



# Report and recommendations of the Environmental Protection Authority



## Ammonium Nitrate Production Expansion Project: Phase 2, Kwinana

**CSBP Limited**

Report 1407  
July 2011

## Public Environmental Review Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
10/05/10	Level of assessment set	
07/09/10	Final environmental scoping document (ESD) approved	17
22/11/10	Public Environmental Review (PER) document released for public review	11
31/01/11	Public review period for PER document closed	10
06/04/11	Final proponent response to PER issues raised	9
18/07/11	Publication of EPA report	15
01/08/11	Close of appeals period	2

Timelines for an assessment may vary according to the complexity of the project and are usually agreed with the proponent soon after the level of assessment is determined.

In this case, the Environmental Protection Authority did not meet its timeline objective in the completion of the assessment and provision of a report to the Minister.



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## Summary and recommendations

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for Environment on the proposal by CSBP Limited to expand its Kwinana Ammonium Nitrate Production Facility (ANPF). The expansion includes the incorporation of additional components into the existing facility and re-engineering (debottlenecking) some existing components in order to increase ammonium nitrate production capacity from 520,000 tonnes per annum (tpa) to 936,000 tpa.

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for Environment on the outcome of its assessment of a proposal. The report must set out:

- The key environmental factors identified in the course of the assessment; and
- The EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may include in the report any other advice and recommendations as it sees fit.

The EPA is also required to have regard for the principles set out in section 4A of the EP Act.

### ***Key environmental factors and principles***

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

- (a) air quality;
- (b) noise;
- (c) liquid waste disposal;
- (d) water supply; and
- (e) greenhouse gas emissions.

There were a number of other factors which were relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

The following principles were considered by the EPA in relation to the proposal:

- (a) the precautionary principle;
- (b) principles relating to improved valuation, pricing and incentive mechanisms; and
- (c) the principle of waste minimisation.

### **Conclusion**

The EPA has considered the proposal by CSBP Limited to expand its ANPF by incorporating additional components into the existing facility and re-engineering (debottlenecking) some existing components in order to increase ammonium nitrate production capacity from 520,000 tpa to 936,000 tpa.

#### *Air quality*

Predicted 1-hour average nitrogen dioxide (NO<sub>2</sub>) ground level concentrations (GLCs) with the proposed expanded ANPF operating in isolation under normal, start-up, or shut-down conditions are below the applicable National Environment Protection Measure (NEPM) standard of 246 micrograms per cubic metre (µg/m<sup>3</sup>). Predicted cumulative 1-hour average NO<sub>2</sub> GLCs at Hope Valley and North Rockingham with the proposed expanded ANPF operating under normal operating conditions are equivalent to about 75.2% and 52.4% of the NEPM standard, respectively. Predicted maximum annual average NO<sub>2</sub> GLCs at Hope Valley and North Rockingham are below the applicable NEPM standard of 62 µg/m<sup>3</sup>.

The incremental change in oxides of nitrogen (NO<sub>x</sub>) emissions due to the expanded ANPF is expected to have a very small impact on photochemical smog production.

Maximum offsite 1-hour average and annual average ammonia (NH<sub>3</sub>) GLCs are predicted to be well below applicable criteria when the expanded ANPF is considered in isolation under normal operating conditions. The maximum cumulative annual average NH<sub>3</sub> GLC at Wells Park would also be well below applicable criteria under normal operating conditions.

The maximum offsite 24-hour average and annual average particulate matter (PM) (as PM<sub>2.5</sub>) GLCs are predicted to be below the applicable NEPM advisory reporting standard when the expanded ANPF is considered in isolation under normal operating conditions. Cumulative air quality modelling predicts that under normal operating conditions, the maximum 24-hour average PM<sub>10</sub> GLC at Abercrombie Road would be above the applicable NEPM standard. However, the above exceedance is largely attributable to the high maximum ambient monitored PM<sub>10</sub> GLC which is due to existing sources.

Selective catalytic reactors (SCRs) are currently being used in the two existing nitric acid plants within the ANPF and the proponent intends to employ a SCR in the proposed third nitric acid plant in order to reduce its NO<sub>x</sub> emissions. The European Commission Reference Document on Best Available Techniques for the Manufacture of Large Volume Inorganic Chemicals - Ammonia, Acids and Fertilisers (European Commission, 2007) indicates that SCRs are considered to be best available technology for minimising NO<sub>x</sub> levels in the tail gas emissions from nitric acid plants.

The expected NO<sub>x</sub> stack emission concentration of 58.4 parts per million by volume (ppmv) from the three ANPF nitric acid plant stacks under normal operating conditions is less than the applicable criteria of 100 ppmv listed in the European Fertilizer Manufacturers Association (EFMA) Best Available Techniques for Pollution Prevention and Control in the European Fertilizer Industry Booklet No. 2: Production of Nitric Acid (EFMA Booklet No. 2) and within the range of 5 to 75 ppmv (as NO<sub>2</sub>) specified in the (European Commission, 2007) reference document for new nitric acid plants.

The expected NH<sub>3</sub> stack emission concentration from the 2008 ammonium nitrate prilling plant stack of approximately 1 milligram per normal cubic metre (mg/Nm<sup>3</sup>) under normal operating conditions is less than the applicable criteria of 10 mg/Nm<sup>3</sup> listed in the EFMA Best Available Techniques for Pollution Prevention and Control in the European Fertilizer Industry Booklet No. 6: Production of Ammonium Nitrate and Calcium Ammonium Nitrate (EFMA Booklet No. 6) and less than the 4.25 to 6.55 mg/Nm<sup>3</sup> range specified in the (European Commission, 2007) reference document for prilling towers producing technical ammonium nitrate (TAN). The expected particulate stack emission concentration from the 2008 ammonium nitrate prilling plant stack of approximately 7.6 mg/Nm<sup>3</sup> is less than the applicable criteria of 15 mg/Nm<sup>3</sup> listed in EFMA Booklet No. 6 and greater than the applicable criteria of 5 mg/Nm<sup>3</sup> listed in the (European Commission, 2007) reference document. Although the expected particulate stack emission concentration is greater than the criteria listed in the (European Commission, 2007) reference document, modelling has shown that it is unlikely to pose an unacceptable risk to human health.

The EPA considers that stack emissions from the expanded ANPF can be adequately regulated through Part V of the EP Act (Prescribed Premises). The EPA expects the Department of Environment and Conservation (DEC) to amend the proponent's existing EP Act Licence 6107/1967/16 in order to include the proposed third nitric acid plant and NH<sub>3</sub> emissions from the 2008 ammonium nitrate prilling plant stack, and to account for the increased stack emissions from existing sources that would result from debottlenecking. The EPA also expects the DEC to set the stack emission concentration limits for both new and existing emission sources within EP Act Licence 6107/1967/16 such that they are commensurate with the use of best practice pollution control technology.

## *Noise*

The EPA considers that potential noise impacts from construction activities can be adequately managed subject to these activities being undertaken in accordance with the Environmental Protection (Noise) Regulations 1997 and Australian Standard 2436-1981: *Guide to Noise Control on Construction, Maintenance and Demolition Sites*.

Noise modelling predicts that under worst case night-time conditions noise emissions from the operating expanded ANPF would not significantly contribute to overall noise levels in residential receiver locations and would comply with the Environmental Protection (Noise) Regulations 1997.

Predicted noise levels at the nearest BP Refinery boundary due to the operating expanded ANPF are expected to comply with the DEC's proposed new industrial assigned level of 75 dB(A) provided that noise attenuation is undertaken within the CSBP Kwinana Industrial Complex (KIC) or at the northern boundary of the site. Although the proponent intends to finalise the required attenuation during the design phase of the proposed expansion, the EPA considers that, if it has not already done so, the proponent should investigate whether suitable noise attenuation measures are available to ensure compliance with the existing  $L_{A10}$  assigned level of 65 dB(A) in the event that the DEC's review of the noise regulations does not result in the level increasing to 75 dB(A). The proponent should also be required to demonstrate that noise levels at the nearest BP Refinery boundary due to the operating expanded ANPF would comply with the existing noise regulations with currently available noise attenuation measures. The EPA recommends that the DEC incorporates the above requirements into the Works Approval for the proposed expansion.

## *Liquid waste disposal*

The quantity and composition of the wastewater that would be discharged into the Sepia Depression Ocean Outlet Landline (SDOOL) as a result of the proposal is expected to continue to comply with the relevant marine pollution control conditions within the proponent's existing Licence 6107/1967/16. The EPA understands that the contaminant loads that would be discharged as a result of the proposal and the proposed increase in discharge volume to 2.4 megalitres (ML) per day are expected to remain within current licence limits based on current average contaminant concentrations.

The EPA considers that the increased quantity of liquid waste that would be discharged from the CSBP KIC as a result of the proposed expansion of the ANPF can be adequately regulated under Part V of the EP Act via the provisions of the relevant marine pollution control related conditions within the proponent's existing Licence 6107/1967/16. The EPA would expect the DEC to amend Licence 6107/1967/16 to reflect the increased quantity of liquid waste that would be discharged from the CSBP KIC as a result of the proposal being implemented.

### *Water supply*

The proposed expansion of the ANPF would require an additional quantity of approximately 520 ML of water per year consisting of about 400 ML of water per year from the Kwinana Water Reclamation Plant (KWRP) and the remainder sourced from the superficial aquifer, the Western Power Corporation (WPC) Industrial Water Source, and scheme water. The EPA also notes that should the water supply from the KWRP be insufficient to meet the proposal's requirements, the shortfall would be addressed by sourcing water from the superficial and sub-artesian aquifers, the WPC Industrial Water Source, and scheme water. In this scenario the required quantity of water for the proposal would increase to approximately 1,500 to 1,900 ML per year depending on water quality and the extent of the shortfall in supply from the KWRP. The EPA is aware that the proponent has access to sufficient quantities of groundwater from the superficial and sub-artesian aquifers to supply water for the proposal within the allocation limits in its current *Rights in Water and Irrigation Act 1914* licences.

### *Greenhouse gas emissions*

The proponent has committed to trialling and installing secondary nitrous oxide (N<sub>2</sub>O) abatement technology into the two existing nitric acid plants and installing tertiary N<sub>2</sub>O abatement technology into the proposed new third nitric acid plant.

The quantity of greenhouse gas emissions generated by the expanded ANPF would increase by approximately 71% over that generated in 2009/2010 [i.e. from about 925,688 tonnes of CO<sub>2</sub>-e (carbon dioxide equivalent) per year to 1,586,000 tonnes of CO<sub>2</sub>-e per year] in the absence of secondary N<sub>2</sub>O abatement technology in the two existing nitric acid plants and tertiary N<sub>2</sub>O abatement technology in the proposed new third nitric acid plant, and with full debottlenecking of all the plants. The above quantity would reduce down to a predicted increase of about 20% over that generated in 2009/2010 with the installation of the proposed new third nitric acid plant with tertiary N<sub>2</sub>O abatement technology with no secondary N<sub>2</sub>O abatement technology installed in the two existing nitric acid plants, and with full debottlenecking of all the plants. Greenhouse gas emissions would be reduced by approximately 71% when compared to the amount generated in 2009/2010 (i.e. from about 925,688 tonnes of CO<sub>2</sub>-e per year down to 264,000 tonnes of CO<sub>2</sub>-e per year) once the installation of secondary N<sub>2</sub>O abatement technology in the two existing nitric acid plants and the construction of the proposed new third nitric acid plant with tertiary N<sub>2</sub>O abatement technology have been completed, and all the plants have been fully debottlenecked.

The proponent has advised the EPA that it has already installed secondary nitrous oxide (N<sub>2</sub>O) abatement technology into existing Nitric Acid Plant 2 and is currently working with the technology supplier to improve the performance of the catalyst in order to achieve the N<sub>2</sub>O reduction guaranteed by the supplier (CSBP Limited, 2011e). The proponent has also confirmed that it will

design and construct the proposed new third nitric acid plant to incorporate tertiary N<sub>2</sub>O abatement technology (CSBP Limited, 2011e).

Whilst the proponent has committed to ensuring that secondary N<sub>2</sub>O abatement technology is in place in the existing Nitric Acid Plants 1 and 2 once they have been fully debottlenecked, the EPA considers that recommended Condition 5-1 in Appendix 4 should be imposed on the proponent requiring the proponent to install secondary N<sub>2</sub>O abatement technology into the existing Nitric Acid Plants 1 and 2 prior to the commencement of debottlenecking procedures in these two plants. The EPA understands from the proponent that there is sufficient time for the installation and commissioning to occur before debottlenecking activities are undertaken. Recommended Condition 5-2 in Appendix 4 requires the proponent to provide the EPA with documentation which confirms the practical completion of the installation and commissioning of secondary N<sub>2</sub>O abatement technology in the existing Nitric Acid Plants 1 and 2.

The EPA also considers that recommended Condition 5-3 in Appendix 4 should be imposed on the proponent requiring a Greenhouse Gas Abatement Report to be prepared which meets the following objectives:

- demonstrates that maximising energy efficiency and opportunities for future energy recovery have been given due consideration in the design of the proposed expanded ANPF;
- ensures that the "greenhouse gas" intensity (i.e. tonnes of CO<sub>2</sub>-e produced per tonne of ammonium nitrate produced) is equivalent to, or better than benchmarked best practice; and
- achieves continuous improvement in "greenhouse gas" intensity through the periodic review, and if practicable, adoption of advances in technology and process management.

Recommended Condition 5-4 in Appendix 4 requires the proponent to make the Greenhouse Gas Abatement Report required by Condition 5-3 publicly available.

The EPA has also recommended a condition to ensure the final decommissioning and rehabilitation of the site.

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

## ***Recommendations***

That the Minister for Environment:

1. Notes that the proposal being assessed is for the expansion of CSBP Limited's ANPF via the incorporation of additional components into the existing facility and re-engineering (debottlenecking) some existing components in order to increase ammonium nitrate production capacity from 520,000 tpa to 936,000 tpa.
2. Considers the report on the key environmental factors as set out in Section 3.
3. Notes the EPA has concluded that it is likely that the EPA's objectives would be achieved, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4.
4. Imposes the conditions and procedures recommended in Appendix 4 of this report.

## ***Conditions***

Having considered 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 ANPF by incorporating additional components into the existing facility and re-engineering (debottlenecking) some existing components in order to increase ammonium nitrate production capacity from 520,000 tpa to 936,000 tpa, is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include greenhouse gas abatement and decommissioning.

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4. Identified decision-making authorities and recommended environmental conditions
5. Summary of submissions and proponent's response to submissions

# 1. Introduction and background

This report provides the advice and recommendations of the EPA to the Minister for Environment on the key environmental factors and principles for the proposal by CSBP Limited to expand its Kwinana Ammonium Nitrate Production Facility (ANPF). The expansion includes the incorporation of additional components into the existing facility and re-engineering (debottlenecking) some existing components in order to increase ammonium nitrate production capacity from 520,000 tonnes per annum (tpa) to 936,000 tpa. The proposal is located within the CSBP Kwinana Industrial Complex (KIC), approximately 40 kilometres (km) south of Perth (Figure 1).

The proposal was referred to the EPA on 28 April 2010, and on 10 May 2010 the level of assessment was set at Public Environmental Review (PER) under section 38 of the EP Act. The PER document was made available for a public review period of 10 weeks commencing on 22 November 2010 and ending on 31 January 2011. The EPA's decision to assess the proposal at the level of PER was based on 5 key environmental factors; air quality, noise, liquid waste disposal, groundwater, and greenhouse gas emissions.

CSBP & Farmers Ltd (now CSBP Limited) sought a Works Approval from the then Department of Environmental Protection (DEP) in March 1993 for the construction of new nitric acid and ammonium nitrate production facilities at its Kwinana site. Approval was granted in May 1993 via Works Approval 936 (File No. W44/67/5). A further Works Approval application was lodged in July 1994 in relation to the above project to cover it to the point of commissioning of the new facilities. Operations at the Kwinana ANPF were subject to conditions prescribed within EP Act Licence No. 6107/1967/13, which included environmental conditions for the management of air emissions and liquid and solid waste.

In 2004, CSBP Limited referred a proposal to expand the Kwinana ANPF to the EPA for assessment. The level of assessment was set at PER and the resulting Ministerial Statement No. 689 included requirements for the management of greenhouse gases, emissions of oxides of nitrogen and particulates, wastewater, and noise. This assessment was also followed by Works Approvals and licences for construction and operation, respectively.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the key environmental factors and principles for the proposal. The conditions to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Appendix 5 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 Limited proposes to expand its Kwinana Ammonium Nitrate Production Facility (ANPF) by incorporating additional components into the existing facility and re-engineering (debottlenecking) some existing components in order to increase ammonium nitrate production capacity from 520,000 tpa to 936,000 tpa.

The ANPF is located within the CSBP Kwinana Industrial Complex (KIC), approximately 40 km south of Perth (Figure 1). The CSBP KIC covers an area of approximately 138 hectares (ha) within the Kwinana Industrial Area (KIA). The proposal encompasses an area of approximately 1 ha within the CSBP KIC (Figure 2). A site plan of the CSBP KIC is shown in Figure 3.

The proposal requires the following changes to be made to the existing ANPF:

1. Debottlenecking of the existing nitric acid ammonium nitrate plants by 20% and construction of an additional nitric acid ammonium nitrate plant, which will then be debottlenecked by 20%, which would result in a total nitric acid production capacity of 720,000 tpa and a total ammonium nitrate solution production capacity of 936,000 tpa.
2. Debottlenecking of the 2008 prilling plant by 100% to double output.
3. Construction of an additional 3,500 tonne 100% nitric acid solution tank (to store 63% nitric acid solution).
4. Construction of an additional 305 cubic metre (m<sup>3</sup>) ammonium nitrate solution tank.
5. Construction of a new auxiliary boiler.
6. Construction of additional solid ammonium nitrate storage facility (within Dangerous Goods Licence approved limit).
7. Upgrade of the existing ammonium nitrate solid and solution despatch facilities.
8. Upgrade of existing utilities and supporting infrastructure and construction of new utilities and supporting infrastructure to support the expansion.

