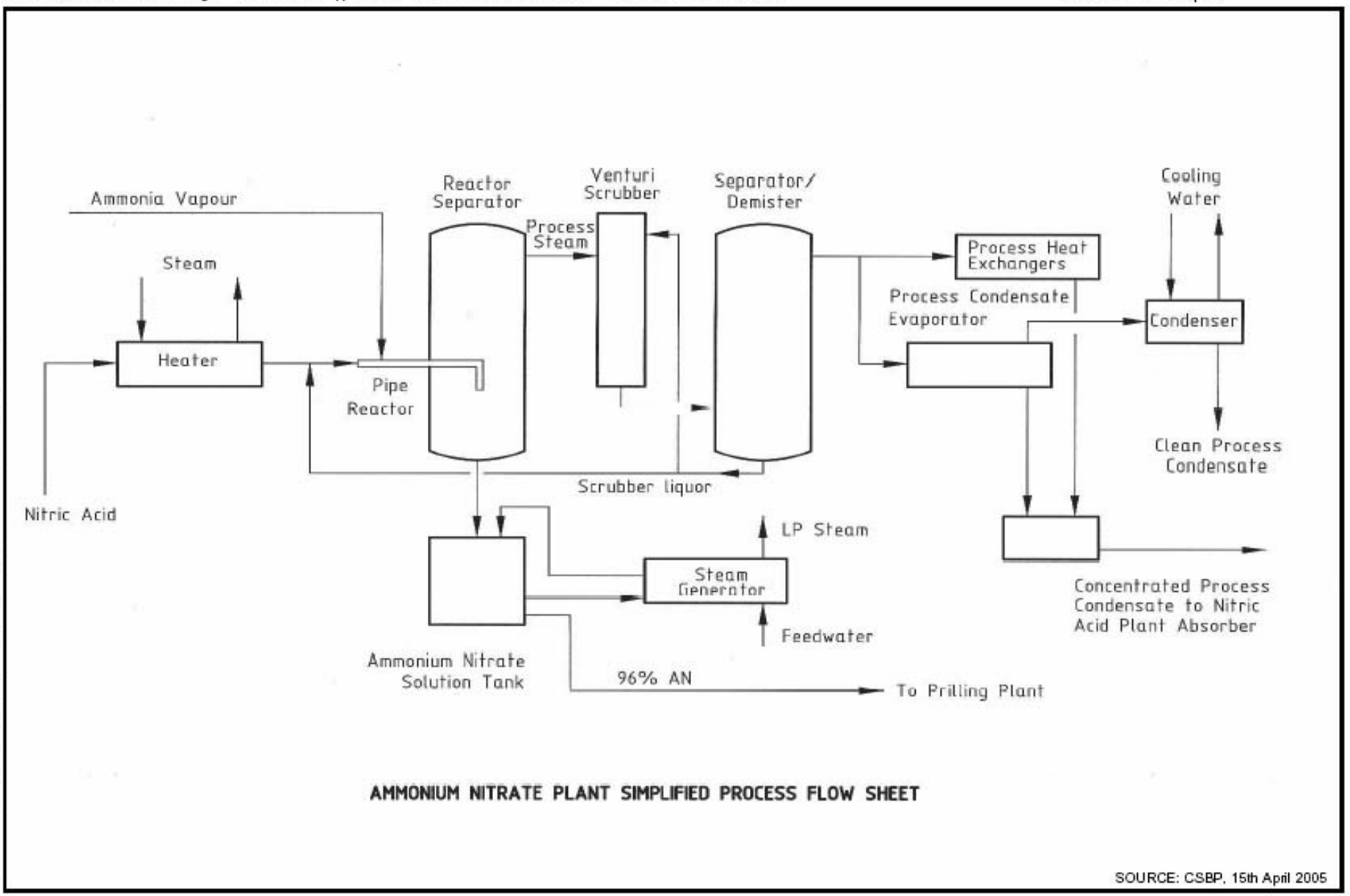
AMMONIUM NITRATE PRODUCTION FACILITY EXPANSION PROJECT
RESPONCES TO SUBMISSIONS (EPA Assessment No. 1537)

