Yara Pilbara

Response to Questions on Notice:

Parliamentary Inquiry into the Protection of Aboriginal Rock Art on the Burrup Peninsula

13th March 2017

Yara Pilbara

Postal Address
Locked Bag 5009
Karratha, WA 6714
Australia

Visiting Address
Lot 564, Village Road
Burrup, Western Australia
WA 6714

Telephone
+61 8 91834100
Facsimile
+61 8 9185 6776

Registered Office:
Level 5,
182, St. George Terrace Perth
WA 6000, Australia
Telephone: +61 8 9327 8100
Facsimile: +61 8 9327 8199

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1 Introduction

Yara Pilbara welcomes the opportunity to provide additional information to the committee in response to questions taken on notice during the Senate Inquiry hearings held on 17 February 2017. Before doing so, Yara Pilbara would make the following observations.

1.1 Yara Pilbara Site Visit

The committee may consider that a site visit would be helpful in getting a better understanding of Yara Pilbara's operations. If so, Yara Pilbara would be pleased to provide a tour of its Burrup operations to committee members at a mutually convenient time.

1.2 Assertions made during the Inquiry

Yara Pilbara has been disappointed by the number of assertions made to the committee, both in written submissions and in comments orally during the hearing on 17 February 2017, which involve speculations or assumptions for which there appears to be no reasonable or rational foundation.

1.3 World Heritage Listing

Yara Pilbara is particularly aggrieved by the imputation made that Yara Pilbara had offered financial support to the Murujuga Aboriginal Corporation (MAC) in relation to the proposed Living Knowledge Centre on the condition that the MAC refrain from supporting World Heritage Listing for the Burrup Peninsula. Yara Pilbara would like to re-iterate that no such pre-condition on funding has been imposed by Yara Pilbara or even discussed with MAC representatives. Further, it was made clear at the hearing before the committee that Yara Pilbara will support World Heritage Listing if that is desired by MAC.

Nor is it correct to imply that Yara Pilbara has been seeking to influence decisions about the location of the Living Knowledge Centre. Yara Pilbara's offer to support the Living Knowledge Centre is not dependent upon the centre being located at a specific site.

1.4 Contributing emissions from the Ammonia Plant and TAN Plant

Yara Pilbara also wishes to provide context around the contribution emissions from the Ammonia Plant and TAN Plant make. Yara Pilbara constitutes 2.1% of NOx emissions, 14.1% of SO2 emissions and 21.7% of particulate (PM10) emissions compared to the total environmental emissions of these substances on the Burrup Peninsula. This data demonstrates that the most significant risks to rock art from nitrogen and sulfur oxide emissions is not presented by the two Yara Pilbara plants.

2 Response to Post – Hearing Questions on Notice

2.1 What environmental conditions do you adhere to for ammonia leaks?

Yara Pilbara Fertilisers Pty Ltd (YPF) operates in accordance with License L7997/2002/11. The license does not include specific emission limits for ammonia gas release. YPF is obliged to ensure compliance with the requirements of the Environmental Protection Act (1986) (WA) (EPA Act) and WA Environmental (Unauthorised Discharge) Regulations 2004 (WA) when there are incidents of unplanned emissions that cause or may cause pollution.

The YPF Environmental License conditions include the following:

- **Condition 2.2.1** which requires that YPF maintain a pilot burner on the process waste gas and ammonia storage tank flare. This requirement is directed to ensuring that any gas vented to the flare is combusted prior to emission.
- **Condition 5.2.1** which requires that YPF provide details in the annual environmental report of all equipment failures or malfunctions, which would include those resulting in ammonia release. An example is the release resulting from failed valves mentioned in the evidence given at the hearing.
- **Condition 5.3.1** which requires YPF to report, as soon as possible, any start up, shut down or upset condition of the plant. The unplanned emission of ammonia gas due to start up, shut down or upset condition would trigger such reporting requirements.

Unplanned emission of ammonia gas from Yara Pilbara Nitrates Pty Ltd (YPN) may also trigger reporting under the requirements to report emissions under the WA Environmental Protection Act (1986) (WA).