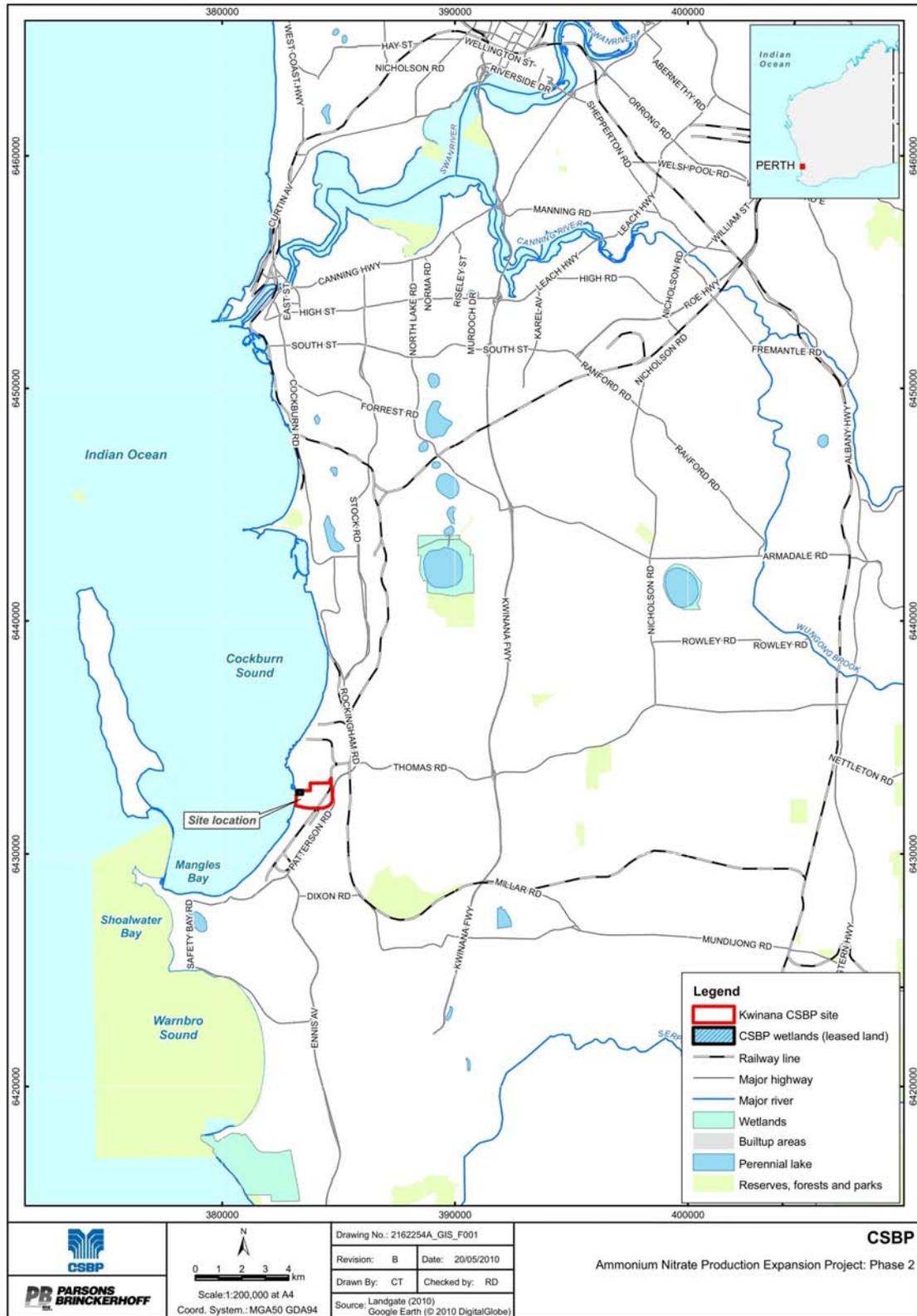
The PER document indicates that construction of the third nitric acid ammonium nitrate plant is planned to be completed before debottlenecking activities are undertaken on the existing nitric acid ammonium nitrate plants. Debottlenecking of the nitric acid ammonium nitrate plants would be undertaken as required to meet increased demand for product. There would be no increase in ammonia production or storage capacity on site.

The exact location of individual expansion components within the expansion boundary has not yet been confirmed by the proponent. However, all additional infrastructure for the proposed expansion would be located within the existing CSBP KIC and there will be no additional land acquisition or disturbance required.

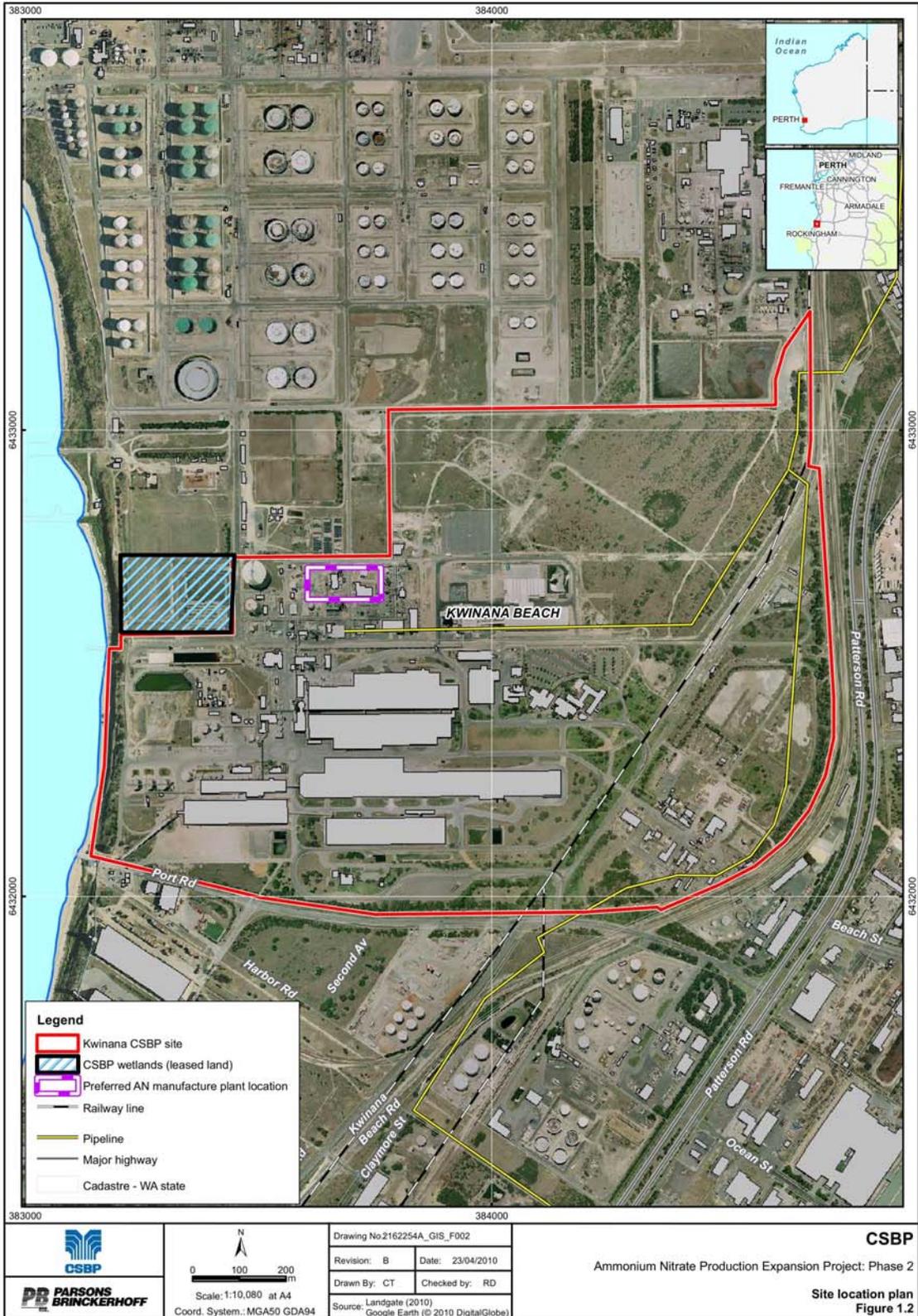
The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Chapter 1 - Section 5 of the PER document (Strategen & Parsons Brinckerhoff, 2010).

**Table 1: Summary of key proposal characteristics**

Element	Description		
<b>General</b>			
CSBP KIC site area	Approximately 138 ha.		
Proposal area	Approximately 1 ha within CSBP KIC site boundary.		
Project life	20 - 30 years.		
Plant operating hours	24 hours/day operation, 365 days per year, except for maintenance shutdowns.		
<b>Plant components</b>			
Nitric acid plants	Increase from two plants to three plants. The new third nitric acid plant will be designed and constructed to incorporate tertiary nitrous oxide (N <sub>2</sub> O) abatement technology.		
Nitric acid storage tanks	Increase in storage capacity from approximately 2,000 tonnes to 5,500 tonnes via construction of an additional 3,500 tonne 100% nitric acid solution tank (to store 63% nitric acid solution).		
Ammonium nitrate solution plants	Increase from two plants to three plants.		
Ammonium nitrate (90% solution) storage tanks	Increase from approximately 305 m <sup>3</sup> to 610 m <sup>3</sup> total capacity.		
Ammonium nitrate (70 - 90% solution) storage tank	Approximately 730 m <sup>3</sup> capacity (No change).		
2008 prilling plant	Debottlenecked.		
Ammonium nitrate bag packaging facility	No change to existing facility.		
Ammonium nitrate solids storage facility	Construction of an additional solid ammonium nitrate storage facility (within Dangerous Goods Licence approved limit).		
New auxiliary boiler			
<b>Production</b>			
Total nitric acid production	Increase from approximately 400,000 tpa to 720,000 tpa.		
Total ammonium nitrate solution production	Increase from approximately 520,000 tpa to 936,000 tpa.		
Total prilled ammonium nitrate production	Increase from approximately 420,000 tpa to 780,000 tpa.		
Net power generation	Increase from approximately 4 MW to 6 MW.		
<b>Inputs</b>			
Water	<p>Additional quantity of approximately 520 ML/yr above current usage of about 3,325 ML/yr consisting of about 400 ML/yr sourced from the Kwinana Water Reclamation Plant (KWRP) and the remainder sourced from the superficial aquifer, the Western Power Corporation (WPC) Industrial Water Source, and scheme water.</p> <p>Additional quantity of approximately 1,500 to 1,900 ML/yr above current usage of about 3,325 ML/yr if sufficient water cannot be obtained from the KWRP and it has to be sourced from the superficial and sub-artesian aquifers, the WPC Industrial Water Source, and scheme water.</p>		
<b>Outputs</b>			
Oxides of nitrogen (NO <sub>x</sub> )	Increase from approximately 269 tpa to 569 tpa.		
Ammonium nitrate particulates as PM <sub>2.5</sub>	Increase from approximately 12 tpa to 20 tpa.		
Ammonia (NH <sub>3</sub> )	Increase from approximately 12 tpa to 18 tpa.		
Greenhouse gas emissions	Decrease from approximately 925,688 tonnes of CO <sub>2</sub> -e per year down to approximately 264,000 tonnes of CO <sub>2</sub> -e per year for Scenario 3 in the PER document.		
Liquid waste	Increase from approximately 2 ML/day to 2.4 ML/day discharged via the Sepia Depression Ocean Outlet Landline (SDOOL).		
<b>Abbreviations</b>			
CO <sub>2</sub> -e	carbon dioxide equivalent	MW	megawatts (10 <sup>6</sup> watts)
ha	hectares	PER	Public Environmental Review
m <sup>3</sup>	cubic metres	PM <sub>2.5</sub>	particulate matter with an aerodynamic diameter of less than 2.5 micrometres
ML/day	megalitres per day	tpa	tonnes per annum
ML/yr	megalitres per year		

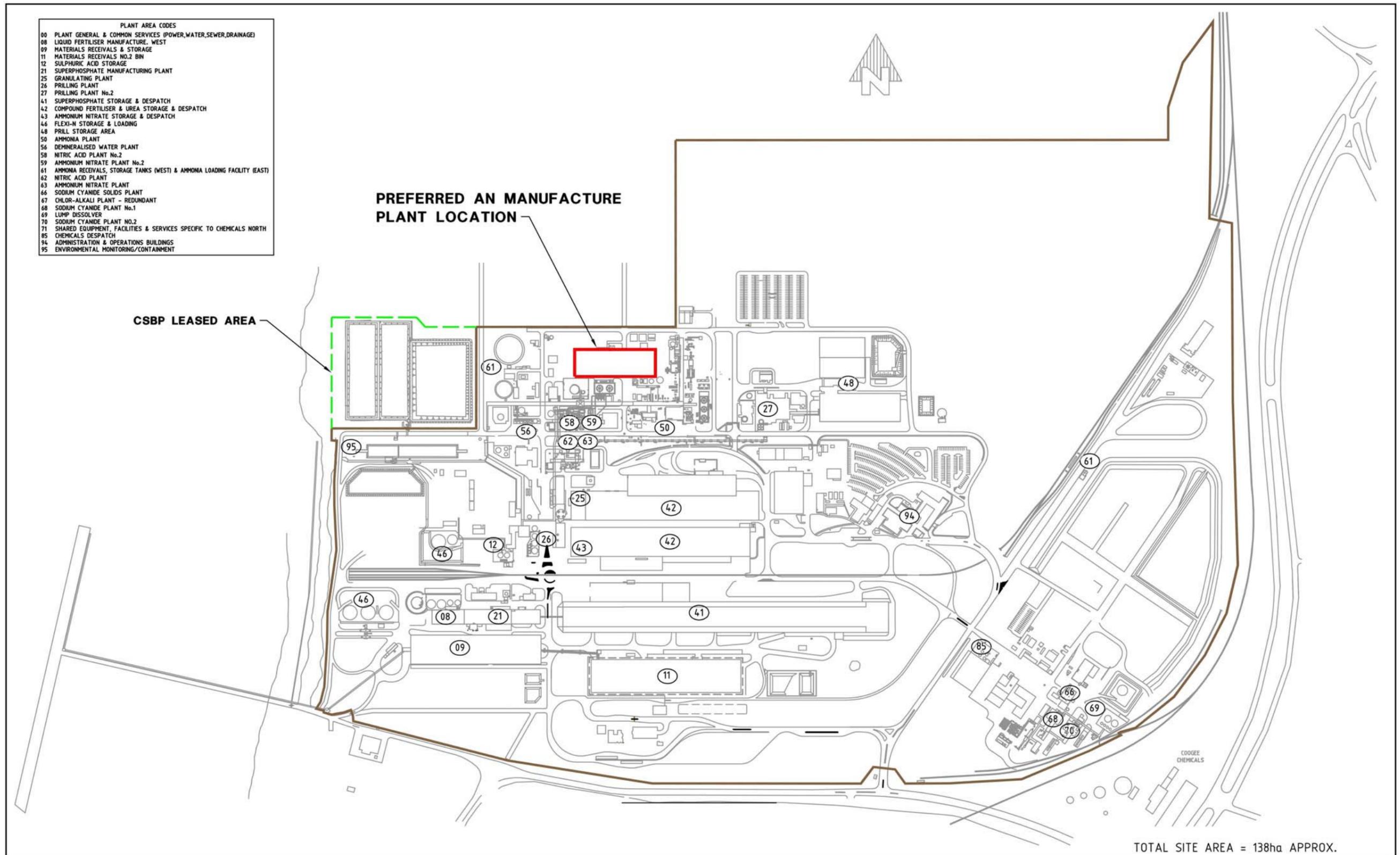


**Figure 1: Regional location (Source: Figure 1.1 from Strategen & Parsons Brinckerhoff, 2010)**



**Figure 2: Site location (Source: Figure 1.2 from Strategen & Parsons Brinckerhoff, 2010)**





REF. DRG. No.	No.	DATE	REVISIONS	BY	CHKD.	CSBP E.	CHKD.	NAME:	SIGN:	DATE:	 <b>CSBP Limited</b> A.B.N. 81 008 668 371  KWINANA WORKS AMMONIUM NITRATE PRODUCTION EXPANSION PROJECT: PHASE 2 LOCATION - FIGURE 1.4	CAD DRAWING DO NOT ALTER MANUALLY		
							CSBP ENGR.					SCALE: 1:6000	DRN: FTL	A3
							CSBP APPD.					DATE: MARCH.10	DRAWING NUMBER 1100-0-0001/069	
												PROJ. DEVT.	REV. C	

Figure 3: CSBP Limited Kwinana Industrial Complex plant layout (Source: Figure 1.4 from Strategen & Parsons Brinckerhoff, 2010)



### **3. Key environmental factors and principles**

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key 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 key 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 risk and hazards and solid waste disposal, 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 key environmental factors for the proposal require detailed evaluation in this report:

- (a) air quality;
- (b) noise;
- (c) liquid waste disposal;
- (d) water supply; and
- (e) greenhouse gas emissions.

The above key 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 set out in Table 1.

Details on the key environmental factors and their assessment are contained in Sections 3.1 - 3.5. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal, taking into consideration environmental impact management by the proponent. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The following principles were considered by the EPA in relation to the proposal:

- (a) the precautionary principle;
- (b) principles relating to improved valuation, pricing and incentive mechanisms; and
- (c) the principle of waste minimisation.

### 3.1 Air quality

#### *Description*

The main sources of atmospheric emissions from the CSBP KIC that are relevant to the proposed expansion of the ANPF include the two existing nitric acid plants and the new third nitric acid plant, the existing and new ammonia plant auxiliary boilers, the 2008 ammonium nitrate prilling plant, and the existing ammonia plant primary reformer, superphosphate plant scrubber, granulation plant scrubber, and granulation plant de-duster.

The various atmospheric emissions produced by the above sources are listed below:

- nitric acid plants - oxides of nitrogen (NO<sub>x</sub>) and ammonia (NH<sub>3</sub>);
- ammonia plant auxiliary boilers - NO<sub>x</sub>;
- 2008 ammonium nitrate prilling plant - NH<sub>3</sub> and particulate matter (PM);
- ammonia plant primary reformer - NO<sub>x</sub>;
- superphosphate plant scrubber - PM; and
- granulation plant scrubber and de-duster - NO<sub>x</sub> and NH<sub>3</sub>.

The proponent has advised the EPA (CSBP Limited, 2011a) that the proposed expansion would result in:

- NO<sub>x</sub> emissions increasing from approximately 269 tonnes per year in 2009/2010 to a nominal 569 tonnes per year (i.e. a 111.5% increase);
- ammonium nitrate particulate emissions (as PM<sub>2.5</sub>) increasing from approximately 12 tonnes per year in 2009/2010 to a nominal 20 tonnes per year (i.e. a 66.7% increase); and
- NH<sub>3</sub> emissions increasing from approximately 12 tonnes per year in 2009/2010 to a nominal 18 tonnes per year (i.e. a 50% increase).

The three nitric acid plants would also generate nitrous oxide (N<sub>2</sub>O) which is a greenhouse gas. Greenhouse gas emissions are considered in Section 3.5 in this report.

NO<sub>x</sub> emissions from the two existing nitric acid plants are reduced by passing their tail gas emissions through separate selective catalytic reactors (SCRs) prior to being discharged into the atmosphere via separate stacks. The proposed new third nitric acid plant would also use a SCR to reduce NO<sub>x</sub> emissions in its tail gas emissions prior to being discharged via a separate stack. The SCRs in the two existing nitric acid plants reduces their NO<sub>x</sub> stack emission concentrations from approximately 800 part per million by volume (ppmv) down to about 58.4 ppmv [i.e. 120 milligrams per normal cubic metre (mg/Nm<sup>3</sup>)] during normal operations. The SCR in the proposed new third nitric acid plant is expected to have the same NO<sub>x</sub> reduction performance. However, the use of SCRs would also result in a small concentration of NH<sub>3</sub>

(typically <1 ppmv) in each nitric acid plant stack due to NH<sub>3</sub> “slippage” through their SCR systems.