SIMPLIFIED PROCESS FLOW DIAGRAM FOR THE AMMONIUM NITRATE SOLUTION PLANT

FIGURE 2



AMMONIUM NITRATE PLANT SIMPLIFIED PROCESS FLOW SHEET

SOURCE: CSBP, 15th April 2005

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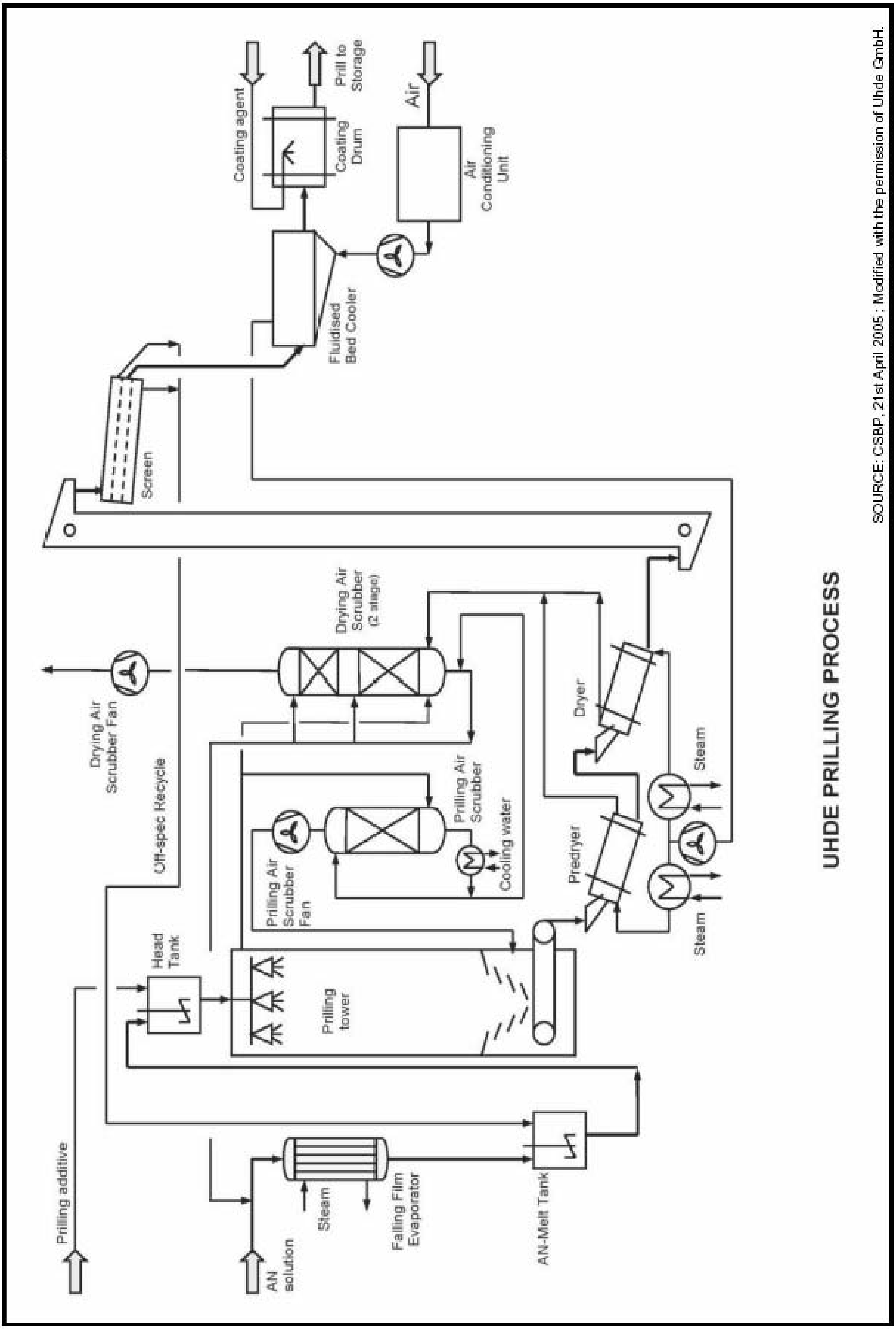

ATA Environmental
environmental scientists

AMMONIUM NITRATE PRODUCTION FACILITY EXPANSION PROJECT
RESPONCES TO SUBMISSIONS (EPA Assessment No. 1537)

SIMPLIFIED PROCESS FLOW DIAGRAM FOR THE NEW PRILLING PLANT

FIGURE 3