2.2 What is the projected pollution load from your proposed TAN plant?

The predicted emissions from the TAN plant have been assessed through Commonwealth and State environmental impact assessment processes and formal approval conditions prescribing air emission mitigation and monitoring have been established by both regulators to ensure the protection of human health, the environment and the rock art of the Burrup Peninsula. Yara Pilbara is committed to full compliance with the approval conditions established for the TAN Plant and the implementation of best practice technology to minimise air emissions.

The predicted emission loads to air from the TAN Plant as provided in Ministerial Statement 870 are contained in the following table.

Table 1: Predicted emission loads for the TAN plant

Substance	Predicted Emission Loads
Nitrogen Oxides (NOx)	Up to 135 tonnes/year (t/y)
Nitrous Oxide (N_2O)	Up to 163.7 t/y
Carbon monoxide (CO)	Up to 41 t/y*
Methane (CH_4)	Up to 17.8 t/y
Ammonia (NH_3)	Up to 0.02 grams/second (g/s)
Sulphur Dioxide (SO_2)	Trace
Carbon Dioxide (CO_2)	Up to 532.6 t/y

*__Note__: The Public Environmental Rreview process undertake in 2010 pursuant to the EPA Act and associated regulations assumed that UHDE DeNOx technology, which would have burned natural gas, would be used in the TAN plant. As described in section 2.4, Espindesa DeNOx technology was subsequently implemented which has reduced the projected CO emissions to a negligible level.

2.3 What evidence do you have that your nitrous PM10 emissions are a safe emission level for human health, the petroglyphs or the environment?

The effect of emission levels from Yara Pilbara's operations on human health, the petroglyphs and the environment generally are measured against a number of multi-layered emission criteria. These criteria which provide objective parameters against which to measure emissions from industrial activity, include:

- the National Environmental Protection Measures (NEPM) ;
- the criteria defined by the New South Wales (NSW) Department of Environment and Climate Change guidelines; and
- criteria established by Commonwealth Scientific and Industrial Research Organisation (CSIRO) through the Department of Environment Regulation (DER) managed Burrup Rock Art Technical Working Group (BRATWG) program.

In establishing Yara Pilbara's operations the NEPM and NSW guidelines were used to inform air emission modelling which was undertaken in 2013. The modelling considered all potential sources of ammonium nitrate dust and was completed using manufacturer guarantees on emission levels.

The emissions modelling methodology and outcomes were assessed by the DER during the TAN Plant Works Approval application. The Works Approval Environmental Assessment Report reviewed the air emission data and dispersion

modelling provided by Yara Pilbara and concluded that the PM_{10} emissions were determined to be insignificant.

2.4 How do you intend to capture the Carbon Monoxide you emit? Does it pose a health risk to humans or animals in the environment?

The impacts of carbon monoxide (CO) emissions from the TAN Plant were assessed in the public environmental review (PER) (which was published in January 2010) using dispersion modelling. As discussed in the PER these emissions were found to be insignificant when compared with the relevant standard (the Ambient Air Quality as measured under the NEPM). More specifically, the predicted worst-case CO ground level concentration was approximately 0.01% of the 8-hour average NEPM standard. As such, the conclusion reached in the PER was that CO emissions from the TAN Plant do not pose a significant risk to humans, flora or fauna in the environment.

Since the PER was published Yara Pilbara has installed NOx emission control technology in the constructed TAN Plant which is superior to what was contemplated during the approvals process for the Plant. This technology has been installed in the nitric acid unit in the TAN Plant. Accordingly, it is anticipated that the impacts of CO emissions from the TAN Plant will be even less significant than originally assessed.

More specifically, the UHDE DeNOx technology assessed in the approvals process, which burns natural gas in the DeNOx unit and produces CO emissions, has been replaced by Espindesa DeNOx technology. That technology utilises waste heat from the reactor to pre-heat the process gas in the DeNOx unit rather than pre-heating through the combustion of natural gas. As such, CO emissions from this part of the plant are avoided and the overall CO emissions are expected to be less than originally assessed in the PER.