CSBP Limited’s current licence permits NO<sub>x</sub> stack emission concentrations for the two existing nitric acid plants to be up to 410 mg/Nm<sup>3</sup> (i.e. 200 ppmv) during normal operations and up to 2,000 mg/Nm<sup>3</sup> (i.e. 974.5 ppmv) during start-up conditions.

Scrubbers are used in the 2008 ammonium nitrate prilling plant to reduce NH<sub>3</sub> and ammonium nitrate particulate emissions. Following debottlenecking, the NH<sub>3</sub> and ammonium nitrate particulate stack emission concentrations from the 2008 ammonium nitrate prilling plant stack are expected to be approximately 1 mg/Nm<sup>3</sup> and 7.6 mg/Nm<sup>3</sup>, respectively, under normal operating conditions.

CSBP Limited’s current licence allows the total suspended particulates (TSP) stack emission concentration for the existing 2008 ammonium nitrate prilling plant to be up to 50 mg/Nm<sup>3</sup> during normal operations.

The proponent’s licence also permits the NO<sub>x</sub> stack emission concentrations for the existing ammonia plant primary reformer and auxiliary boiler to be up to 144 mg/Nm<sup>3</sup> (i.e. 70 ppmv) under normal operating conditions. It also allows the NH<sub>3</sub> stack emission concentration from the existing granulating plant scrubber to be up to 1,000 mg/Nm<sup>3</sup> under normal operating conditions. However, it does not specify maximum allowable stack emission concentrations for the existing superphosphate plant scrubber and granulation plant de-duster.

The nearest residential premises are located in Medina approximately 3 km to the east of the existing ANPF.

The Gaussian dispersion models Dispmod (Version 2005) and Industrial Source Complex 3 (ISC3) (Version 5.1.0) were both employed in the air quality modelling that was undertaken for the PER document. The PER document indicates that these two models were chosen in order to ensure that coastal dispersion influences and building wake effects were accounted for in the modelling. The PER document also indicated that no one model generated the most conservative results. The ISC3 model was run using both the urban and rural wind profile settings in order to determine which one was the most conservative setting.

The air quality modelling that was undertaken considered the emissions from the proposed expanded ANPF both in isolation and cumulatively with emissions from existing sources. However, the PER document only includes information on the cumulative impact of the expanded ANPF on NO<sub>2</sub> and NH<sub>3</sub> ground level concentrations (GLCs). Information on the cumulative impact of the expanded ANPF on PM GLCs was subsequently included in the summary of submissions and proponent’s response to submissions document (Strategen & Parsons Brinckerhoff, 2011), and is referred to below.

The cumulative impact of the expanded ANPF was determined by adding the maximum incremental change in predicted GLCs associated with the expanded ANPF at a number of monitoring sites in the vicinity of the CSBP KIC to the monitored ambient GLCs at those sites. Ambient monitored NO<sub>2</sub> GLCs were obtained from the Hope Valley and North Rockingham monitoring sites. Ambient monitored NH<sub>3</sub> and PM<sub>10</sub> GLCs were obtained from the Wells Park and Abercrombie Road monitoring sites, respectively. The PER document indicates that the above methodology is extremely conservative for the 1-hour and 24-hour averaging periods as the maximum predicted incremental change in GLCs associated with the expanded ANPF at each of the monitoring sites has been added to the maximum ambient concentrations that were recorded at the monitoring sites. The actual GLCs at the monitoring sites are expected to be less than the predicted values as the above scenario (i.e. maximum values occurring simultaneously) is not anticipated to eventuate in reality.

When the expanded ANPF is considered in isolation under normal operating conditions the maximum offsite 1-hour average nitrogen dioxide (NO<sub>2</sub>) ground level concentration (GLC) is predicted to be approximately 82 micrograms per cubic metre (µg/m<sup>3</sup>) by the ISC3 model (urban setting). During start-up events the maximum offsite 1-hour average NO<sub>2</sub> GLC is predicted to be 205 µg/m<sup>3</sup> by the Dispmod model. During shut-down events the maximum offsite 1-hour average NO<sub>2</sub> GLC is predicted to be 187 µg/m<sup>3</sup> by the Dispmod model. All of the above predicted 1-hour average NO<sub>2</sub> GLCs are below the National Environment Protection Measure (NEPM) standard of 246 µg/m<sup>3</sup>.

When the expanded ANPF is considered in isolation under normal operating conditions the maximum offsite annual average NO<sub>2</sub> GLC is predicted to be approximately 3 µg/m<sup>3</sup> by the ISC3 model (urban setting). This figure is well below the applicable NEPM standard of 62 µg/m<sup>3</sup>.

Cumulative air quality modelling predicts that for normal operating conditions, the maximum 1-hour average NO<sub>2</sub> GLCs at Hope Valley and North Rockingham would be approximately 185 µg/m<sup>3</sup> and 129 µg/m<sup>3</sup>, respectively (ISC3 model - urban setting). The above predicted NO<sub>2</sub> GLCs are equivalent to about 75.2% and 52.4% of the NEPM standard of 246 µg/m<sup>3</sup>, respectively. The maximum annual average NO<sub>2</sub> GLC at Hope Valley is predicted to be approximately 18.1 µg/m<sup>3</sup> by the ISC3 model (rural setting). The maximum annual average NO<sub>2</sub> GLC at North Rockingham is predicted to be approximately 27.1 µg/m<sup>3</sup> by the ISC3 model (urban setting). The above predicted NO<sub>2</sub> GLCs are below the applicable NEPM standard of 62 µg/m<sup>3</sup>.

The air quality modelling report in the PER document also examined the impact of NO<sub>x</sub> emissions from the expanded ANPF on photochemical smog production. Photochemical smog is characterised by high ozone (O<sub>3</sub>) GLCs and is mainly formed via the reaction between NO<sub>x</sub> and reactive organic compounds (ROCs) in the atmosphere under the influence of sunlight and high temperatures. The air quality modelling report referred to the Perth Photochemical Smog Study (Western Power Corporation and Department of Environmental Protection, 1996) and indicated that the study determined that

motor vehicles were the main cause of photochemical smog in the Perth airshed as they are the largest emission sources of NO<sub>x</sub> and ROCs.

The Perth Photochemical Smog Study stated that the emissions from the Kwinana Industrial Area (KIA) “resulted in a significant quenching of ozone across those portions of the metropolitan area impacted by the Kwinana NO<sub>x</sub> plume”. The air quality modelling report indicated that this quenching (i.e. reduction) was due to the presence of nitrogen oxide (NO) and a low ROC:NO<sub>x</sub> ratio within the KIA emissions. The report concluded that, as the proposal would result in a small increase in NO<sub>x</sub> emissions in the airshed, it could result in further slight quenching of ozone in the airshed. It also concluded that the proposed expansion would result in a small reduction in the ROC-NO<sub>x</sub> ratio which could also contribute to a small reduction in ozone formation potential.

The summary of submissions and proponent’s response to submissions document (Strategen & Parsons Brinckerhoff, 2011) indicated that:

- additional analysis of predicted incremental NO<sub>2</sub> GLCs at Hope Valley and North Rockingham due to the expanded ANPF indicates that the highest changes in incremental NO<sub>2</sub> GLCs are predicted to occur between 7:00pm and 8:00am which are times that are not associated with O<sub>3</sub> production;
- emissions from the expanded ANPF would disperse as they travel downwind resulting in lower GLCs with increasing distance;
- the photochemical reactions for NO<sub>2</sub> and O<sub>3</sub> take time and peak O<sub>3</sub> concentrations normally occur well downwind of the emission sources;
- at the point that the peak O<sub>3</sub> concentrations would occur, the NO<sub>2</sub> concentrations from the expanded ANPF would be well below the maximum predicted concentrations at Hope Valley and North Rockingham; and
- therefore, the incremental change in the NO<sub>x</sub> emissions due to the proposal is expected to have a very small impact on photochemical smog production.

The PER document indicates that for air quality modelling purposes all PM emissions associated with the proposal have been assumed to be PM<sub>2.5</sub>. This is a conservative assumption in view of the fact that PM emissions consist of a blend of PM<sub>10</sub> and PM<sub>2.5</sub> rather than just PM<sub>2.5</sub>, and that the applicable NEPM standards for PM<sub>2.5</sub> are more stringent than the NEPM standards for PM<sub>10</sub>. However, the information on the cumulative PM GLCs that was subsequently included in Strategen & Parsons Brinckerhoff (2011) refers to PM<sub>10</sub> GLCs rather than PM<sub>2.5</sub> GLCs.

When the expanded ANPF is considered in isolation under normal operating conditions the maximum offsite 24-hour average PM (as PM<sub>2.5</sub>) GLC is

predicted to be approximately  $13.5 \mu\text{g}/\text{m}^3$  by the ISC3 model (rural setting). This figure is below the applicable NEPM advisory reporting standard of  $25 \mu\text{g}/\text{m}^3$ . The maximum offsite annual average  $\text{PM}_{2.5}$  GLC is predicted to be approximately  $2.1 \mu\text{g}/\text{m}^3$  by the ISC3 model (rural setting). This figure is below the applicable NEPM advisory reporting standard of  $8 \mu\text{g}/\text{m}^3$ . Given that all PM emissions from the ANPF were considered to be  $\text{PM}_{2.5}$ , compliance with the NEPM advisory reporting standard also demonstrates compliance with the applicable 24-hour average  $\text{PM}_{10}$  NEPM standard of  $50 \mu\text{g}/\text{m}^3$ .

Cumulative air quality modelling predicts that under normal operating conditions, the maximum 24-hour average  $\text{PM}_{10}$  GLC at Abercrombie Road would be approximately  $67 \mu\text{g}/\text{m}^3$  (ISC3 model - rural setting). This predicted  $\text{PM}_{10}$  GLC is above the applicable NEPM 24-hour average  $\text{PM}_{10}$  standard of  $50 \mu\text{g}/\text{m}^3$ . However, the above exceedance is almost entirely attributable to the high maximum ambient monitored  $\text{PM}_{10}$  GLC of  $67 \mu\text{g}/\text{m}^3$  which is due to existing sources. The predicted maximum incremental  $\text{PM}_{10}$  GLC at Abercrombie Road due to the expanded ANPF is only  $0.13 \mu\text{g}/\text{m}^3$ , which in the proponent's view is insignificant.

When the expanded ANPF is considered in isolation under normal operating conditions the maximum offsite 1-hour average  $\text{NH}_3$  GLC is predicted to be approximately  $25 \mu\text{g}/\text{m}^3$  by the ISC3 model (rural setting). This figure is well below the 1-hour average criterion of  $330 \mu\text{g}/\text{m}^3$  derived by the proponent from the Victorian State Environmental Protection Policy (VIC SEPP) 3-minute average design criterion of  $600 \mu\text{g}/\text{m}^3$ .

When the expanded ANPF is considered in isolation under normal operating conditions the maximum offsite annual average  $\text{NH}_3$  GLC is predicted to be approximately  $1.1 \mu\text{g}/\text{m}^3$  by the ISC3 model (urban setting). This figure is well below the annual average criterion of  $180 \mu\text{g}/\text{m}^3$  derived by the proponent from the United Kingdom Environmental Agency (UKEA) 8-hour average Occupational Exposure Level (OEL).

Cumulative air quality modelling predicts that for normal operating conditions, the maximum annual average  $\text{NH}_3$  GLC at Wells Park would be approximately  $17 \mu\text{g}/\text{m}^3$  (ISC3 model - urban setting). This figure is well below the UKEA annual average criterion of  $180 \mu\text{g}/\text{m}^3$ .

### ***Submissions***

The main issues that were raised in the submissions related to the adequacy of the assessment of cumulative  $\text{NO}_2$  concentrations, the adequacy of the assessment of the effect of  $\text{NO}_x$  emissions on photochemical smog, and the lack of cumulative air quality modelling for PM emissions.

### ***Assessment***

The EPA's environmental objective for this factor is to ensure that emissions do not adversely affect environmental values, land uses, or the health, welfare

and amenity of people, by meeting statutory requirements and acceptable standards.

The EPA notes that predicted 1-hour average NO<sub>2</sub> GLCs with the proposed expanded ANPF operating in isolation under normal, start-up, or shut-down conditions are below the applicable NEPM standard. The EPA also notes that predicted cumulative 1-hour average NO<sub>2</sub> GLCs at Hope Valley and North Rockingham with the proposed expanded ANPF operating under normal operating conditions are equivalent to about 75.2% and 52.4% of the NEPM standard of 246 µg/m<sup>3</sup>, respectively. The EPA is also aware that predicted maximum annual average NO<sub>2</sub> GLCs at Hope Valley and North Rockingham are below the applicable NEPM standard of 62 µg/m<sup>3</sup>.

The EPA understands that the submission from the Department of Environment and Conservation (DEC) raised some concerns in regard to the adequacy of the assessment of cumulative NO<sub>2</sub> concentrations. However, the EPA notes that with respect to cumulative 1-hour average NO<sub>2</sub> GLCs, the DEC submission states that “Any other assessment methodology leads to a maximum likely NO<sub>2</sub> concentration within the NEPM limit. As a result, it is concluded that NO<sub>2</sub> concentrations will remain within the NEPM limit.”

In view of the above, the EPA considers that it is unlikely that the operation of the expanded ANPF would result in cumulative 1-hour average NO<sub>2</sub> GLCs exceeding the applicable NEPM standard.

The EPA also notes that the incremental change in the NO<sub>x</sub> emissions due to the expanded ANPF is expected to have a very small impact on photochemical smog production.

SCRs are currently being used in the two existing nitric acid plants within the ANPF and the proponent intends to employ a SCR in the proposed third nitric acid plant in order to reduce its NO<sub>x</sub> emissions. The EPA understands that the European Commission Reference Document on Best Available Techniques for the Manufacture of Large Volume Inorganic Chemicals - Ammonia, Acids and Fertilizers (European Commission, 2007) indicates that SCRs are considered to be best available technology for minimising NO<sub>x</sub> levels in the tail gas emissions from nitric acid plants.

The European Fertilizer Manufacturers Association (EFMA) Best Available Techniques for Pollution Prevention and Control in the European Fertilizer Industry Booklet No. 2: Production of Nitric Acid (EFMA Booklet No. 2) indicates that new nitric acid plants can achieve a NO<sub>x</sub> stack emission concentration of 100 ppmv under normal operating conditions. However, the (European Commission, 2007) reference document indicates that new nitric acid plants can achieve a NO<sub>x</sub> (as NO<sub>2</sub>) stack emission concentration of between 5 ppmv and 75 ppmv under normal operating conditions.

The EPA notes that the expected NO<sub>x</sub> stack emission concentration of 58.4 ppmv from the three ANPF nitric acid plant stacks is less than the

applicable criteria of 100 ppmv listed in EFMA Booklet No. 2 and within the range specified in the (European Commission, 2007) reference document.

The EPA is aware that the maximum offsite 1-hour average and annual average NH<sub>3</sub> GLCs are predicted to be well below applicable criteria when the expanded ANPF is considered in isolation under normal operating conditions. The EPA is also aware that the maximum cumulative annual average NH<sub>3</sub> GLC at Wells Park would be well below applicable criteria under normal operating conditions.

The EPA notes that the maximum offsite 24-hour average and annual average PM (as PM<sub>2.5</sub>) GLCs are predicted to be below the applicable NEPM advisory reporting standard when the expanded ANPF is considered in isolation under normal operating conditions. Cumulative air quality modelling predicts that under normal operating conditions, the maximum 24-hour average PM<sub>10</sub> GLC at Abercrombie Road would be above the applicable NEPM standard. However, the EPA understands that the above exceedance is largely attributable to the high maximum ambient monitored PM<sub>10</sub> GLC which is due to existing sources.

The EFMA Best Available Techniques for Pollution Prevention and Control in the European Fertilizer Industry Booklet No. 6: Production of Ammonium Nitrate and Calcium Ammonium Nitrate (EFMA Booklet No. 6) indicates that prilling towers in new plants can achieve NH<sub>3</sub> and particulate stack emission concentrations of 10 mg/Nm<sup>3</sup> and 15 mg/Nm<sup>3</sup>, respectively, under normal operating conditions. It also indicates that new plants can achieve NH<sub>3</sub> stack emission concentrations of 50 mg/Nm<sup>3</sup> from all other individual emission points under normal operating conditions. However, the (European Commission, 2007) reference document indicates that prilling towers producing technical ammonium nitrate (TAN) can achieve a NH<sub>3</sub> stack emission concentration in the range of 4.25 to 6.55 mg/Nm<sup>3</sup>, and a dust stack emission concentration of 5 mg/Nm<sup>3</sup>.

The EPA notes that the expected NH<sub>3</sub> stack emission concentration from the 2008 ammonium nitrate prilling plant stack of approximately 1 mg/Nm<sup>3</sup> is less than the applicable criteria listed in EFMA Booklet No. 6 and the (European Commission, 2007) reference document. The EPA is also aware that the expected particulate stack emission concentration from the 2008 ammonium nitrate prilling plant stack of approximately 7.6 mg/Nm<sup>3</sup> is less than the applicable criteria listed in EFMA Booklet No. 6 and greater than the criteria listed in the (European Commission, 2007) reference document. Although the expected particulate stack emission concentration is greater than the criteria listed in the (European Commission, 2007) reference document, modelling has shown that it is unlikely to pose an unacceptable risk to human health.

The EPA considers that stack emissions from the expanded ANPF can be adequately regulated through Part V of the EP Act (Prescribed Premises). The EPA expects the DEC to amend the proponent's existing EP Act Licence 6107/1967/16 in order to include the proposed third nitric acid plant and NH<sub>3</sub> emissions from the 2008 ammonium nitrate prilling plant stack, and to account

for the increased stack emissions from existing sources that would result from debottlenecking. The EPA also expects the DEC to set the stack emission concentration limits for both new and existing emission sources within EP Act Licence 6107/1967/16 such that they are commensurate with the use of best practice pollution control technology.

### **Summary**

Having particular regard to the:

- (a) results obtained from the air quality modelling that was undertaken for the proposal which was based on conservative assumptions;
- (b) the information provided in the submission from the DEC; and
- (c) regulatory measures available to manage the monitoring and reporting of stack emissions from the expanded ANPF under Part V of the EP Act,

it is the EPA's opinion that it is likely that the EPA's environmental objective for this factor can be achieved.

## **3.2 Noise**

### **Description**

The proposed expansion is expected to contribute to noise impacts from the CSBP KIC during construction and operation. The main noise impacts from the proposal are expected to be from the construction and operation of the proposed nitric acid ammonium nitrate plant.

Pile driving and the use of earthmoving equipment are likely to be the main sources of noise during construction. The PER document indicates that construction activities would be carried out in accordance with the Environmental Protection (Noise) Regulations 1997 (noise regulations) and Australian Standard 2436-1981: *Guide to Noise Control on Construction, Maintenance and Demolition Sites*.

Noise modelling was undertaken using SoundPlan Version 7 to predict noise levels due to the operation of the proposed expanded ANPF. The noise modelling predicted that  $L_{A10}$  noise levels in residential receiver locations under worst-case night time conditions would be approximately 30 dB(A) or less. The noise modelling also determined that noise emissions from the expanded ANPF would not significantly contribute to overall noise levels in residential receiver locations and would therefore comply with the noise regulations.

The DEC is currently reviewing the Environmental Protection (Noise) Regulations 1997 and has advised that a change to industrial noise assigned levels is being pursued. The DEC proposes to increase the Industrial

Receiver  $L_{A10}$  assigned level from 65 dB(A) to 75 dB(A), with an adjustment of +5 dB(A) to the measured/predicted level if the noise is tonal in characteristic.

The predicted noise levels under worst case daytime wind conditions at the nearest BP Refinery boundary due to the expansion are expected to comply with the DEC's proposed new industrial assigned level of 75 dB(A) if noise attenuation is employed within the CSBP KIC or at the northern boundary of the site. The proponent has assumed that noise emissions at the northern boundary of the CSBP KIC would be tonal in characteristic. The proponent has a design target of 70 dB(A) to account for the required +5 dB(A) adjustment to predicted noise levels due to the tonal characteristics of the noise emissions at the northern boundary of the CSBP KIC. The required attenuation would be finalised during the design phase of the proposed expansion.

The proponent intends to fit noise attenuation features to new equipment or plant installed as part of the expansion where deemed necessary to ensure that noise levels comply with the noise regulations, as they are proposed to be amended. The proponent also intends to incorporate noise control measures into the proposed third nitric acid ammonium nitrate plant to match the second nitric acid ammonium nitrate plant noise attenuation measures. The proponent would also ensure that the engineering changes to be implemented for the debottlenecking of the nitric acid ammonium nitrate plants and the 2008 prilling plant would be reviewed by an acoustic consultant to enable identification of any potential increases in noise emission and implementation of appropriate noise control measures.

The PER document indicates that in the event that the DEC's review of the noise regulations does not result in an increase in the industrial noise assigned levels, the proponent would comply with the existing noise regulations within 24 months of the DEC's review process ending.

### ***Submissions***

No specific noise related issues were raised in the submissions.

### ***Assessment***

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

The EPA considers that potential noise impacts from construction activities can be adequately managed subject to these activities being undertaken in accordance with the noise regulations and Australian Standard 2436-1981.

The EPA understands that noise modelling predicts that under worst case night-time conditions noise emissions from the operating expanded ANPF would not significantly contribute to overall noise levels in residential receiver locations and would comply with the noise regulations.

The EPA notes that predicted noise levels at the nearest BP Refinery boundary due to the operating expanded ANPF are expected to comply with the DEC's proposed new industrial assigned level of 75 dB(A) provided that noise attenuation is undertaken within the CSBP KIC or at the northern boundary of the site. Although the proponent intends to finalise the required attenuation during the design phase of the proposed expansion, the EPA considers that, if it has not already done so, the proponent should investigate whether suitable noise attenuation measures are available to ensure compliance with the existing  $L_{A10}$  assigned level of 65 dB(A) in the event that the DEC's review of the noise regulations does not result in the level increasing to 75 dB(A). The proponent should also be required to demonstrate that noise levels at the nearest BP Refinery boundary due to the operating expanded ANPF would comply with the existing noise regulations with currently available noise attenuation measures. The EPA recommends that the DEC incorporates the above requirements into the Works Approval for the proposed expansion.

### ***Summary***

Having particular regard to the:

- (a) results obtained from noise modelling; and
- (b) regulatory measures available under Part V of the EP Act to ensure that the proponent implements appropriate noise control measures so that noise levels at the nearest BP Refinery boundary would comply with applicable noise criteria,

it is the EPA's opinion that it is likely that the EPA's environmental objective for this factor can be achieved.

## **3.3 Liquid waste disposal**

### ***Description***

Under normal operating conditions wastewater from the CSBP KIC is discharged into the marine environment through the Sepia Depression Ocean Outlet Landline (SDOOL). The PER document indicates that the Cockburn Sound outfall which was used previously to discharge wastewater from the CSBP KIC remains as a licensed discharge point and is maintained as an emergency back-up. The PER document also indicates that the discharge of wastewater into Cockburn Sound would only occur in the event of a loss of access to the SDOOL, either through an emergency event or a planned shut-down of the SDOOL. An emergency beach outfall is also maintained to accommodate overflows generated by extreme stormwater flows.

Implementation of the proposal is expected to result in the average quantity of wastewater discharged from the CSBP KIC into the SDOOL increasing from approximately 2 megalitres per day (ML/day) to about 2.4 ML/day.

The proponent considers that the impact of additional wastewater from the proposed expansion would be manageable using the existing wastewater management system. The PER document indicates that there is adequate pumping and storage capacity in the existing wastewater management system, including the nutrient stripping wetland, to handle the increased quantity of wastewater arising from the implementation of the proposal. The proposed expansion would only require minor additions to the stormwater collection system within the proposal footprint to accommodate an expected minor increase in stormwater flows.

The proponent's current EP Act Licence 6107/1967/16 contains a combination of concentration and load based limits for contaminants in the wastewater. The PER document indicates that the quantity and composition of the wastewater that would be discharged into the SDOOL as a result of the proposal would continue to comply with the relevant marine pollution control conditions within Licence 6107/1967/16. Based on current average concentrations and the proposed increase in discharge volume to 2.4 ML/day, the loads discharged as a result of the proposal are expected to remain within current licence limits.

The PER document indicates that a review of wastewater discharges from the CSBP KIC was undertaken by Oceanica (2007a). The report examined the issues related to the disposal of wastewater from the CSBP KIC and the risks posed to the marine environment. Discharge data was compared against the Environmental Quality Criteria (EQC) for Cockburn Sound and it was determined that concentrations were unlikely to have an unreasonable impact on the environment. The report also identified that discharge to the SDOOL posed a lower risk due to greater dilution of wastewater from the CSBP KIC with wastewater from other sources in the pipeline and the greater assimilative capacity of the Sepia Depression compared to Cockburn Sound.

Oceanica (2007a) recommended that Whole of Effluent Toxicity (WET) testing of CSBP KIC wastewater be undertaken in accordance with the ANZECC/ARMCANZ (2000) and (EPA, 2005a) water quality management framework. The WET testing concluded that a high level of protection would be attained whether discharge was to Cockburn Sound or to the SDOOL (Oceanica, 2007b).

The Water Corporation report, *Sepia Depression Ocean Outlet Landline (SDOOL) Annual report 2009*, states that "results from the monitoring and investigative studies undertaken over the 2008-2009 monitoring period indicate that there is minimal risk to the marine environment due to the discharge of the combined waste stream into the Sepia Depression. The water quality conditions required for ecosystem protection and public health in terms of contaminant levels were met" (Water Corporation, 2009).

Given that the proposed expansion is not expected to result in wastewater contaminant loads and concentrations changing significantly from those that have been previously modelled, the proponent considers that the potential environmental impacts associated with wastewater disposal have been adequately addressed in previous assessments. Accordingly, the PER document does not include any information on the potential environmental impacts associated with the disposal of additional wastewater from the CSBP KIC due to the proposed expansion.

### ***Submissions***

No specific liquid waste disposal related issues were raised in the submissions.

### ***Assessment***

The EPA's environmental objective for this factor is to ensure that liquid wastes are managed in accordance with the waste management hierarchy (i.e. avoid, minimise, recycle, treat and dispose) and where this is not possible, are contained and isolated from surface water and groundwater, and that discharges meet statutory requirements and acceptable standards relating to marine water quality.

The EPA notes that the quantity and composition of the wastewater that would be discharged into the SDOOL as a result of the proposal is expected to continue to comply with the relevant marine pollution control conditions within the proponent's existing EP Act Licence 6107/1967/16. Table 3 in Condition M6(a) in Licence 6107/1967/16 specifies the concentration and load limits for various substances in the wastewater that is currently being discharged from the CSBP KIC. Condition M6(b) in Licence 6107/1967/16 specifies allowable ranges for the pH of the wastewater discharged into Cockburn Sound or into the SDOOL. The EPA understands that the contaminant loads that would be discharged as a result of the proposal and the proposed increase in discharge volume to 2.4 ML/day are expected to remain within current licence limits based on current average contaminant concentrations.

The EPA also notes the outcomes of the (Oceanica, 2007a), (Oceanica, 2007b), and (Water Corporation, 2009) studies.

In view of the above, the EPA considers that the increased quantity of liquid waste that would be discharged from the CSBP KIC as a result of the proposed expansion of the ANPF can be adequately regulated under Part V of the EP Act (Prescribed Premises) via the provisions of the relevant marine pollution control related conditions within the proponent's existing EP Act Licence 6107/1967/16. The EPA would expect the DEC to amend EP Act Licence 6107/1967/16 to reflect the increased quantity of liquid waste that would be discharged from the CSBP KIC as a result of the proposal being implemented.

## **Summary**

Having particular regard to the:

- (a) regulatory measures available under Part V of the EP Act via the proponent's existing EP Act Licence 6107/1967/16 which includes relevant marine pollution control related conditions and specifies applicable wastewater contaminant load and concentration criteria; and
- (b) outcomes of the (Oceanica, 2007a), (Oceanica, 2007b), and (Water Corporation, 2009) studies,

it is the EPA's opinion that it is likely that the EPA's environmental objective for this factor can be achieved.

## **3.4 Water supply**

### ***Description***

The CSBP KIC consumed approximately 3,325 ML of water in 2009/2010. This water was sourced from:

- the Kwinana Water Reclamation Plant (KWRP) (1,400 ML per year);
- groundwater directly (1,374 ML per year);
- remediated groundwater from Western Power Corporation (WPC) (455 ML per year);
- scheme water (76 ML per year); and
- recycled process waters (20 ML per year).

CSBP Limited currently holds water abstraction licences under the *Rights in Water and Irrigation Act 1914* (RIWI Act), which permits abstraction of up to 4,800 ML per year from bores in the Tamala (superficial) and Yarragadee (sub-artesian) aquifers. Annual groundwater abstraction has gradually increased over the years but has remained within licence limits.

The proposed expansion would require an estimated additional quantity of at least 520 ML of water per year above the current usage of about 3,325 ML of water per year. The proponent has advised the EPA (CSBP Limited, 2011b) that the above additional quantity of water would consist of approximately 400 ML of water per year sourced from the KWRP with the remainder sourced from the superficial aquifer, the WPC Industrial Water Source, and scheme water (mainly for potable/amenity uses). The proponent has also advised that in the event that the water supply from the KWRP is insufficient to meet the proposals requirements, the shortfall would be addressed by sourcing water from the superficial and sub-artesian aquifers, the WPC Industrial Water Source, and scheme water (mainly for potable/amenity uses). In this scenario

the estimated additional quantity of water required for the proposed expansion would increase to approximately 1,500 to 1,900 ML per year depending on water quality and the extent of the shortfall in supply from the KWRP (CSBP Limited, 2011b). The proponent considers that there is sufficient access to groundwater from the superficial and sub-artesian aquifers to supply water for the proposal within the allocation limits in its current RIWI Act licences.

The PER document indicates that scheme water from the Water Corporation reticulated system is available to the CSBP KIC if required to supplement the other sources. However, this is the proponent's least preferred alternative source. The PER document also indicates that scheme water usage at the CSBP KIC has progressively decreased by ensuring process needs are met from alternative sources such as the KWRP and groundwater. Scheme water consumption is expected to increase during the construction phase. A small increase in scheme water consumption is also expected following commissioning due to a minor increase in the permanent site workforce.

The use of groundwater from the superficial and sub-artesian aquifers would require additional treatment chemicals and the installation of a dedicated reverse osmosis water treatment plant within the CSBP KIC which would generate additional liquid wastes that would require disposal into the SDOOL. The proponent has advised the EPA (CSBP Limited, 2011c) that if required and installed in the future, the reverse osmosis water treatment plant would generate approximately 13,000 litres of additional wastewater per hour which would be disposed of into the SDOOL, and that this quantity is included in the additional 0.4 ML of wastewater per day that would be produced as a result of the proposed expansion (refer to Section 3.3 in this report). The proponent has also advised the EPA (CSBP Limited, 2011d) that the reverse osmosis water treatment plant does not form part of this current proposal and that it would seek the necessary approvals should it be required in the future.

### ***Submissions***

The main issues that were raised in the submissions related to:

- whether the reuse of wastewater has been considered as a source of water for the proposed expansion in order to reduce the reliance on, and potential impacts associated with groundwater abstraction;
- whether a water use efficiency plan, including a water balance, has been developed for the proposed expansion;
- the need for relevant hydrogeological information and a brief discussion of potential water quality issues to be provided;
- the potential for salinity impacts such as saltwater intrusion to occur due to increased groundwater abstraction; and
- the need for information on water quality issues currently being experienced to be provided.

## **Assessment**

The EPA's environmental objective for this factor is to maintain the quantity of groundwater so that existing and potential environmental values, including ecosystem maintenance, are protected.

The EPA notes that the proposed expansion of the ANPF would require an additional quantity of approximately 520 ML of water per year consisting of about 400 ML of water per year sourced from the KWRP and the remainder sourced from the superficial aquifer, the WPC Industrial Water Source, and scheme water. The EPA also notes that should the water supply from the KWRP be insufficient to meet the proposals requirements, the shortfall would be addressed by sourcing water from the superficial and sub-artesian aquifers, the WPC Industrial Water Source, and scheme water. The EPA understands that in this scenario the required quantity of water for the proposal would increase to approximately 1,500 to 1,900 ML per year depending on water quality and the extent of the shortfall in supply from the KWRP. The EPA is aware that the proponent has access to sufficient quantities of groundwater from the superficial and sub-artesian aquifers to supply water for the proposal within the allocation limits in its current RIWI Act licences.

The EPA notes that the additional quantity of wastewater that would be generated by a reverse osmosis water treatment plant, should it be required in the future to process groundwater, has been included in the additional 0.4 ML of wastewater per day that would be produced as a result of the proposed expansion. As mentioned in Section 3.3 of this report, the contaminant loads that would be discharged into the SDOOL as a result of the proposed increase in discharge volume from 2 ML/day to 2.4 ML/day are expected to remain within the proponent's current licence limits based on current average contaminant concentrations.

The EPA considers that the issues relating to water supply that were raised in the public submissions on the PER document have been adequately addressed by the proponent in the summary of submissions and proponent's response to submissions document (Strategen & Parsons Brinckerhoff, 2011).

## **Summary**

Having particular regard to the:

- (a) fact that a significant proportion of the additional water required for the proposed expansion is expected to be sourced from the KWRP under normal circumstances;
- (b) proponent having access to sufficient quantities of groundwater from the superficial and sub-artesian aquifers to supply water for the proposal within the allocation limits in its current RIWI Act licences in the event that the water supply from the KWRP is insufficient; and

- (c) responses provided by the proponent to submissions that raised issues in relation to water supply,

it is the EPA's opinion that it is likely that the EPA's environmental objective for this factor can be achieved.

### **3.5 Greenhouse gas emissions**

#### ***Description***

The ANPF produced approximately 925,688 tonnes of carbon dioxide equivalent (CO<sub>2</sub>-e) (net) in 2009/2010. The above quantity of greenhouse gas emissions consisted of approximately 937,262 tonnes of CO<sub>2</sub>-e attributable to the generation of nitrous oxide (N<sub>2</sub>O) from the two existing nitric acid plants which was offset (i.e. reduced by 11,574 tonnes of CO<sub>2</sub>-e) to account for excess power which was generated within the ANPF and exported to other parts of the CSBP KIC.

The proponent has calculated the quantity of greenhouse gas emissions that would be produced by the proposed expansion in three different operating scenarios in view of the fact that the expansion is expected to be undertaken progressively. All three scenarios include the greenhouse gas emissions produced by the combustion of natural gas in a new auxiliary boiler which forms part of the proposal (i.e. about 15,000 tonnes of CO<sub>2</sub>-e per year), as well as an offset (i.e. a reduction) of 14,000 tonnes of CO<sub>2</sub>-e per year to account for excess power which would be generated within the expanded ANPF and exported to other parts of the CSBP KIC.

In the first scenario the ANPF is assumed to be fully debottlenecked with no N<sub>2</sub>O abatement technology fitted to the three nitric acid plants. In this scenario the ANPF is expected to generate approximately 1,586,000 tonnes of CO<sub>2</sub>-e per year (i.e. an increase of about 71% over the amount generated in 2009/2010).

The second scenario represents the ANPF following the construction and full debottlenecking of the third nitric acid plant with tertiary N<sub>2</sub>O abatement technology fitted to it, and with full debottlenecking of the two existing nitric acid plants without secondary abatement technology being incorporated into them. In this scenario the ANPF is expected to generate approximately 1,110,000 tonnes of CO<sub>2</sub>-e per year (i.e. an increase of about 20% over the amount generated in 2009/2010).

The third scenario represents the ANPF following full debottlenecking of all three nitric acid plants with secondary N<sub>2</sub>O abatement technology incorporated into the two existing nitric acid plants, and tertiary N<sub>2</sub>O abatement technology fitted to the third nitric acid plant. In this scenario the ANPF is expected to generate approximately 264,000 tonnes of CO<sub>2</sub>-e per year (i.e. a decrease of about 71% when compared to the amount generated in 2009/2010).

Secondary N<sub>2</sub>O abatement systems employ catalysts which are situated immediately below the primary ammonia oxidation catalyst in a nitric acid plant to convert N<sub>2</sub>O to nitrogen (N<sub>2</sub>) and oxygen (O<sub>2</sub>) according to the reaction  $2\text{N}_2\text{O} \rightarrow 2\text{N}_2 + \text{O}_2$ . The PER document indicates that secondary N<sub>2</sub>O abatement systems are expected to reduce N<sub>2</sub>O emissions by 70 to 90%.

The PER document indicates that the proponent commits to trialling secondary N<sub>2</sub>O abatement technology in existing Nitric Acid Plant 2 in 2011, and if the trial is successful, the proponent commits to installing secondary N<sub>2</sub>O abatement technology in existing Nitric Acid Plant 1 later in 2011. The PER document also indicates that for the trial to be considered successful, N<sub>2</sub>O reduction efficiencies must meet the abatement technology supplier's specifications and have no adverse impact on current nitric acid plant performance. Notwithstanding the above mentioned commitments, the proponent also commits to ensuring that secondary N<sub>2</sub>O abatement technology is in place in the existing Nitric Acid Plants 1 and 2 once they have been fully debottlenecked. Debottlenecking of the existing Nitric Acid Plants 1 and 2 will occur as required to meet increase demand for product.

Tertiary N<sub>2</sub>O abatement systems are installed in the tail gas stream of nitric acid plants and employ catalysts to destroy N<sub>2</sub>O in the tail gas emissions. The PER document indicates that tertiary N<sub>2</sub>O abatement systems are expected to reduce N<sub>2</sub>O emissions by at least 90%. The proponent has not yet determined what type of tertiary N<sub>2</sub>O abatement technology would be used in the third nitric acid plant.

The PER document indicates that the proponent commits to designing and constructing the proposed new third nitric acid plant to include tertiary N<sub>2</sub>O abatement technology. The proponent plans to complete the construction of the third nitric acid plant prior to undertaking debottlenecking activities in the existing Nitric Acid Plants 1 and 2.