CO is emitted from the Ammonia Plant from combustion of natural gas in the primary reformer furnace and package boiler. The ammonia production process involves formation of CO (and hydrogen) from steam reformation of natural gas. That CO is then converted to carbon dioxide in a shift reaction to produce additional hydrogen. Small amounts of unreacted CO are emitted through the venting of carbon dioxide.

The impacts of CO emissions from the Ammonia Plant were reassessed in 2015 by the Western Australian Office of the Environmental Protection Authority (OEPA) and the Western Australian Department of Environmental Regulation (DER), as part of an amendment to Ministerial Statement 586, which was approved in August 2015 by the Minister pursuant to Section 45C of the Environmental Protection Act (1986) (WA). During this reassessment it was determined that the worst-case predicted ground level CO concentrations from the operation of the Ammonia Plant were less than 0.2% of the NEPM. This determination indicates that the CO emissions from the ammonia plant carry a low risk of adverse impacts to human health and the environment as measured against the NEPM.

The assessments conducted by the various regulatory agencies have imposed no conditions or requirements that require the Ammonia or the TAN Plant to reduce carbon monoxide emissions via capture before discharge.

2.5 Do you have any concerns about your TAN plant being in a cyclone surge zone?

In 1996 the Burrup Peninsula Land Use Plan and Management Strategy was prepared by the Burrup Peninsula Management Advisory Board for the purpose of allocating land for industry, conservation, heritage and recreation. This document provides management objectives and outlines acceptable uses and development considerations in respect of the Burrup Maitland Industrial Estate.

The Burrup strategic industrial area is located within the City of Karratha. Under the City's Town Planning Scheme No.8, the strategic industrial area is zoned 'Strategic Industry'. Designated industrial sites within the Burrup Maitland Industrial Estate are actively marketed by the West Australian Land Authority (LandCorp) with the support of the WA Department of State Development (DSD) to take advantage of the region's natural gas resources.

The TAN Plant has been constructed on a designated site within the Burrup strategic industrial area. The location of the TAN Plant, design and operational procedures were considered in the PER process carried out by the OEPA under s38 of the EPA Act. Ministerial Approval was granted on 11 July 2011 (Statement No. 870). The planning and design phases of the TAN Plant included comprehensive risk assessments against established risk criteria. The risk assessments were required to demonstrate to the satisfaction of the WA Department of Mines and Petroleum (DMP) the TAN Plant's location and operation would not pose unacceptable levels of risk, The PER also specifically referred to the management measures put in place to minimise various risks which included those relating to the location of the TAN Plant.

2.6 What is the standard recommended separation distance between the Ammonium Nitrate plants and other industrial or residential facilities?

Why is there a recommended standard separation distance?

What is the separation distance between the proposed TAN plant and the Fertiliser plant?

Have you notified your insurance provider accordingly?

The applicable Western Australian planning approvals regime, which is administered by the DMP**,** DER and the OEPA, includes a risk based approach to the location of industrial facilities.

There is not a standard recommended separation distance between ammonium nitrate and other industrial or residential facilities. This risk based assessment

approach is also utilised in the European Union and other Australian states and territories.

The planning criteria for industrial developments in the vicinity of the TAN plant refers to industrial neighbours, that is, facilities not part of the Yara Pilbara complex. The planning requirements are documented in Hazardous Industry Planning Advisory Paper (HIPAP) 4: Risk Criteria for Land Use Planning.

The distance between the Ammonia and TAN Plants is 0.77 km.

Yara Pilbara's insurance providers conduct annual inspections and reviews as part of their internal processes and are aware of the separation distance between the plants.

2.7 What discussions have you had with Premier Barnett or the Commonwealth or State or Federal Government Departments about risks to people or the environment or the petroglyphs beyond your boundaries

No discussions have taken place with Premier Barnett regarding the risks to people, the environment or the petroglyphs beyond the boundaries of the TAN Plant and the Ammonia Plant.

All approvals for Yara Pilbara's operations have been obtained in accordance with the processes defined in the relevant State and Federal environmental and safety legislation. Those processes involved Yara Pilbara communicating extensively with Commonwealth and State regulators over a period of approximately 10 years. Yara Pilbara continues to liaise with all of the relevant regulators that administer this legislation regarding its operations on the Burrup Peninsula.