### ***Submissions***

The main issues that were raised in the submissions related to the lack of an effective carbon constraint on the proposal in the absence of a carbon pricing mechanism, and the proposed greenhouse gas offset strategies not being consistent with the principles of offsetting.

### ***Assessment***

The EPA's environmental objectives for this factor are to:

- minimise greenhouse gas emissions in absolute terms and reduce emissions per unit of product to as low as reasonably practicable; and
- mitigate greenhouse gas emissions, mindful of Commonwealth and State greenhouse gas strategies and programs.

The EPA notes the various commitments that have been made by the proponent in relation to trialling and installing secondary N<sub>2</sub>O abatement technology into the two existing nitric acid plants and installing tertiary N<sub>2</sub>O abatement technology into the proposed new third nitric acid plant.

The quantity of greenhouse gas emissions generated by the expanded ANPF would increase by approximately 71% over that generated in 2009/2010 (i.e. from about 925,688 tonnes of CO<sub>2</sub>-e per year to 1,586,000 tonnes of CO<sub>2</sub>-e per year) in the absence of secondary N<sub>2</sub>O abatement technology in the two existing nitric acid plants and tertiary N<sub>2</sub>O abatement technology in the proposed new third nitric acid plant, and with full debottlenecking of all the plants. The above quantity would reduce down to a predicted increase of about 20% over that generated in 2009/2010 with the installation of the proposed new third nitric acid plant with tertiary N<sub>2</sub>O abatement technology with no secondary N<sub>2</sub>O abatement technology installed in the two existing nitric acid plants, and with full debottlenecking of all the plants. Greenhouse gas emissions would be reduced by approximately 71% when compared to the amount generated in 2009/2010 (i.e. from about 925,688 tonnes of CO<sub>2</sub>-e per year down to 264,000 tonnes of CO<sub>2</sub>-e per year) once the installation of secondary N<sub>2</sub>O abatement technology in the two existing nitric acid plants and the construction of the proposed new third nitric acid plant with tertiary N<sub>2</sub>O abatement technology have been completed, and all the plants have been fully debottlenecked.

The proponent has advised the EPA that it has already installed secondary N<sub>2</sub>O abatement technology into existing Nitric Acid Plant 2 and is currently working with the technology supplier to improve the performance of the catalyst in order to achieve the N<sub>2</sub>O reduction guaranteed by the supplier (CSBP limited, 2011e). The proponent has also confirmed that it will design and construct the proposed new third nitric acid plant to incorporate tertiary N<sub>2</sub>O abatement technology (CSBP limited, 2011e). The incorporation of tertiary N<sub>2</sub>O abatement technology in the proposed new third nitric acid plant is reflected in Table 1: Summary of key proposal characteristics, and therefore is part of the proposal to be implemented.

Whilst the proponent has committed to ensuring that secondary N<sub>2</sub>O abatement technology is in place in the existing Nitric Acid Plants 1 and 2 once they have been fully debottlenecked, the EPA considers that recommended Condition 5-1 in Appendix 4 should be imposed on the proponent requiring the installation, commissioning, and operation of secondary N<sub>2</sub>O abatement technology in the existing Nitric Acid Plants 1 and 2 prior to the commencement of debottlenecking procedures in these two plants. The EPA understands from the proponent that there is sufficient time for the installation and commissioning to occur before debottlenecking activities are undertaken. Recommended Condition 5-2 in Appendix 4 requires the proponent to provide the EPA with documentation which confirms the practical completion of the installation and commissioning of secondary N<sub>2</sub>O abatement technology in the existing Nitric Acid Plants 1 and 2.

The EPA also considers that recommended Condition 5-3 in Appendix 4 should be imposed on the proponent requiring a Greenhouse Gas Abatement Report to be prepared which meets the following objectives:

- demonstrates that maximising energy efficiency and opportunities for future energy recovery have been given due consideration in the design of the proposed expanded ANPF;
- ensures that the "greenhouse gas" intensity (i.e. tonnes of CO<sub>2</sub>-e produced per tonne of ammonium nitrate produced) is equivalent to, or better than benchmarked best practice; and
- achieves continuous improvement in "greenhouse gas" intensity through the periodic review, and if practicable, adoption of advances in technology and process management.

Recommended Condition 5-4 in Appendix 4 requires the proponent to make the Greenhouse Gas Abatement Report required by Condition 5-3 publicly available.

### **Summary**

Having particular regard to the:

- (a) commitments made by the proponent in relation to trialling and installing secondary N<sub>2</sub>O abatement technology into the two existing nitric acid plants and installing tertiary N<sub>2</sub>O abatement technology into the proposed new third nitric acid plant;
- (a) predicted quantities of greenhouse gas emissions from the expanded ANPF under the three development scenarios referred to above; and
- (b) the EPA's recommended conditions,

it is the EPA's opinion that it is likely that the EPA's environmental objectives for this factor can be achieved provided that the recommended conditions are implemented.

## **3.6 Environmental principles**

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the EP Act. Appendix 3 contains a summary of the EPA's consideration of the principles.

## **4. Conditions**

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key 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.

#### **4.1 Recommended conditions**

Having considered 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 ANPF by incorporating additional components into the existing facility and re-engineering (debottlenecking) some existing components to enable increased throughput in order to increase ammonium nitrate production capacity from 520,000 tpa to 936,000 tpa, is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include greenhouse gas abatement and decommissioning.

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

- Works Approval and Licence under Part V of the EP Act;
- Groundwater abstraction licences under the *Rights in Water and Irrigation Act 1914*; and
- Approvals for construction and operation of a Major Hazard Facility, explosives manufacture, and transport and storage of dangerous goods under the *Dangerous Goods Safety Act 2004* and associated Dangerous Goods Safety Regulations 2007.

#### **4.2 Consultation**

In developing these conditions, the EPA consulted with the proponent, the Department of Environment and Conservation, Department of Water, Department of Mines and Petroleum, and the Town of Kwinana in respect of matters of fact and matters of technical or implementation significance.

# **Appendix 1**

**List of submitters**

**Organisations:**

1. Cockburn Sound Management Council.
2. Department of Environment and Conservation (Air Quality Management Branch, Noise Regulation Branch, and Office of Climate Change).
3. Department of Health.
4. Department of Water.
5. Kwinana Industries Council.
6. Water Corporation.

**Individuals:**

1. Mrs Kathy Miller.

## **Appendix 2**

### **References**

CSBP Limited (2011a). Email from CSBP Limited to the Office of the Environmental Protection Authority dated 24 March 2011.

CSBP Limited (2011b). Email from CSBP Limited to the Office of the Environmental Protection Authority dated 12 April 2011.

CSBP Limited (2011c). Email from CSBP Limited to the Office of the Environmental Protection Authority dated 13 April 2011.

CSBP Limited (2011d). Email from CSBP Limited to the Office of the Environmental Protection Authority dated 13 April 2011.

CSBP Limited (2011e). Email from CSBP Limited to the Office of the Environmental Protection Authority dated 19 May 2011.

Department of Mines and Petroleum (2008). *Kwinana Cumulative Risk Study (KCRS), Non-Technical Summary*. Perth, Western Australia.

Oceanica Consulting Pty Ltd (2007a). *CSBP Environmental Assessment Reporting, Wastewater Discharges: August 2006 to January 2007*. Report prepared for CSBP Limited - Kwinana, Perth, Western Australia.

Oceanica Consulting Pty Ltd (2007b). *CSBP: Review of WET Test Results*. Report prepared for CSBP Limited - Kwinana, Perth, Western Australia.

Strategen & Parsons Brinckerhoff (2010). *CSBP Kwinana: Ammonium Nitrate Production Expansion Project: Phase 2 Public Environmental Review*. Prepared by Strategen & Parsons Brinckerhoff Australia Pty Ltd for CSBP Limited. November 2010.

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Water Corporation (2009). *Sepia Depression Ocean Outlet Landline (SDOOL) Annual report 2009*. Perth, Western Australia.

Western Power Corporation and Department of Environmental Protection (1996). *The Perth Photochemical Smog Study*. Perth. Western Australia. May 1996.

## **Appendix 3**

**Summary of identification of key environmental factors and principles**

Preliminary environmental factors	Proposal characteristics	Government agency and public comments	Identification of key environmental factors
<b>BIOPHYSICAL</b>			
Water supply	<p>The CSBP KIC consumed approximately 3325 ML of water in 2009/2010. This water was sourced from:</p> <ul style="list-style-type: none"> <li>the Kwinana Water Reclamation Plant (KWRP) (1400 ML per year);</li> <li>directly from groundwater (1374 ML per year);</li> <li>remediated groundwater from Western Power (455 ML per year);</li> <li>scheme water (76 ML per year); and</li> <li>recycled process waters (20 ML per year).</li> </ul> <p>CSBP Limited currently holds water abstraction licences under the <i>Rights in Water and Irrigation Act 1914</i>, which permits abstraction of up to 4,800 ML per year from bores in the Tamala (superficial) and Yarragadee (sub-artesian) aquifers. Annual groundwater abstraction has gradually increased over the years but has remained within licence limits.</p> <p>The proposed expansion would require an estimated additional quantity of at least 520 ML of water per year above the current usage of about 3,325 ML of water per year. The proponent has advised the EPA (CSBP Limited, 2011b) that the above additional quantity of water would consist of approximately 400 ML of water per year sourced from the KWRP with the remainder sourced from the superficial aquifer, Western Power Corporation (WPC) Industrial Water Source, and scheme water (mainly for potable/amenity uses). The proponent has also advised that in the event that the water supply from the KWRP is insufficient to meet the proposals requirements, the shortfall would be addressed by sourcing water from the superficial and sub-artesian aquifers, the WPC Industrial Water Source, and scheme water (mainly for potable/amenity uses). In this scenario the estimated additional quantity of water required for the proposed expansion would increase to approximately 1,500 to 1,900 ML per year depending on water quality and the extent of the shortfall in supply from the KWRP (CSBP Limited, 2011b). The proponent considers that there is sufficient access to groundwater from the superficial and sub-artesian aquifers to supply water for the proposal within the allocation limits in its current <i>Rights in Water and Irrigation Act 1914</i> licences.</p> <p>The PER document indicates that scheme water from the Water Corporation reticulated system is available to the CSBP KIC if required to supplement the other sources. However, this is the proponent's least preferred alternative source. The PER document also indicates that scheme water usage at the CSBP KIC has progressively decreased by ensuring process needs are met from alternative sources such as the KWRP and groundwater. Scheme water consumption is expected to increase during the construction phase. A small increase in scheme water consumption is also expected following commissioning due to a minor increase in the permanent site workforce.</p> <p>The use of groundwater from the superficial and sub-artesian aquifers would require additional treatment chemicals and the installation of a dedicated reverse osmosis water treatment plant within the CSBP KIC which would generate additional liquid wastes that would require disposal into the SDOOL. The proponent has advised the EPA (CSBP Limited, 2011c) that if</p>	<p><b>Department of Water</b></p> <ol style="list-style-type: none"> <li>Has the reuse of wastewater, (stormwater and cooling tower blowdown water) that currently discharges into the nutrient stripping wetland prior to discharging into the SDOOL, been considered as a source of water for the proposed expansion? Reusing this wastewater is a feasible option (that is currently undertaken by other major industries for process purposes) to reduce the reliance and its impacts on groundwater abstraction. Has a water use efficiency plan, including a water balance, been developed for CSBP and its proposed expansion?</li> <li>There appears to be some incorrect figures stated within the report. Within section 8.3 of chapter 3, the text states that process water usage sourced directly from groundwater is 1355 ML/yr, whilst table 3.24 states 1374 ML/yr. Also within section 8.3, the last paragraph states that CSBP holds a water abstraction license to abstract up to 4400 ML/yr from the superficial and Yarragadee aquifers. However, abstraction figures within table 3.24 equal 4800 KL/yr. The correct figure as per abstraction licenses is 4800 KL/yr.</li> <li>As previously recommended, relevant hydrogeological information should be included as well as a brief discussion of potential water quality issues. An increase in groundwater abstraction will increase the potential for salinity impacts (ie saltwater intrusion). Water quality issues currently experienced should be included.</li> </ol> <p><b>Kwinana Industries Council</b></p> <ol style="list-style-type: none"> <li>KIC members are investigating alternative supplies of industrial process water in line with an intention to reduce (and possibly eliminate) reliance on scheme water to fulfill this need. The advent of KWRP water is a significant factor in the achievement of this, as is ongoing development of additional sources of fit for purpose (recycled) water. The CSBP proposal aligns with this philosophy.</li> </ol>	<p>In view of the nature of the concerns that were raised in the comments that were received, the EPA considers that water supply is a relevant environmental factor.</p>

Preliminary environmental factors	Proposal characteristics	Government agency and public comments	Identification of key environmental factors
	<p>required and installed in the future, the reverse osmosis water treatment plant would generate approximately 13,000 litres of additional wastewater per hour which would be disposed of into the SDOOL, and that this quantity is included in the additional 0.4 ML of wastewater per day that would be produced as a result of the proposed expansion (refer to Section 3.3 in this report). The proponent has also advised the EPA (CSBP Limited, 2011d) that the reverse osmosis water treatment plant does not form part of this current proposal and that it would seek the necessary approvals should it be required in the future.</p>		
Marine environment	<p>Increased shipping movements associated with the proposal have the potential to increase the risk of marine pest incursion into Cockburn Sound.</p> <p>The discharge of wastewater from the CSBP KIC into Cockburn Sound is discussed under the environmental factor of liquid waste disposal below.</p>	<p><b>Cockburn Sound Management Council</b></p> <ol style="list-style-type: none"> <li>1. The CSMC is very concerned about the current level of marine pest monitoring that occurs in Cockburn Sound. Increased shipping will raise the risk of a potentially destructive and harmful marine pest incursion into the Sound. Discussion of how CSBP will address these issues or help Port authorities manage marine pests would help clarify this issue with increased ammonium nitrate production at this industrial facility.</li> </ol>	<p>The EPA considers that the concerns that were raised have been adequately addressed by the proponent. The discharge of wastewater from the CSBP KIC into Cockburn Sound will be considered under the factor of liquid waste disposal. In view of the above, the EPA considers that this environmental factor does not require further evaluation.</p>
<b>POLLUTION</b>			
Air quality	<p>The main sources of atmospheric emissions from the CSBP KIC that are relevant to the proposed expansion of the ANPF include the two existing nitric acid plants and the new third nitric acid plant, the existing and new ammonia plant auxiliary boilers, the 2008 ammonium nitrate prilling plant, and the existing ammonia plant primary reformer, superphosphate plant scrubber, granulation plant scrubber, and granulation plant de-duster.</p> <p>The various atmospheric emissions produced by the above sources are listed below:</p> <ul style="list-style-type: none"> <li>• nitric acid plants - oxides of nitrogen (NO<sub>x</sub>) and ammonia (NH<sub>3</sub>);</li> <li>• ammonia plant auxiliary boilers - NO<sub>x</sub>;</li> <li>• 2008 ammonium nitrate prilling plant - NH<sub>3</sub> and particulate matter (PM);</li> <li>• ammonia plant primary reformer - NO<sub>x</sub>;</li> <li>• superphosphate plant scrubber - PM; and</li> <li>• granulation plant scrubber and de-duster - NO<sub>x</sub> and NH<sub>3</sub>.</li> </ul> <p>The proponent has advised the EPA (CSBP Limited, 2011) that the proposed expansion would result in:</p> <ul style="list-style-type: none"> <li>• NO<sub>x</sub> emissions increasing from approximately 269 tonnes per year in 2009/2010 to a nominal 569 tonnes per year (i.e. a 111.5% increase);</li> <li>• ammonium nitrate particulate emissions (as PM<sub>2.5</sub>) increasing from approximately 12 tonnes per year in 2009/2010 to a nominal 20 tonnes per year (i.e. a 66.7% increase); and</li> <li>• NH<sub>3</sub> emissions increasing from approximately 12 tonnes per year in 2009/2010 to a nominal 18 tonnes per year (i.e. a 50% increase).</li> </ul> <p>The three nitric acid plants would also generate nitrous oxide (N<sub>2</sub>O) which is a greenhouse gas. Greenhouse gas emissions are considered in Section 3.5 in this report.</p>	<p><b>Department of Environment and Conservation Air Quality Management Branch</b></p> <ol style="list-style-type: none"> <li>1. There remain weaknesses in the assessment of cumulative NO<sub>2</sub> concentrations. While the method used to assess the maximum possible hourly and annual averages at Hope Valley and North Rockingham is sound, there is no assessment of cumulative effects at any other location in the region. The "maximum incremental changes" estimated at these locations lie in the range 4 to 16 µg/m<sup>3</sup> (Table 3.6), while those for the whole region are in the range 31 to 82 µg/m<sup>3</sup> (Table 3.5). Addition of the highest value from Table 3.5 (82 µg/m<sup>3</sup>) to that from Table 3.6 (173 µg/m<sup>3</sup>) gives a value of 255 µg/m<sup>3</sup>. This slightly exceeds the National Environment Protection Measure (NEPM) criterion of 246 µg/m<sup>3</sup>. DEC recognises, however, that the Hope Valley measurement of 173 µg/m<sup>3</sup> reflects downwind transport of Kwinana plumes, which would not have reached ground level at the (near-source) location of the ISC3-modelled peak responsible for the highest model value of 82 µg/m<sup>3</sup>. Any other assessment methodology leads to a maximum likely NO<sub>2</sub> concentration within the NEPM limit. As a result, it is concluded that NO<sub>2</sub> concentrations will remain within the NEPM limit.</li> <li>2. The changes made to section 2.5.3 in response to DEC's previous technical advice of 10 September 2010 are minimal: <ul style="list-style-type: none"> <li>• There remains no evidence of any quantitative assessment of the effect of NO<sub>x</sub> emissions on photochemical smog. While it is stated that the total emissions will be only 0.59 % of the total airshed emissions, it can not [sic] be presumed that these will not have an effect on ozone concentrations (which may be both positive and negative, changing with distance) immediately downwind of the source.</li> <li>• For example, the modelled contribution to the peak NO<sub>x</sub> concentration at Hope Valley equates to about 3 to 12 ppb, which has a potential, if undispersed, to generate an additional 10 to 40 ppb of ozone. What the</li> </ul> </li> </ol>	<p>In view of the nature of the concerns that were raised in the comments that were received, the EPA considers that air quality is a relevant environmental factor.</p>

Preliminary environmental factors	Proposal characteristics	Government agency and public comments	Identification of key environmental factors
	<p>NO<sub>x</sub> emissions from the two existing nitric acid plants are reduced by passing their tail gas emissions through separate selective catalytic reactors (SCRs) prior to being discharged into the atmosphere via separate stacks. The proposed new third nitric acid plant would also use a SCR to reduce NO<sub>x</sub> emissions its tail gas emissions prior to being discharged via a separate stack. The SCRs in the two existing nitric acid plants reduces their NO<sub>x</sub> stack emission concentrations from approximately 800 part per million by volume (ppmv) down to about 58.4 ppmv (i.e. 120 mg/Nm<sup>3</sup>) during normal operations. The SCR in the proposed new third nitric acid plant is expected to have the same NO<sub>x</sub> reduction performance. However, the use of SCRs would also result in a small concentration of NH<sub>3</sub> (typically &lt;1 ppmv) in each nitric acid plant stack due to NH<sub>3</sub> "slippage" through their SCR systems.</p> <p>CSBP Limited's current licence permits NO<sub>x</sub> stack emission concentrations for the two existing nitric acid plants to be up to 410 mg/Nm<sup>3</sup> (i.e. 200 ppmv) during normal operations and up to 2,000 mg/Nm<sup>3</sup> (i.e. 974.5 ppmv) during start-up conditions.</p> <p>Scrubbers are used in the 2008 ammonium nitrate prilling plant to reduce NH<sub>3</sub> and ammonium nitrate particulate emissions. Following debottlenecking, the NH<sub>3</sub> and ammonium nitrate particulate stack emission concentrations from the 2008 ammonium nitrate prilling plant stack are expected to be approximately 1 mg/Nm<sup>3</sup> and 7.6 mg/Nm<sup>3</sup>, respectively, under normal operating conditions.</p> <p>CSBP Limited's current licence allows the total suspended particulates (TSP) stack emission concentration for the existing 2008 ammonium nitrate prilling plant to be up to 50 mg/Nm<sup>3</sup> during normal operations.</p> <p>The proponent's licence also permits the NO<sub>x</sub> stack emission concentrations for the existing ammonia plant primary reformer and auxiliary boiler to be up to 144 mg/Nm<sup>3</sup> (i.e. 70 ppm) under normal operating conditions. It also allows the NH<sub>3</sub> stack emission concentration from the existing granulating plant scrubber to be up to 1,000 mg/Nm<sup>3</sup> under normal operating conditions. However, it does not specify maximum allowable stack emission concentrations for the existing superphosphate plant scrubber and granulation plant de-duster.</p> <p>The nearest residential premises is located in Medina approximately 3 km to the east of the existing ANPF.</p> <p>The Gaussian dispersion models Dispmod (Version 2005) and Industrial Source Complex 3 (ISC3) (Version 5.1.0) were both employed in the air quality modelling that was undertaken for the PER document. The PER document indicates that these two models were chosen in order to ensure that coastal dispersion influences and building wake effects were accounted for in the modelling. The PER document also indicated that no one model generated the most conservative results. The ISC3 model was run using both the urban and rural wind profile settings in order to determine which one was the most conservative setting.</p> <p>The air quality modelling that was undertaken considered the emissions from the proposed expanded ANPF both in isolation and cumulatively with</p>	<p>actual effects would be, when the effects of a progressive chemical transformation, dispersion and day-to-day variations are included, are the responsibility of the proponent to assess.</p> <ul style="list-style-type: none"> <li>In addition, some of the added comments, such as "ozone production was greatest in areas where vehicle emissions were concentrated", are misleading, in that there is a clear attempt to imply that concentrations are highest in those locations, which they are not. Often, due to the titration effect of nitric oxide, they are actually the lowest.</li> </ul> <ol style="list-style-type: none"> <li>The analysis of particles does not include the contributions from any background concentrations. This is a significant issue and contrary to DEC's modelling guidelines.</li> <li>The changes to the analysis of ammonia concentrations (section 4) now make this section acceptable.</li> </ol> <p><b>Cockburn Sound Management Council</b></p> <ol style="list-style-type: none"> <li>CSMC felt that some information or note should have been made of impacts on increased ammonia vapours, or exceedance incidents to avifauna, reptiles and other fauna groups, i.e. vapour toxicity on fauna. If information was unavailable or limited, statements should have been made in the PER to dismiss this possible environmental impact. The data provided seems to indicate this may not be an issue particularly for humans, but other animal groups live within the foreshore and the industrial estate that could potentially be impacted with possible management implications.</li> </ol> <p><b>Kwinana Industries Council</b></p> <ol style="list-style-type: none"> <li>Ammonia - No adverse environmental impact is expected as the emission levels are likely to be within the NEPM advisory standards, however, again the case for the existence and preservation of the buffer is strengthened.</li> <li>Particulates - Particulates of nitrogen to be emitted into the marine environment from this project are unlikely to compromise the objective of ongoing improvement of the health of Cockburn Sound.</li> </ol>	

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	<p>emissions from existing sources. However, the PER document only includes information on the cumulative impact of the expanded ANPF on NO<sub>2</sub> and NH<sub>3</sub> GLCs. Information on the cumulative impact of the expanded ANPF on PM GLCs was subsequently included in the summary of submissions and proponent's response to submissions document (Strategen &amp; Parsons Brinckerhoff, 2011), and is referred to below.</p> <p>The cumulative impact of the expanded ANPF was determined by adding the maximum incremental change in predicted GLCs associated with the expanded ANPF at a number of monitoring sites in the vicinity of the CSBP KIC to the monitored ambient GLCs at those sites. Ambient monitored NO<sub>2</sub> GLCs were obtained from the Hope Valley and North Rockingham monitoring sites. Ambient monitored NH<sub>3</sub> and PM<sub>10</sub> GLCs were obtained from the Wells Park and Abercrombie Road monitoring sites, respectively. The PER document indicates that the above methodology is extremely conservative for the 1-hour and 24-hour averaging periods as the maximum predicted incremental change in GLCs associated with the expanded ANPF at each of the monitoring sites has been added to the maximum ambient concentrations that were recorded at the monitoring sites. The actual GLCs at the monitoring sites are expected to be less than the predicted values as the above scenario (i.e. maximum values occurring simultaneously) is not anticipated to eventuate in reality.</p> <p>When the expanded ANPF is considered in isolation under normal operating conditions the maximum offsite 1-hour average nitrogen dioxide (NO<sub>2</sub>) ground level concentration (GLC) is predicted to be approximately 82 micrograms per cubic metre (µg/m<sup>3</sup>) by the ISC3 model (urban setting). During start-up events the maximum offsite 1-hour average NO<sub>2</sub> GLC is predicted to be 205 µg/m<sup>3</sup> by the Dispmod model. During shut-down events the maximum offsite 1-hour average NO<sub>2</sub> GLC is predicted to be 187 µg/m<sup>3</sup> by the Dispmod model. All of the above predicted 1-hour average NO<sub>2</sub> GLCs are below the National Environment Protection Measure (NEPM) standard of 246 µg/m<sup>3</sup>.</p> <p>When the expanded ANPF is considered in isolation under normal operating conditions the maximum offsite annual average NO<sub>2</sub> GLC is predicted to be approximately 3 µg/m<sup>3</sup> by the ISC3 model (urban setting). This figure is well below the applicable NEPM standard of 62 µg/m<sup>3</sup>.</p> <p>Cumulative air quality modelling predicts that for normal operating conditions, the maximum 1-hour average NO<sub>2</sub> GLCs at Hope Valley and North Rockingham would be approximately 185 µg/m<sup>3</sup> and 129 µg/m<sup>3</sup>, respectively (ISC3 model - urban setting). The above predicted NO<sub>2</sub> GLCs are equivalent to about 75.2% and 52.4% of the NEPM standard of 246 µg/m<sup>3</sup>, respectively. The maximum annual average NO<sub>2</sub> GLC at Hope Valley is predicted to be approximately 18.1 µg/m<sup>3</sup> by the ISC3 model (rural setting). The maximum annual average NO<sub>2</sub> GLC at North Rockingham is predicted to be approximately 27.1 µg/m<sup>3</sup> by the ISC3 model (urban setting). The above predicted NO<sub>2</sub> GLCs are below the applicable NEPM standard of 62 µg/m<sup>3</sup>.</p> <p>The PER document indicates that for air quality modelling purposes all PM emissions associated with the proposal have been assumed to be PM<sub>2.5</sub>. This is a conservative assumption in view of the fact that PM emissions consist of a blend of PM<sub>10</sub> and PM<sub>2.5</sub> rather than just PM<sub>2.5</sub>, and that the</p>		

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	<p>applicable NEPM standards for PM<sub>2.5</sub> are more stringent than the NEPM standards for PM<sub>10</sub>. However, the information on the cumulative PM GLCs that was subsequently included in (Strategen &amp; Parsons Brinckerhoff, 2011) refers to PM<sub>10</sub> GLCs rather than PM<sub>2.5</sub> GLCs.</p> <p>When the expanded ANPF is considered in isolation under normal operating conditions the maximum offsite 24-hour average PM (as PM<sub>2.5</sub>) GLC is predicted to be approximately 13.5 µg/m<sup>3</sup> by the ISC3 model (rural setting). This figure is below the applicable NEPM advisory reporting standard of 25 µg/m<sup>3</sup>. The maximum offsite annual average PM<sub>2.5</sub> GLC is predicted to be approximately 2.1 µg/m<sup>3</sup> by the ISC3 model (rural setting). This figure is below the applicable NEPM advisory reporting standard of 8 µg/m<sup>3</sup>. Given that all PM emissions from the ANPF were considered to be PM<sub>2.5</sub>, compliance with the NEPM advisory reporting standard also demonstrates compliance with the applicable 24-hour average PM<sub>10</sub> NEPM standard of 50 µg/m<sup>3</sup>.</p> <p>Cumulative air quality modelling predicts that for normal operating conditions, the maximum 24-hour average PM<sub>10</sub> GLC at Abercrombie Road would be approximately 67 µg/m<sup>3</sup> (ISC3 model - rural setting). This predicted PM<sub>10</sub> GLC is above the applicable NEPM 24-hour average PM<sub>10</sub> standard of 50 µg/m<sup>3</sup>. However, the above exceedance is almost entirely attributable to the high maximum ambient monitored PM<sub>10</sub> GLC of 67 µg/m<sup>3</sup> which is due to existing sources. The predicted maximum incremental PM<sub>10</sub> GLC at Abercrombie Road due to the expanded ANPF is only 0.13 µg/m<sup>3</sup>, which is insignificant.</p> <p>When the expanded ANPF is considered in isolation under normal operating conditions the maximum offsite 1-hour average NH<sub>3</sub> GLC is predicted to be approximately 25 µg/m<sup>3</sup> by the ISC3 model (rural setting). This figure is well below the 1-hour average criterion of 330 µg/m<sup>3</sup> derived by the proponent from the Victorian State Environmental Protection Policy (VIC SEPP) 3-minute average design criterion of 600 µg/m<sup>3</sup>.</p> <p>When the expanded ANPF is considered in isolation under normal operating conditions the maximum offsite annual average NH<sub>3</sub> GLC is predicted to be approximately 1.1 µg/m<sup>3</sup> by the ISC3 model (urban setting). This figure is well below the annual average criterion of 180 µg/m<sup>3</sup> derived by the proponent from the United Kingdom Environmental Agency (UKEA) 8-hour average Occupational Exposure Level (OEL).</p> <p>Cumulative air quality modelling predicts that for normal operating conditions, the maximum annual average NH<sub>3</sub> GLC at Wells Park would be approximately 17.1 µg/m<sup>3</sup> (ISC3 model - urban setting). This figure is well below the UKEA annual average criterion of 180 µg/m<sup>3</sup>.</p>		
Noise	<p>The proposed expansion is expected to contribute to noise impacts from the CSBP KIC during construction and operation. The main noise impacts from the proposal are expected to be from the construction and operation of the proposed nitric acid ammonium nitrate plant.</p> <p>Pile driving and the use of earthmoving equipment are likely to be the main sources of noise during construction. The PER document indicates that construction activities would be carried out in accordance with the <i>Environmental Protection (Noise) Regulations 1997</i> and Australian Standard 2436-1981: <i>Guide to Noise Control on Construction, Maintenance and</i></p>	<p><b>Department of Environment and Conservation Noise Regulation Branch</b></p> <ol style="list-style-type: none"> <li>1. DEC has reviewed and commented on the Scoping PER document and draft PER document for this proposed expansion on 20 June and 8 October 2010, respectively. I have been advised that all the concerns raised by DEC previously on the noise issues have now been satisfactorily addressed in the final PER document. I have also been advised that the noise generated by the CSBP Kwinana Industrial Complex with the proposed expansion can be managed so that it complies with the Environmental Protection (Noise) Regulations 1997 at both nearby noise sensitive premises and neighbouring</li> </ol>	The EPA considers that noise is a relevant environmental factor.

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	<p><i>Demolition Sites.</i></p> <p>Acoustic modelling was undertaken using SoundPlan Version 7 to predict noise levels due to the operation of the proposed expanded ANPF. The acoustic modelling predicted that <math>L_{A10}</math> noise levels in residential receiver locations under worst-case night time conditions would be approximately 30 dB(A) or less. The acoustic noise modelling also determined that noise emissions from the expanded ANPF would not significantly contribute to overall noise levels in residential receiver locations and would therefore comply with the <i>Environmental Protection (Noise) Regulations 1997</i>.</p> <p>The Department of Environment and Conservation (DEC) is currently reviewing the <i>Environmental Protection (Noise) Regulations 1997</i> and has advised that a change to industrial noise assigned levels is being pursued. The DEC proposes to increase the Industrial Receiver <math>L_{A10}</math> assigned level from 65 dB(A) to 75 dB(A), with an adjustment of +5 dB(A) to the measured/predicted level if the noise is tonal in characteristic.</p> <p>The predicted noise levels under worst case daytime wind conditions at the nearest BP Refinery boundary due to the expansion are expected to comply with the DEC's proposed new industrial assigned level of 75 dB(A) if noise attenuation is employed within the CSBP KIC or at the northern boundary of the site. The proponent has assumed that noise emissions from the northern boundary of the CSBP KIC would be tonal in characteristic. The proponent has a design target of 70 dB(A) to account for the required +5 dB(A) adjustment to predicted noise levels due to the tonal characteristics of the noise emissions at the northern boundary of the CSBP KIC. The required attenuation would be finalised during the design phase of the proposed expansion.</p> <p>The proponent intends to fit noise attenuation features to new equipment or plant installed as part of the expansion where deemed necessary to ensure that noise levels comply with the <i>Environmental Protection (Noise) Regulations 1997</i>, as they are proposed to be amended. The proponent also intends to incorporate noise control measures into the proposed third nitric acid ammonium nitrate plant to match the second nitric acid ammonium nitrate plant noise attenuation measures. The proponent would also ensure that the engineering changes to be implemented for the debottlenecking of the nitric acid ammonium nitrate plants and the 2008 prilling plant would be reviewed by an acoustic consultant to enable identification of any potential increases in noise emission and implementation of appropriate noise control measures.</p> <p>The PER document indicates that in the event that the DEC's review of the <i>Environmental Protection (Noise) Regulations 1997</i> does not result in an increase in the industrial noise assigned levels, the proponent would comply with the existing noise regulations within 24 months of the DEC's review process ending.</p>	<p>industrial premises. DEC has not identified any other noise-related issues. In summary, DEC would consider that the potential noise impact from this proposed expansion is manageable.</p> <p><b>Kwinana Industries Council</b></p> <ol style="list-style-type: none"> <li>1. Emanation of noise from the industrial area has been an ongoing source of concern for pockets of neighbouring communities over many years. Abatement activities by Kwinana industries in recent years has mitigated this problem and KIC has facilitated a Noise Reference Group comprised of community, local and state government representatives, and of course Industry representatives, including CSBP. As a consequence, noise modeling [sic] in the region is now well understood, and complaints from the community have been substantially reduced. The proponent has addressed noise in its PER and KIC supports their contention that noise can be managed within the appropriate standards.</li> </ol>	
Liquid waste disposal	<p>Under normal operating conditions wastewater from the CSBP KIC is discharged into the marine environment through the Sepia Depression Ocean Outlet Landline (SDOOL). The PER document indicates that the Cockburn Sound outfall which was used previously to discharge wastewater from the CSBP KIC remains as a licensed discharge point and is maintained as an emergency back-up. The PER document also indicates that the discharge of wastewater into Cockburn Sound would only occur in the event</p>	<p><b>Water Corporation</b></p> <ol style="list-style-type: none"> <li>1. The Water Corporation commented on the Environmental Scoping Document on 25th June 2010, and believes our concerns are covered in the PER. Our concerns were: <ul style="list-style-type: none"> <li>a) Total nitrogen load to the sepia depression would not exceed the annual</li> </ul> </li> </ol>	<p>The EPA considers that liquid waste disposal is a relevant environmental factor.</p>

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	<p>of a loss of access to the SDOOL, either through an emergency event or a planned shut-down of the SDOOL. An emergency beach outfall is also maintained to accommodate overflows generated by extreme stormwater flows.</p> <p>Implementation of the proposal is expected to result in the average quantity of wastewater discharged from the CSBP KIC into the SDOOL increasing from approximately 2 ML/day to about 2.4 ML/day.</p> <p>The proponent considers that the impact of additional wastewater from the proposed expansion would be manageable using the existing wastewater management system. The PER document indicates that there is adequate pumping and storage capacity in the existing wastewater management system, including the nutrient stripping wetland, to handle the increased quantity of wastewater arising from the implementation of the proposal. The proposed expansion would only require minor additions to the stormwater collection system within the proposal footprint to accommodate an expected minor increase in stormwater flows.</p> <p>The proponent's current Licence 6107/1967/16 contains a combination of concentration and load based limits for contaminants in the wastewater. The PER document indicates that the quantity and composition of the wastewater that would be discharged into the SDOOL as a result of the proposal would continue to comply with the relevant marine pollution control conditions within Licence 6107/1967/16. Based on current average concentrations and the proposed increase in discharge volume to 2.4 ML/day, the loads discharged as a result of the proposal are expected to remain within current licence limits.</p> <p>The PER document indicates that a review of wastewater discharges from the CSBP KIC was undertaken by Oceanica (2007a). The report examined the issues related to the disposal of wastewater from the CSBP KIC and the risks posed to the marine environment. Discharge data was compared against the Environmental Quality Criteria (EQC) for Cockburn Sound and it was determined that concentrations were unlikely to have an unreasonable impact on the environment. The report also identified that discharge to the SDOOL posed a lower risk due to greater dilution of wastewater from the CSBP KIC with wastewater from other sources in the pipeline and the greater assimilative capacity of the Sepia Depression compared to Cockburn Sound.</p> <p>(Oceanica, 2007a) recommended that Whole of Effluent Toxicity (WET) testing of CSBP KIC wastewater be undertaken in accordance with the ANZECC/ARMCANZ (2000) and (EPA, 2005a) water quality management framework. The WET testing concluded that a high level of protection would be attained whether discharge was to Cockburn Sound or to the SDOOL (Oceanica, 2007b).</p> <p>The Water Corporation report, <i>Sepia Depression Ocean Outlet Landline (SDOOL) Annual report 2009</i>, states that "results from the monitoring and investigative studies undertaken over the 2008-2009 monitoring period indicate that there is minimal risk to the marine environment due to the discharge of the combined waste stream into the Sepia Depression. The water quality conditions required for ecosystem protection and public health in terms of contaminant levels were met" (Water Corporation, 2009).</p>	<p>limit of 1778 tonnes as per Condition 10 of Ministerial Statement #665.</p> <p>b) Relevant ANZECC and ARMCANZ guideline values for bio-accumulating toxicants continue to be met.</p> <p>Based on information in the PER, CSBP's daily discharge to the SDOOL will increase from 2 to 2.4 ML/d, and discharge of N and bio-accumulating substances will remain within CSBP's Licence (6107/1967/16) load limits. These inputs will ensure the cumulative discharge to the sepia depression for all SDOOL participants is not exceeded.</p>	