The PER process undertaken by Yara Pilbara, in conjunction with the Western Australian Environmental Protection Authority in 2010, in addition to other environmental planning processes undertaken with the DER and Department of Environment and Energy (at a Commonwealth level) specifically addressed environmental risks beyond Yara Pilbara's operational boundaries, including petroglyphs. These considerations were reflected in the approval obtained under the Environmental Protection & Biodiversity Conservation Act (EPBC Act) which sets out the required monitoring program for rock art sites.

Yara Pilbara has also had numerous discussions with the DMP, as part of the DMP's role in administering the Dangerous Goods Safety Act 2004 (WA) and Dangerous Goods Safety (Major Hazard Facilities) Regulations 2007, and other occupational health and safety legislation applicable to Yara Pilbara's operations. Regulatory approvals and reviews that were obtained from the DMP for both the TAN and Ammonia Plants (in accordance with their status as Major Hazard Facilities) have included risk assessments which have focused on the potential risk to persons and land uses beyond the site boundaries of both plants.

2.8 Do you have expansion plans for a solar powered ammonia/hydrogen plant in the Burrup adjacent to your Fertiliser and TAN plants? Why does it have to be in the Burrup and not at Maitland Industrial Estate?

Yara Pilbara is undertaking a feasibility study for a pilot project for production of hydrogen which will be produced by the process of electrolysis using seawater and electricity produced from solar energy. The hydrogen produced by the pilot plant will be used to produce ammonia using Yara Pilbara's existing ammonia production infrastructure. The pilot plant will be located within the existing lease boundary of the ammonia plant.

The hydrogen produced by the pilot plant is intended to be used in the existing Ammonia plant, partially replacing the use of natural gas and hence slightly reducing emission of NOx and CO2.

There is also a feasibility study ongoing for a larger scale renewable hydrogen/ammonia project which, if feasible, is proposed to be commissioned as a staged development. The second stage of this project may require the use of an adjacent designated industrial site within the Burrup Strategic Industrial Area to be used for solar panels.

Any further development of the project beyond this second stage will require much larger areas of land for solar panels, which are likely to be situated on larger tracts of land away from the Burrup Peninsula. This project has the potential to reduce NOx and CO2 emissions from Yara Pilbara's existing operations in the area. It is also seen as a first step in developing a "green ammonia" market that is less reliant on natural gas as a feedstock.

2.9 At the inquiry hearing you said that you are not required to conduct a survey of the rock art sites within 2 km radius of the project site, on what basis did you reach this conclusion?

Yara Pilbara has complied with the requirement under Condition 10(c)i of the EPBC approval to survey identified and known rock art sites within a 2 km radius of the project site. Under this condition it is not a specific requirement that all rock art sites within a 2km radius of the project site must be monitored.

In this regard, Yara Pilbara notes the following:

- The survey required by condition 10(c)i of EPBC 2008/4546 is directed to selection of additional rock art sites that are required to be monitored in a manner that is consistent with the 'DER-managed Monitoring Program' (as that expression is defined in condition 10(a)).
- The specific purpose for the survey is made clear from the chapeau (i.e., the introductory words) to condition 10(c) which is incorporated into and forms part of condition 10(c)i.

2.10 Please explain exactly how/why ammonium nitrate will not explode, as you outlined during the inquiry hearing?

For ammonium nitrate to be an explosive, it needs to be sensitised. Sensitisation for Yara Pilbara's TAN product only occurs at the customer's mine site, in preparation for use of the product in blasting. All ammonium nitrate at the Yara Pilbara site is equivalent to a fertiliser grade ammonium nitrate held at a hardware store.

Attention is drawn to the Code of Practice for Safe Storage of Ammonium Nitrate[1]:

"Pure AN is difficult to detonate, and flame, spark, rough handling, impact or friction are not known to cause a propagated detonation. An explosion of pure AN can be initiated with high explosives under ambient conditions, and explosives must never be used to break up or loose caked AN. Under ambient conditions, it is not possible to initiate AN by means of a bullet. However, the shock sensitivity of molten AN increases significantly with temperature, and severe mechanical impact under extreme conditions of temperature may lead to detonation in certain circumstances. AN can also explode without shock if heated sufficiently, but only if contaminated, under confinement, or both".