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	<p>Given that the proposed expansion is not expected to result in wastewater contaminant loads and concentrations changing significantly from those that have been previously modelled, the proponent considers that the potential environmental impacts associated with wastewater disposal have been adequately addressed in previous assessments. Accordingly, the PER document does not include any information on the potential environmental impacts associated with the disposal of additional wastewater from the CSBP KIC due to the proposed expansion.</p>		
Solid waste disposal	<p>The proposal would result in the generation of additional wastes during the construction phase. However, the quantity of solid waste generated from the operational phase is expected to be negligible. Solid waste generation would be managed under the proponent's Waste Management Plan.</p>	<p><b>Kwinana Industries Council</b></p> <ol style="list-style-type: none"> <li>1. These aspects of the proposal are unlikely to generate adverse environmental impacts.</li> </ol>	<p>Given that the Kwinana Industries Council did not raise any specific issues in relation to solid waste disposal and the minimal increase in the quantity of solid waste that would be generated, the EPA considers that this environmental factor does not require further evaluation.</p>
Greenhouse gas emissions	<p>The ANPF produced approximately 925,688 tonnes of CO<sub>2</sub>-e (net) in 2009/2010. The above quantity of greenhouse gas emissions consisted of approximately 937,262 tonnes of CO<sub>2</sub>-e attributable to the generation of nitrous oxide (N<sub>2</sub>O) from the two existing nitric acid plants which was offset (i.e. reduced by 11,574 tonnes of CO<sub>2</sub>-e) to account for excess power which was generated within the ANPF and exported to other parts of the CSBP KIC.</p> <p>The proponent has calculated the quantity of greenhouse gas emissions that would be produced by the proposed expansion in three different operating scenarios in view of the fact that the expansion is expected to be undertaken progressively. All three scenarios include the greenhouse gas emissions produced by the combustion of natural gas in a new auxiliary boiler which forms part of the proposal (i.e. about 15,000 tonnes of CO<sub>2</sub>-e per year), as well as an offset (i.e. a reduction) of 14,000 tonnes of CO<sub>2</sub>-e per year to account for excess power which would be generated within the expanded ANPF and exported to other parts of the CSBP KIC.</p> <p>In the first scenario the ANPF is assumed to be fully debottlenecked with no N<sub>2</sub>O abatement technology fitted to the three nitric acid plants. In this scenario the ANPF is expected to generate approximately 1,586,000 tonnes of CO<sub>2</sub>-e per year (i.e. an increase of about 71% over the amount generated in 2009/2010).</p> <p>The second scenario represents the ANPF following the construction and full debottlenecking of the third nitric acid plant with tertiary N<sub>2</sub>O abatement technology fitted to it, and with full debottlenecking of the two existing nitric acid plants without secondary abatement technology being incorporated into them. In this scenario the ANPF is expected to generate approximately 1,110,000 tonnes of CO<sub>2</sub>-e per year (i.e. an increase of about 20% over the amount generated in 2009/2010).</p> <p>The third scenario represents the ANPF following full debottlenecking of all three nitric acid plants with secondary N<sub>2</sub>O abatement technology incorporated into the two existing nitric acid plants, and tertiary N<sub>2</sub>O abatement technology fitted to the third nitric acid plant. In this scenario the ANPF is expected to generate approximately 264,000 tonnes of CO<sub>2</sub>-e per</p>	<p><b>Department of Environment and Conservation Office of Climate Change</b></p> <ol style="list-style-type: none"> <li>1. <b><i>Issue: That there is no effective carbon constraint on this project in the absence of a carbon pricing mechanism.</i></b></li> </ol> <p>The Environmental Scoping Document noted the environmental objectives related to greenhouse gas emissions will include consideration of 'offsets to further reduce cumulative emissions'.</p> <p>The PER notes the environmental objective for greenhouse gas emissions includes to "mitigate GHG emissions, mindful of Commonwealth and State GHG strategies and programs (EPA 2010).</p> <p>The PER makes no mention of offsets, despite the fact that the expanded facility will potentially emit a significant amount of greenhouse gas emissions (total of 1.1 Mt CO<sub>2</sub>e under Scenario 2).</p> <p>The proponent notes that EPA assessments undertaken in 2010 of projects with significant greenhouse gas emissions have indicated a policy approach based on providing an interim management strategy to cover the period until a Federal scheme becomes operational. These objectives were in the context of an anticipated Carbon Pollution Reduction Scheme (CPRS).</p> <p>There is currently significant uncertainty over how and when a carbon price is to be introduced. In September 2010, the Prime Minister announced the establishment of the Multi-Party Climate Change Committee to explore options for the introduction of a carbon price, however, timing for the committee's outcomes is unclear. It seems likely that a clear carbon price policy will not emerge before late 2011 at the earliest, with implementation delayed for at least a year beyond that.</p> <p>While the CPRS has been deferred indefinitely, it represented a well understood and developed model. In contrast, there is virtually no detail of how a carbon tax would operate.</p> <p>The uncertainty around a carbon price policy means a period of several years where there will be no effective carbon constraint on new projects,</p>	<p>In view of the significant quantities of additional greenhouse gas emissions that would be produced by the ANPF in the first two development scenarios that were considered by the proponent, the EPA considers that greenhouse gas emissions is a relevant environmental factor.</p>

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	<p>year (i.e. a decrease of about 71% when compared to the amount generated in 2009/2010).</p> <p>Secondary N<sub>2</sub>O abatement systems employ catalysts which are situated immediately below the primary ammonia oxidation catalyst in a nitric acid plant to convert N<sub>2</sub>O to nitrogen (N<sub>2</sub>) and oxygen (O<sub>2</sub>) according to the reaction 2N<sub>2</sub>O → 2N<sub>2</sub> + O<sub>2</sub>. The PER document indicates that secondary N<sub>2</sub>O abatement systems are expected to reduce N<sub>2</sub>O emissions by 70 to 90%.</p> <p>The PER document indicates that the proponent commits to trialling secondary N<sub>2</sub>O abatement technology in existing Nitric Acid Plant 2 in 2011, and if the trial is successful, the proponent commits to installing secondary N<sub>2</sub>O abatement technology in existing Nitric Acid Plant 1 later in 2011. The PER document also indicates that for the trial to be considered successful, N<sub>2</sub>O reduction efficiencies must meet the abatement technology supplier's specifications and have no adverse impact on current nitric acid plant performance. Notwithstanding the above mentioned commitments, the proponent also commits to ensuring that secondary N<sub>2</sub>O abatement technology is in place in the existing Nitric Acid Plants 1 and 2 once they have been fully debottlenecked.</p> <p>Tertiary N<sub>2</sub>O abatement systems are installed in the tail gas stream of nitric acid plants and employ catalysts to destroy N<sub>2</sub>O in the tail gas emissions. The PER document indicates that tertiary N<sub>2</sub>O abatement systems are expected to reduce N<sub>2</sub>O emissions by at least 90%. The proponent has not yet determined what type of tertiary N<sub>2</sub>O abatement technology would be used in the third nitric acid plant.</p> <p>The PER document indicates that the proponent commits to designing and constructing the proposed new third nitric acid plant to include tertiary N<sub>2</sub>O abatement technology.</p>	<p>including potentially significant emitters. This will potentially burden Western Australia's economy with an emissions legacy compounding the problem of transitioning to a low carbon economy.</p> <p><b>Recommendation 1:</b> The following recommendations should be considered for incorporation into the greenhouse gas abatement conditions:</p> <ul style="list-style-type: none"> <li>• The proponent should be subject to an equivalent constraint as would have been imposed if the CPRS was currently operational. This constraint should be a "net" constraint which incorporates the impact of any shielding proposed under the CPRS.</li> <li>• The proponent should be required to manage the liability they would have incurred under the CPRS by undertaking any combination of the following: <ul style="list-style-type: none"> <li>- geosequestration;</li> <li>- biosequestration; or</li> <li>- purchase of Kyoto compliant permits in the voluntary market.</li> </ul> </li> <li>• This requirement should apply while the current carbon price uncertainty persists. Once a carbon price is operational, proponents who are liable under that regime and thus managing their carbon liabilities should no longer be subject to these provisions.</li> </ul> <p>2. <b>Issue: The 'Greenhouse gas offset strategies' noted in 6.5.4 and detailed in section 6.7 are not consistent with the principles of offsetting.</b></p> <p>The measures outlined in section 6.7 are actions to be implemented by the proponent to increase efficiency or otherwise reduce emissions associated with the ammonium nitrate processing facility.</p> <p>The underlying principle of an offset is the payment of another entity to reduce greenhouse gas emissions and thereby offset the proponent's carbon footprint.</p> <p>On this basis, the measures proposed in section 6.7 are not considered to be 'greenhouse gas offset strategies'.</p> <p><b>Recommendation 2:</b> That the proponent identify the proposed measures as abatement measures rather than greenhouse gas offset strategies.</p> <p><b>Kwinana Industries Council</b></p> <ol style="list-style-type: none"> <li>1. Whilst Kwinana industry is mindful of the need to reduce greenhouse gas emissions, it is inevitable that reductions on the one hand will be offset by increased activity within the industrial area on the other. CSBP has previously demonstrated its performance in reducing greenhouse gas release into the environment, and is indicating that the trialling of secondary abatement technology in the future is strongly supported by KIC.</li> </ol>	
Site contamination	The CSBP KIC has been classified as 'Possibly Contaminated - Investigation Required' by the DEC Contaminated Sites Branch under the <i>Contaminated Sites Act 2003</i> . Contamination has been reported in soil and groundwater as a result of historic industrial practices during fertiliser and	<p><b>Cockburn Sound Management Council</b></p> <ol style="list-style-type: none"> <li>1. The CSMC believe a map showing areal [sic] extent of existing groundwater plumes on the CSBP estate should have been provided to help clarify the</li> </ol>	The EPA considers that the disturbance of contaminated areas within the ANPF arising from construction activities can be

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	<p>chemicals manufacture. Elevated concentrations of arsenic in groundwater were detected during routine groundwater monitoring in the vicinity of the original ammonia plant (now demolished). Investigations determined that the arsenic was relatively immobile, remaining relatively close to the source area. A recent human health and environmental risk assessment found that the main arsenic plume is decreasing in size and concentration. Arsenic concentrations in soil were not considered to be a risk to human health.</p> <p>The proponent will continue to manage the site in accordance with the <i>Contaminated Sites Act 2003</i>, and will continue to communicate investigations and management undertaken with the DEC and an accredited auditor. The proponent will continue to review and implement its existing Waste Management Plan and related Solid Waste Procedure in regard to any contaminated soil and/or groundwater that may be excavated during construction.</p>	<p>relevance of the arsenic plume to the PER. It is presumed CSBP would also have a company policy in place in terms of its current and future plans to manage the historical arsenic contaminated plume.</p>	<p>adequately managed by the proponent via consultation with the DEC's Contaminated Sites Branch in order to ensure compliance with the <i>Contaminated Sites Act 2003</i> and the <i>Contaminated Sites Regulations 2006</i> which are administered by the DEC. In view of the above, the EPA considers that this environmental factor does not require further evaluation.</p>
<b>SOCIAL SURROUNDINGS</b>			
<p>Risk and hazards</p>	<p><i>Individual risk of fatality</i></p> <p>Two risk scenarios have been investigated for the proposed expansion. The first scenario describes risk associated with importing ammonia (typically 14 shipments per year, up from the current licensed 9 shipments per year), the inclusion of the ANPF expansion facility and producing ammonia at the CSBP site for the proposal. The second scenario describes risk associated with the maximum proposed shipping rate of 25 shipments per year, the inclusion of the ANPF expansion facility and the cessation of ammonia production on site. The results obtained from the investigation are as follows:</p> <ul style="list-style-type: none"> <li>The existing ANPF exceeds the CSBP Kwinana Industrial Complex boundary criteria of <math>5 \times 10^{-5}</math> at one location (in the vicinity of the BP facility). The proposed expansion results in a slight increase in risk in this area.</li> <li>The proposed expansion does not exceed the criterion for active open space of <math>1 \times 10^{-5}</math>. Wells Park is located over 1 km from the proposed development and 850 m from the CSBP Jetty. The CSBP ammonia import infrastructure is situated entirely within CSBP/Fremantle Port Authority privately owned industrial land.</li> <li>The proposed expansion does not exceed the criterion for commercial developments of <math>5 \times 10^{-6}</math>. The nearest commercial operation would be the take away facility on Rockingham Road (corner Beach Road) which is over 1 km south-east from the proposed development. The commercial development contour extends some 50 m outside the CSBP KIC boundary in a south-easterly direction.</li> <li>The proposed expansion does not exceed the criterion for residential areas of <math>1 \times 10^{-6}</math>. There is no change in the <math>1 \times 10^{-6}</math> contour from the proposed development; it continues to extend outside the site boundary by 50 m on the western boundary. The nearest residential area is in Medina which is approximately 3 km from the proposed development.</li> <li>The proposed expansion does not exceed the criterion for sensitive developments of <math>5 \times 10^{-7}</math>.</li> </ul>	<p><b>Cockburn Sound Management Council</b></p> <ol style="list-style-type: none"> <li>Similarly, no information is provided to clarify if increased risk will result from increased truck movements and possible accidents associated with increased production of ammonium nitrate.</li> </ol> <p><b>Kwinana Industries Council</b></p> <ol style="list-style-type: none"> <li>Published risk contours indicate that there will be no (or at most, negligible) change to the risk profile of neighbouring communities.</li> </ol> <p>Risk profile changes to neighbouring industries have been identified and management strategies identified. Risk 'over the fence' is a fact of life in an industrial area such as the KIA. Companies in this environment manage this as part of their normal risk management planning. The proponent has indicated their awareness of this in their proposal.</p> <p>KIC submits that the proposal by CSBP to expand its operations as detailed in their PER is sound and its [sic] environmental outcomes do not compromise the work being carried out across the KIA in respect to continually improving environmental performance.</p> <p><b>Public</b></p> <ol style="list-style-type: none"> <li>I write this submission on CSBP's PER for the proposed expansion of their ammonium nitrate facility in Kwinana (Phase 2). I write as an individual citizen of Western Australian. I am concerned about the risk to the public from this proposal as set out in the PER Appendix 6.</li> </ol> <p>I am also concerned about the public risk related to the proposed Perdaman fertiliser plant near Collie and the two proposals are in some ways comparable. For Perdaman's proposal, the major contribution to off-site individual fatality risk was deemed to be a catastrophic release of anhydrous ammonia from a 10,000 tonne cryogenic double walled tank (Perdaman PER). The Perdaman PER Appendix K section 4.6.3 states the consequences of a release of 10,000 tonnes of ammonia would be up to 70% fatality 5km from the source and 1-7% fatality 8km from the source. This conclusion is vastly underestimated because nonstandard data and</p>	<p>As the ANPF is classified as a Major Hazard Facility (MHF), the proponent would be required to obtain the necessary approvals for the construction and operation of the proposed expanded ANPF, the manufacture of explosives, and the transport and storage of dangerous goods from the Department of Mines and Petroleum (DMP) under the requirements of the <i>Dangerous Goods Safety Act 2004</i> and the associated <i>Dangerous Goods Safety Regulations 2007</i>. The DMP is the relevant decision making authority which is responsible for assessing the risk levels associated with the proposal and the granting of the above mentioned approvals.</p> <p>In addition, the EPA considers that the concerns that were raised have been adequately addressed by the responses provided by the proponent.</p> <p>In view of the above, the EPA considers that this environmental factor does not require further evaluation.</p>

Preliminary environmental factors	Proposal characteristics	Government agency and public comments	Identification of key environmental factors
	<p><i>Societal risk</i></p> <p>Societal risk results from the Kwinana Cumulative Risk and Land Use Plan (Department of Mines and Petroleum, 2008) indicate that the impact of the proposed development, when considered with the existing facility, is negligible on the surrounding residential population and tolerable for the neighbouring industrial facilities.</p> <p><i>Management of risk</i></p> <p>The proponent will continue to maintain a Safety Report as described under the <i>Dangerous Goods Safety Act 2004</i> (and associated legislation, as required by the ANPF dangerous goods licence or other relevant legislation, on advice of the Department of Mines and Petroleum to ensure that emergency response is appropriate for all scenarios. The proponent will obtain and maintain the relevant Dangerous Goods Licences for the ANPF. The proponent will present a full quantitative risk assessment (QRA) to the Department of Mines and Petroleum for consideration in line with the requirements of the Dangerous Goods Licence.</p>	<p>methods were used to calculate the risk.</p> <p>For example, Perdaman's use of a figure for the toxic concentration of ammonia of 15,500ppm being 70% fatal after 10 minutes exposure whilst Australian Standard 2022:2003 and FESA guidance both state 5000ppm ammonia is 100% fatal within a few minutes. A Collie community group commissioned an independent evaluation of Perdaman's Risk Assessment (PRACE, 2010; available on request), which was written and reviewed pro-bono by the foremost experts in the field, and found that Perdaman vastly underestimated the off-site individual risk. The scientific reality is that Perdaman's proposal has, by the EPA's own criteria, an unacceptable fatality risk to the population more than 10km away, related to the possibility of 10,000 tonnes of cryogenic anhydrous ammonia being released from the double walled tank.</p> <p>The CSBP PER states there are two single walled cryogenic anhydrous ammonia tanks of 10,000 tonnes and 30,000 tonnes respectively. Unlike Perdaman, there is also a significant amount of explosive ammonium nitrate involved in this plant. It is astounding then that CSBP's PER appears to conclude a lower off site individual fatality risk than Perdaman's PER with significant risk zones in CSBP PER Figures 6 to 8 shown as extending only about 700m from both the ammonia tanks to the north west.</p> <p>2. The EPA website states "informed comments are most useful, so find out as much as you can by...reading documents relating to the proposal or policy..."; "the EIA process is designed to be transparent and accountable".</p> <p>The CSBP PER does not contain any information in the risk assessment about the methods or data used to calculate the risk, instead stating that Appendix 6 is a review of referenced previous risk assessments with a small amount of additional data. These previous documents therefore must be considered to form part of this PER.</p> <p>Despite repeated requests for the referenced documents which are stated to contain all the details relevant to the Appendix 6, I was unable to obtain them in time before the submission period closed. After not replying to my initial request, CSBP replied to my second email that "these documents contain confidential information which is not for public release". They offered to supply me with information if I could be specific about what I needed but this was not practical as I wanted to read all the details of the risk assessment methodology so as to make a fully informed opinion. Neither the EPA nor the DMP were able to provide me with the documents. I therefore consider CSBP's refusal to provide these documents in their entirety as a breach of the PER process.</p> <p>3. A basic internet search shows the consequences of an ammonia release are far greater than CSBP is admitting in their PER. For example, the actual accidental release of 7000 tonnes of ammonia in Jonova, Lithuania resulted in the evacuation of a city of 40,000 people located 12km from the plant.</p> <p>Modelling software available free from the US EPA shows a release of 10,000 tonnes of cryogenic ammonia as having definite human fatalities more than 10km away. For CSBP to show the risk zone as less than 1km from the plant when they will store 40,000 tonnes of ammonia, plus vast amounts of highly explosive ammonium nitrate both in solution and as a</p>	