Further information on the properties of Technical Ammonium Nitrate can be found in the product Safety Data Sheet available from the Yara Pilbara website.

As a Major Hazard Facility, Yara Pilbara has multiple layers of safety systems, engineering controls and procedures for the safe production, storage and handling of Technical Ammonium Nitrate. Each of these systems applies one or more Safety Critical Elements (SCEs).

An SCE is a device, system, or action that would likely interrupt the chain of events following an initiating event, or that would mitigate the impacts of an event such that an incident does not result in serious harm or the likelihood of serious harm is reduced. The TAN plant incorporates SCEs, which are designed to prevent an incident or mitigate its consequences.

The application of these SCEs is detailed the YPN Safety Report which is approved by the DMP.

The Safety Critical Elements are detailed in Attachment A.

[1] Department of Mines and Petroleum, 2013, Safe storage of solid ammonium nitrate – code of practice (3rd edition): Resources Safety, Department of Mines and Petroleum, Western Australia, 14 pp

3 Response to Questions taken on Notice from Public Hearing 17th February 2017

3.1 This is a significant direct foreign investment by your company. Can you give us an idea of when Yara started looking at this investment internally, before you committed to the project? (Hansard, p. 33)

And further:

- **When, or how long before, did you actually consider an investment of this size?**
- **Did you inherit blueprints for this expansion at that stage**

Yara International ASA (Yara) first considered the concept for developing a TAN plant on the Burrup Peninsula in 2004, by utilising a designated adjacent industrial site to the ammonia plant within the Burrup Strategic Industrial Area. These industrial sites were being marketed by the Western Australian Land Authority (LandCorp) to promote downstream industry on the Burrup Peninsula and are zoned for 'Strategic Industry' as set out in the City of Karratha's Town Planning Scheme No.8.

Investment in the TAN Plant was considered by Yara in the context of its acquisition of an interest in the existing ammonia plant between 2004 and 2012, which was owned, constructed and operated by Burrup Fertilisers Pty Ltd prior to 2010 (now, Yara Pilbara Fertilisers Pty Ltd). Yara did not inherit blueprints associated with the construction of the TAN Plant.

Some background and history to Yara's consideration of their investment in the TAN Plant is set out below:

- In 2005, Yara made its original investment in the ammonia plant by acquiring a 30% interest in Burrup Holdings Pty Ltd (Burrup Holdings) (now known as Yara Pilbara Holdings Pty Ltd). At this time Yara took an interest in a company, which was incorporated for the purpose of investigating the development of other projects in the area, including a potential TAN Plant to service mining customers in the Pilbara.
- In May 2008, Burrup Holdings and Yara executed a memorandum of understanding concerning the proposed construction and operation of a new TAN plant. A Deed of Undertaking was executed in September 2008 that specifically referred to commitments regarding the construction of the TAN Plant.
- Subsequently, in December 2008, Burrup Holdings and Yara International executed a term sheet in relation to the proposed construction, operation and maintenance of a TAN plant on the Burrup Peninsula through Burrup Nitrates Pty Ltd (now known as Yara Pilbara Nitrates Pty Ltd (YPN)) (as the proposed incorporated joint venture vehicle) (TAN Term Sheet). Under the terms of TAN Term Sheet, Yara International assumed responsibility on behalf of YPN for undertaking a feasibility study and determining projected plant costs,

and for funding 100% of the study. Once completed, the feasibility study was to be delivered to Burrup Holdings and the parties were to determine whether they wished to proceed with the construction and development of the TAN project.