Preliminary environmental factors	Proposal characteristics	Government agency and public comments	Identification of key environmental factors
		<p>solid, does not add up.</p> <p>Hence, I object to this proposal as I feel that the risk to the public has not been made clear and transparent that the risk contours shown in Appendix 6 are not justified or explained and that CSBP appear to be grossly underestimating the true risk levels.</p> <p>4. I request the EPA to require CSBP to make the PER fully transparent and accountable, particularly relating to Appendix 6, and for it to be readvertised for public comment, or alternatively, I request the EPA to commission a fully independent risk assessment which uses the National guidelines, including EPA, enHealth and Australian Standard requirements, for methods and data inputs to risk assessments.</p>	
Public health	<p>Air and noise emissions associated with the proposal have the potential to affect public health.</p> <p>Potential impacts of air and noise emissions associated with the proposal are discussed under the environmental factors of air quality and noise above.</p>	<p><b>Department of Health</b></p> <p>1. The Department of Health (WA Health) provided comments on the draft PER released for this project in September 2010 and is satisfied that the proponent has appropriately addressed these public health concerns within the current PER.</p>	<p>Given that the concerns that were raised by the Department of Health have been adequately addressed by the proponent and that potential impacts of air and noise emissions from the proposal will be considered under the environmental factors of air quality and noise, the EPA considers that this environmental factor does not require further evaluation.</p>
Light overspill	<p>As the proposed expansion is within the existing ANPF, the need for extra lighting would be minimal and unlikely to be noticeable in view of the surrounding land use. The following management strategies would be undertaken to minimise the potential for light overspill:</p> <ul style="list-style-type: none"> <li>• impacts will be minimised through strategic positioning of light poles and towers, and utilisation of directional lighting; and</li> <li>• where any additional light sources are installed, these will be in accordance with AS 4282-1997 for the control of light overspill.</li> </ul>	<p><b>Kwinana Industries Council</b></p> <p>1. These aspects of the proposal are unlikely to generate adverse environmental impacts.</p>	<p>Given that the Kwinana Industries Council did not raise any specific issues in relation to light overspill, the EPA considers that this environmental factor does not require further evaluation.</p>
Transport and shipping	<p><i>Road traffic</i></p> <p>During construction there will be an increase of about 150 light vehicles movements per day. During operation ammonium nitrate transport related vehicle movements would increase to about 37 trucks per day, seven days a week (i.e. a 48% increase over current truck movements at the site). When the increase in truck movements from the CSBP site and the other users on Kwinana Beach Road are taken into consideration (i.e. approximately 4700 users per day), this increase is about 0.8%.</p> <p><i>Shipping</i></p> <p>The number of shipping movements from CSBP is anticipated to increase by approximately 5%. Ammonium nitrate export shipping is expected to be phased out within the next four years due to high domestic demand, which would result in shipping movements decreasing by approximately 70 movements per year.</p>	<p><b>Kwinana Industries Council</b></p> <p>1. These aspects of the proposal are unlikely to generate adverse environmental impacts.</p>	<p>Given that the Kwinana Industries Council did not raise any specific issues in relation to transport and shipping, the EPA considers that this environmental factor does not require further evaluation.</p>

<b>PRINCIPLES</b>		
<b>Principle</b>	<b>Relevant Yes/No</b>	<b>If yes, consideration</b>
<p><b>1. The precautionary principle</b>  <i>Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In application of this precautionary principle, decisions should be guided by -</i></p> <p>a) <i>careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i></p> <p>b) <i>an assessment of the risk-weighted consequences of various options.</i></p>	Yes	<p>In considering this principle, the EPA notes the following:</p> <ul style="list-style-type: none"> <li>• investigations of the physical environment provided background information to assess risks and identify measures to avoid or minimise impacts;</li> <li>• the assessment of the adequacy of these impacts and management is provided in Section 3 of this report; and</li> <li>• conditions have been recommended where considered necessary.</li> </ul>
<p><b>2. The principle of intergenerational equity</b>  <i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i></p>	No	
<p><b>3. The principle of the conservation of biological diversity and ecological integrity</b>  <i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i></p>	No	
<p><b>4. Principles relating to improved valuation, pricing and incentive mechanisms</b></p> <p>(1) <i>Environmental factors should be included in the valuation of assets and services.</i></p> <p>(2) <i>The polluter pays principles - those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</i></p> <p>(3) <i>The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.</i></p> <p>(4) <i>Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solution and responses to environmental problems.</i></p>	Yes	<p>The proponent would be required to manage the gaseous and particulate emissions, noise emissions, and liquid and solid wastes generated by the proposed development. The proponent would bear the costs associated with meeting their obligations in this regard.</p>
<p><b>5. The principle of waste minimisation</b>  <i>All reasonable and practicable measures should be taken to minimize the generation of waste and its discharge into the environment.</i></p>	Yes	<p>The proposal would generate gaseous, particulate, liquid, and solid wastes. Hence, the proponent would be expected to address the waste hierarchy and minimise the generation of unavoidable wastes.</p>

## **Appendix 4**

**Identified decision-making authorities  
and  
recommended environmental conditions**

### Identified decision-making authorities

Section 44(2) of the EP Act specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This Appendix contains the EPA's recommended conditions and procedures.

Section 45(1) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified for this consultation:

<b>Decision-making authority</b>	<b>Approval</b>
1. Department of Environment and Conservation.	Works Approval and Licence under Part V of the EP Act.
2. Director General, Department of Mines and Petroleum.	Approvals for construction and operation of a Major Hazard Facility, explosives manufacture, and transport and storage of dangerous goods under the <i>Dangerous Goods Safety Act 2004</i> and associated <i>Dangerous Goods Safety Regulations 2007</i> .
3. Minister for Water.	Groundwater abstraction licences under the <i>Rights in Water and Irrigation Act 1914</i> .
4. Town of Kwinana.	Decision maker for permits and development approvals.

Note: In this instance, agreement is only required with DMA No. 3 since this DMA is a Minister.

RECOMMENDED ENVIRONMENTAL CONDITIONS

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

AMMONIUM NITRATE PRODUCTION EXPANSION  
PROJECT: PHASE 2, KWINANA  
TOWN OF KWINANA

**Proposal:** CSBP Limited proposes to expand its Kwinana Ammonium Nitrate Production Facility located within the CSBP Kwinana Industrial Complex, approximately 40 km south of Perth by incorporating additional components into the existing facility and re-engineering (debottlenecking) some existing components in order to increase ammonium nitrate production capacity from 520,000 tpa to 936,000 tpa. The proposal is further documented in Schedule 1 of this statement.

**Proponent:** CSBP Limited

**Proponent Address:** PO Box 345, KWINANA WA 6966.

**Assessment Number:** 1834

**Previous Assessment Number:** 1537

**Report of the Environmental Protection Authority:** 1407

**Previous Report of the Environmental Protection Authority:** 1182

**Previous Statement Number:** 689 (Published on 21 September 2005)

The proposal referred to in the above report of the Environmental Protection Authority may be implemented. The implementation of that proposal is subject to the following conditions and procedures:

**1 Proposal Implementation**

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

Published On

## **2 Proponent Nomination and Contact Details**

- 2-1 The proponent for the time being nominated by the Minister for Environment under sections 38(6) or 38(7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal.
- 2-2 The proponent shall notify the Chief Executive Officer of the Office of the Environmental Protection Authority of any change of the name and address of the proponent for the serving of notices or other correspondence within 30 days of such change.

## **3 Time Limit of Authorisation**

- 3-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.
- 3-2 The proponent shall provide the Chief Executive Officer of the Office of the Environmental Protection Authority with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

## **4 Compliance Reporting**

- 4-1 The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the Chief Executive Officer of the Office of the Environmental Protection Authority.
- 4-2 The proponent shall submit to the Chief Executive Officer of the Office of the Environmental Protection Authority the compliance assessment plan required by condition 4-1 at least 6 months prior to the first compliance report required by condition 4-6, or prior to implementation, whichever is sooner.

The compliance assessment plan shall indicate:

- 1 the frequency of compliance reporting;
- 2 the approach and timing of compliance assessments;
- 3 the retention of compliance assessments;
- 4 the method of reporting of potential non-compliances and corrective actions taken;
- 5 the table of contents of compliance assessment reports; and
- 6 public availability of compliance assessment reports.

- 4-3 The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by condition 4-1.
- 4-4 The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by condition 4-1 and shall make those reports available when requested by the Chief Executive Officer of the Office of the Environmental Protection Authority.
- 4-5 The proponent shall advise the Chief Executive Officer of the Office of the Environmental Protection Authority of any potential non-compliance within seven days of that non-compliance being known.
- 4-6 The proponent shall submit to the Chief Executive Officer of the Office of the Environmental Protection Authority the first compliance assessment report fifteen months from the date of issue of this Statement addressing the twelve month period from the date of issue of this Statement and then annually from the date of submission of the first compliance report.

The compliance assessment report shall:

- 1 be endorsed by the proponent's Managing Director or a person delegated to sign on the Managing Director's behalf;
- 2 include a statement as to whether the proponent has complied with the conditions;
- 3 identify all potential non-compliances and describe corrective and preventative actions taken;
- 4 be made publicly available in accordance with the approved compliance assessment plan; and
- 5 indicate any proposed changes to the compliance assessment plan required by condition 4-1.

## **5 Greenhouse gas abatement**

- 5-1 The proponent shall install, commission, and operate secondary nitrous oxide (N<sub>2</sub>O) abatement technology in the existing Nitric Acid Plants 1 and 2 prior to the commencement of debottlenecking procedures in these two plants.
- 5-2 The proponent shall provide the Chief Executive Officer of the Office of the Environmental Protection Authority with documentation which confirms the practical completion of the installation and commissioning of secondary N<sub>2</sub>O abatement technology in the existing Nitric Acid Plants 1 and 2 within six months following the completion of the installation and commissioning of

secondary N<sub>2</sub>O abatement technology in the existing Nitric Acid Plants 1 and 2.

5-3 Within three years following the date of this statement, and subsequently at intervals of two years, the proponent shall prepare and submit to the Chief Executive Officer of the Office of the Environmental Protection Authority a Greenhouse Gas Abatement Report which meets the following objectives:

1. demonstrates that maximising energy efficiency and opportunities for future energy recovery have been given due consideration in the design of the proposed expanded Ammonium Nitrate Production Facility;
2. ensures that the "greenhouse gas" intensity (i.e. tonnes of CO<sub>2</sub>-e produced per tonne of ammonium nitrate produced) is equivalent to, or better than benchmarked best practice; and
3. achieves continuous improvement in "greenhouse gas" intensity through the periodic review, and if practicable, adoption of advances in technology and process management.

5-4 The proponent shall make the Greenhouse Gas Abatement Report required by condition 5-3 publicly available in a manner approved by the Chief Executive Officer of the Office of the Environmental Protection Authority.

## **6 Decommissioning**

6-1 At least six months prior to the anticipated date of closure, the proponent shall submit a Final Decommissioning Plan designed to ensure that the site is suitable for future land uses, for approval of the Chief Executive Officer of the Office of the Environmental Protection Authority. The Final Decommissioning Plan shall set out procedures and measures for:

1. removal or, if agreed in writing by the appropriate regulatory authority, retention of plant and infrastructure agreed in consultation with relevant stakeholders;
2. rehabilitation of all disturbed areas to a standard suitable for the new land use(s) as agreed pursuant to the consultation referred to in condition 6-1(1); and
3. identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.

6-2 The proponent shall implement the Final Decommissioning Plan required by condition 6-1 from the date of closure until such time as the Minister for Environment determines, on advice of the Chief Executive Officer of the

Office of the Environmental Protection Authority, that the proponent's decommissioning responsibilities have been fulfilled.

- 6-3 The proponent shall make the Final Decommissioning Plan required by condition 6-1 publicly available in a manner approved by the Chief Executive Officer of the Office of the Environmental Protection Authority.

### **Notes**

1. Where a condition states "on advice of the Office of the Environmental Protection Authority", the Office of the Environmental Protection Authority will provide that advice to the proponent.
2. The Minister for Environment will determine any dispute between the proponent and the Office of the Environmental Protection Authority over the fulfilment of the requirements of the conditions.
3. 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 No. 1834)

CSBP Limited proposes to expand its Kwinana Ammonium Nitrate Production Facility (ANPF) by incorporating additional components into the existing facility and re-engineering (debottlenecking) some existing components in order to increase ammonium nitrate production capacity from 520,000 tonnes per annum (tpa) to 936,000 tpa.

The ANPF is located within the CSBP Kwinana Industrial Complex (KIC), approximately 40 kilometres (km) south of Perth (Figure 1). The CSBP KIC covers an area of approximately 138 hectares (ha) within the Kwinana Industrial Area (KIA). The proposal encompasses an area of approximately 1 ha within the CSBP KIC (Figure 2). A site plan of the CSBP KIC is shown in Figure 3.

The proposal requires the following changes to be made to the existing ANPF:

1. Debottlenecking of the existing nitric acid ammonium nitrate plants by 20% and construction of an additional nitric acid ammonium nitrate plant, which will then be debottlenecked by 20%, which would result in a total nitric acid production capacity of 720,000 tpa and a total ammonium nitrate solution production capacity of 936,000 tpa.
2. Debottlenecking of the 2008 prilling plant by 100% to double output.
3. Construction of an additional 3,500 tonne 100% nitric acid solution tank (to store 63% nitric acid solution).
4. Construction of an additional 305 cubic metre (m<sup>3</sup>) ammonium nitrate solution tank.
5. Construction of a new auxiliary boiler.
6. Construction of additional solid ammonium nitrate storage facility (within Dangerous Goods Licence approved limit).
7. Upgrade of the existing ammonium nitrate solid and solution despatch facilities.
8. Upgrade of existing utilities and supporting infrastructure and construction of new utilities and supporting infrastructure to support the expansion.

The construction of the third nitric acid ammonium nitrate plant is planned to be completed before debottlenecking activities are undertaken on the existing nitric acid ammonium nitrate plants. Debottlenecking of the nitric acid ammonium nitrate plants would be undertaken as required to meet increased demand for product. There would be no increase in ammonia production or storage capacity on site.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Chapter 1 - Section 5 of the PER document (Strategen & Parsons Brinckerhoff, 2010).

**Table 1: Summary of key proposal characteristics**

Element	Description
<b>General</b>	
CSBP KIC site area	Approximately 138 ha.
Proposal area	Approximately 1 ha within CSBP KIC site boundary.
Project life	20 - 30 years.
Plant operating hours	24 hours/day operation, 365 days per year, except for maintenance shutdowns.
<b>Plant components</b>	
Nitric acid plants	Increase from two plants to three plants. The new third nitric acid plant will be designed and constructed to incorporate tertiary nitrous oxide (N <sub>2</sub> O) abatement technology.
Nitric acid storage tanks	Increase in storage capacity from approximately 2,000 tonnes to 5,500 tonnes via construction of an additional 3,500 tonne 100% nitric acid solution tank (to store 63% nitric acid solution).
Ammonium nitrate solution plants	Increase from two plants to three plants.
Ammonium nitrate (90% solution) storage tanks	Increase from approximately 305 m <sup>3</sup> to 610 m <sup>3</sup> total capacity.
Ammonium nitrate (70 - 90% solution) storage tank	Approximately 730 m <sup>3</sup> capacity (No change).
2008 prilling plant	Debottlenecked.
Ammonium nitrate bag packaging facility	No change to existing facility.
Ammonium nitrate solids storage facility	Construction of an additional solid ammonium nitrate storage facility (within Dangerous Goods Licence approved limit).
New auxiliary boiler	
<b>Production</b>	
Total nitric acid production	Increase from approximately 400,000 tpa to 720,000 tpa.
Total ammonium nitrate solution production	Increase from approximately 520,000 tpa to 936,000 tpa.
Total prilled ammonium nitrate production	Increase from approximately 420,000 tpa to 780,000 tpa.
Net power generation	Increase from approximately 4 MW to 6 MW.
<b>Inputs</b>	
Water	<p>Additional quantity of approximately 520 ML/yr above current usage of about 3,325 ML/yr consisting of about 400 ML/yr sourced from the Kwinana Water Reclamation Plant (KWRP) and the remainder sourced from the superficial aquifer, the Western Power Corporation (WPC) Industrial Water Source, and scheme water.</p> <p>Additional quantity of approximately 1,500 to 1,900 ML/yr above current usage of about 3,325 ML/yr if sufficient water cannot be obtained from the KWRP and it has to be sourced from the superficial and sub-artesian aquifers, the WPC Industrial Water Source, and scheme water.</p>
<b>Outputs</b>	
Oxides of nitrogen (NO <sub>x</sub> )	Increase from approximately 269 tpa to 569 tpa.
Ammonium nitrate particulates as PM <sub>2.5</sub>	Increase from approximately 12 tpa to 20 tpa.
Ammonia (NH <sub>3</sub> )	Increase from approximately 12 tpa to 18 tpa.
Greenhouse gas emissions	Decrease from approximately 925,688 tonnes of CO <sub>2</sub> -e per year down to approximately 264,000 tonnes of CO <sub>2</sub> -e per year for Scenario 3 in the PER document.
Liquid waste	Increase from approximately 2 ML/day to 2.4 ML/day discharged via the Sepia Depression Ocean Outlet Landline (SDOOL).

**Abbreviations**

CO<sub>2</sub>-e carbon dioxide equivalent  
 ha hectares  
 m<sup>3</sup> cubic metres  
 ML/day megalitres per day  
 ML/yr megalitres per year

MW megawatts (10<sup>6</sup> watts)  
 PER Public Environmental Review  
 PM<sub>2.5</sub> particulate matter with an aerodynamic diameter of less than 2.5 micrometres  
 tpa tonnes per annum

**References**

1. Strategen & Parsons Brinckerhoff (2010). *CSBP Kwinana: Ammonium Nitrate Production Expansion Project: Phase 2 Public Environmental Review*. Prepared by Strategen & Parsons Brinckerhoff for CSBP Limited. November 2010.

## **Figures (attached)**

Figure 1: Regional location (Source: Figure 1.1 from Strategen & Parsons Brinckerhoff, 2010).

Figure 2: Site location (Source: Figure 1.2 from Strategen & Parsons Brinckerhoff, 2010).

Figure 3: CSBP Limited Kwinana Industrial Complex plant layout (Source: Figure 1.4 from Strategen & Parsons Brinckerhoff, 2010).

Note - The above mentioned Figures 1 to 3 are as included in the main body of this report.

# **Appendix 5**

**Summary of submissions and  
proponent's response to submissions**