- In February 2011, Yara signed a letter of intent addressed to Tecnicas Reunidas S.A. (TR), (the Spanish EPC Contractor responsible for building the TAN Plant) (Letter of Intent). This letter confirmed its intention, on behalf of YPN, to enter into a EPC Lump Sum Turn Key Contract (EPC Contract) with TR, for the design, engineering and construction of the TAN plant, provided certain conditions referred to in the Letter of Intent were satisfied, including approval by the board of Burrup Holdings. On 23 March 2011, Yara publicly announced that it had signed the Letter of Intent. On 31 May 2011, Yara announced that the construction TAN was delayed due to the uncertainty around the decision-making ability of the Board of Burrup Holdings Ltd.
- In January 2012, Yara acquired a 51% interest in Burrup Holdings Pty Ltd, in conjunction with Apache Corporation, who acquired a 49% interest. At that time Yara was appointed as the operator of the ammonia plant.
- In May 2012, Orica acquired a 45% interest, and Apache acquired a 10% interest in YPN, leaving Yara with 45% interest in YPN. Under the terms of this transaction Yara was appointed as operator, and is responsible for overseeing the construction and operation of the TAN Plant by YPN.
- The EPC Contract for the construction of the TAN Plant was formally executed by YPN with TR on 24 May 2012, and construction of the TAN Plant commenced shortly thereafter.
- In November 2015, Apache sold its interest in the ammonia plant and the TAN plant to Yara pursuant to which Yara acquired an 100% interest in Burrup Holdings (and thereby full operational control of the ammonia plant). This transaction increased Yara's interest in YPN and therefore the TAN Plant from 45% to 55%.

3.2 What is the pollution load at your existing plant? (Hansard, p. 34)

The emissions load for the existing (ammonia) plant for 2015 and 2016 is presented in Appendix A. The data has been provided to the Clean Energy Regulator under the National Pollution Inventory (NPI) requirements. The emissions detailed below are prepared by specialist external consultants.

3.3 What environmental conditions do you adhere to for ammonia leaks? On the Ammonia plant. The Fertiliser plant. (Hansard, p. 34)

Please refer to the response in section 2.1.

3.4 Have you had any leaks since February 2015? Leaks of ammonia. (Hansard, p. 34)

And further:

- **Could you please take on notice leaks for 2015, the number and volume of each, and the volume of each of those four leaks in 2016? Could you check from the beginning of 2015? (Hansard, p. 34)**

There are a number of processes YPF use to report emissions of ammonia from the ammonia plant to both State and Federal regulatory departments. These are:

- Notification under Section 72(1) (s72) of the Environmental Protection Act 1986;
- As per Licence (L7997/2002/11) condition 5.2.1 requiring a summary of any environmental incidents that have occurred in the Annual Environmental Report (AER);
- As per License (L7997/2002/11) condition 5.3.1 (refer to Section 3.7);
- Submission of the NPI data to the Department of Environment Regulation which is subsequently submitted to the Clean Energy Regulator (the Federal government body responsible for measuring, managing, reducing or offsetting Australia's carbon emissions).

In 2016 there were four (4) releases of ammonia gas and one (1) release of liquid ammonia. It was determined that none of the ammonia releases had any offsite impacts. The releases in 2016 were reported to the DER through the methods detailed in the following table.

There were no ammonia releases in 2015 reported in either the AER or via a s72 notification under the Environmental Protection Act 1986 (WA). Please refer to table 2 in Section 3.7 for details of reports made to the DER in respect of upset conditions.

Table 2: Overview of ammonia releases

Year	#	Date	Volume of ammonia gas	Reporting Process
2016	1	03/12	3.50 tonnes (note: liquid ammonia, not ammonia gas)	AER
	2	03/06	0.70 tonnes	s72 notification
	3	30/05	1.10 tonnes	s72 notification
	4	25/03	1.40 tonnes	s72 notification
	5	03/02	1.72 tonnes	AER

3.5 What is the projected pollution load from the TAN plant? The total pollution load? (Hansard, p. 35)

Please refer to the response in section 2.2.

3.6 In terms of your new nitrate plant, my understanding is that it is modular and it can be moved.

And further:

- **Has there been any estimation of costs by the company for moving that plant somewhere else, if there was a risk in the future that emissions were too high? Mr Evans might pull me up for a hypothetical question but, nevertheless, it is an important one. I will not ask if you have done any contingency planning, but (Hansard, p. 37)**
- **Could you give the committee an idea of what kinds of costs you would be looking at for relocation.**
- **So that is not what 'modular' means then? It could not be easily relocated?**

It is correct that the TAN plant had been built in modular form. This means that certain parts of the plant had been pre-assembled before being shipped from the construction yard to the TAN plant site.

- Upon arrival at site, the modules were placed into their final position. At this point, a process was undertaken to connect all piping, power supplies, instrumentation cabling etcetera in a manner which is identical to any other chemical plant that had not been built in a modular way.
- Despite what the name ‘modular’ may suggest, the TAN plant is not a “plug and play” device. On the contrary, the end result after construction is a plant with thousands of interconnected pipes, tubes and cables which run all through the plant like in any other plant in the chemical industry.

Such a plant cannot be dismantled into modules again without major works at a major cost. These costs would be at a level which would be roughly equal to relocating any other similar chemical plant that had not been constructed in a modular way. Further, the TAN plant makes use of the utilities available at the YPF site including the cooling water and waste water treatment systems available for the industrial users at the Burrup Strategic Industrial Area.

Operating the TAN plant from another, distant location would also require an ammonia pipeline to be built from the YPF facility. Operating a very long ammonia pipeline increases risk. Currently the pipeline between YPF and YPN is short and is protected, secured and maintained.

Finally, in the case of the TAN plant, which has to operate in a very competitive market, the cost of relocation and the losses related to the extra operational downtime would likely be financially unacceptable and result in the loss of the significant sums invested by Yara and Orica to construct the TAN Plant (being

approximately AUD$1 billion. Such a course of action would also result in the loss of many jobs which have been created by the project in Karratha, where the workforce lives.

3.7 How many circumstances have there been with regard to upset conditions (At the ammonia plant)? (Hansard, p. 38)

An “upset condition” in this section has been defined as venting during normal shutdown and start-up processes (plant trip).

Since 2015, 8 circumstances of “upset conditions” have been reported to the DER. This accounted for 14 plant trips in total, indicated in the table below:

Table 3: Overview upset conditions and plant trips

Year	# Upset conditions	Date of plant trips *(shut down – restart)*
2017	1[a]	04/02 - 17/02 04/02 – 09/02 09/02 – 17/02
2016	1	16/01 – 20/01
	2	26/04 – 02/05
	3	25/07 – 03/09
2015	1	13/03 – 17/03
	2[b]	20/05 - 02/06 20/05 – 26/05 27/05 – 29/05 30/05 – 30/05 31/05 – 02/06
	3[c]	11/10 - 30/11 11/10 – 04/11 06/11 – 08/11 10/11 – 30/11
	4	08/12/15 – 09/01/16

NOTES

[a] The Non-Standard Flaring & Venting report submitted to the DER covered two trips in the period 4 to 17 February 2017.

[b] The Non-Standard Flaring & Venting report submitted to the DER covered a number of trips in the period 20 May to 2 June 2015.

[c] The Non-Standard Flaring & Venting report submitted to the DER covered a number of trips in the period 11 October to 30 November 2015.

3.8 Best Available Technology

"We have installed the best available technology in that plant, which consists of a double wet scrubber system on the main stack of the plant. So there is a double system filtering out particles and also ammonium emissions if they are still in the fumes by using a chemical process in the stack to clean the gases. It is worldwide best practice that is described by the European fertiliser association. "Is it endorsed by European regulators? "Yes" (Hansard, p. 38)

And further:

- **Could you provide us with some information on notice? Your comment is that you have incorporated best practice, and I am just keen for you to demonstrate it.**
- **You have just said it is international best practice and I am keen for you to demonstrate how it is international best practice. You can just do that on notice.**

Please refer to Attachment B: *The Burrup TAN Plant Emission Comparison with Best Available Techniques Reference Documents, dated 19/09/2012, Document Nº: 15626-F16-002.*

3.9 Can I ask if your air quality monitoring is 24 hours a day, seven days a week? I understand that you cannot tell me straightaway which is doing what.

And further:

- **Could you take it on notice to tell us which monitoring is 24 hours and which is responsive? (Hansard, p. 39)**
- **Does that mean the negative data was erroneous? You do not actually have the data—if the equipment was down, you do not have the data? Can you take on notice how many times that has happened. (Hansard, p. 40)**
- **If that was down, was other equipment down as well? Maybe take on notice how often the other equipment is down. (Hansard, p. 40)**

Could you take it on notice to tell us which monitoring is 24 hours and which is responsive? (p.39)

Details of the monitoring instrumentation and sampling duration and frequencies are summarised in Table 5 for boundary monitoring and Table 6 for off-site monitoring. Note that the actual sampling duration and frequencies in any period may be less than indicated due to instrument failures, power outages, decommissioning prior to cyclones and damage caused by weather conditions and other unforeseen reasons. The primary requirement of the monitoring is to provide data that are fit for purpose. As detailed in Table 5 and Table 6, that involves 24-hour monitoring for some parameters and other times for other parameters, commensurate with the capability of the respective methods.

Does that mean the negative data was erroneous?

In terms of negative data being "erroneous", this can be the case for instrument fault or error conditions, whereas negative values due to instrument drift are not considered erroneous and are retained in the data set for calculation of 24-hour average concentrations. This is an Australian/New Zealand standard (AS/NZS 3850.9.8-2008) recommendation for treating continuous PM_{10} data from TEOM instruments, which is typically adopted for other continuous monitoring methods for ambient dust. For 24 hour average TSP sampling, negative values reflect gravimetric errors and those data are rejected. For passive sampling of gases, negative data obtained by the laboratory is reported as less than the method detection limit.

Further details are provided in Table 7.

You do not actually have the data—if the equipment was down, you do not have the data? Can you take on notice how many times that has happened. (p.40)

As stated in the public hearing, Yara Pilbara engaged an Air Quality Monitoring consultant in mid-November 2016 to undertake a review of all AQM and baseline data. Monitoring equipment is considered by the expert to be down when the instrumentation is not available at the time when a measurement is required to be made.

Details of the instrument availability for the parameters of interest are provided in Table 8 (boundary locations) and Tables 9, 10, 11 and 12 for off-site locations.

Data have been obtained from boundary and off-site monitoring locations for parameters of interest, with the exception being TSP at two off-site locations sites. On Thursday 2 March 2017 Yara Pilbara briefed the department on the findings from the review and advised that the baseline monitoring data was still being analysed. Details of this issue are provided in attached correspondence (refer Attachment C).

Yara Pilbara can confirm that the data availability at off site locations exceeds the requirements from Condition 9 of EPBC Approval, being a minimum of 24 months of monitoring and at least one reading four times per year, for the following parameters:

- NH_3
- NO_2
- SO2
- TSP (at one off site monitoring location)
- Dust (dust deposition)

If that was down, was other equipment down as well? Maybe take on notice how often the other equipment is down. (p.40)

See response to previous question.

3.10 Could you let us know when you invited Mr Chapple, and if you know whether he has visited the site previously? (Hansard, p. 41)

An invitation for a briefing was sent by Yara Pilbara to Mr Chapple on Thursday, 18 August 2016. Mr Chapple's staff suggested a range of dates to visit the plant. Mr Chapple subsequently declined the invitation to attend Yara Pilbara's facilities on Friday, August 26.

Yara Pilbara provided a subsequent invitation to Mr Chapple on 30 August 2016 to attend a briefing at either Yara Pilbara's or Mr Chapple's Perth office. No response was received.

Appendix A – Emissions from Yara Pilbara Fertilisers

Table 4: NPI report 15/16, dated 16.02.17

Emissions Data

Substance	Usage (t/year)	Air Point (kg/year)	EET	Air Fugitive (kg/year)	EET	Total	Water (kg/year)	EET	Land (kg/year)	EET
Ammonia (total)	680668	63658	1	26803.37	3	90461.37	2081.4	3		
Arsenic & compounds		0.4152154	4			0.4152154	20.72043	3		
Beryllium & compounds		0.00249385	4			0.00249385				
Cadmium & compounds		2.284964	4			2.284964				
Carbon monoxide		2493	3,4	8865459	1,4	8867952				
Chromium (III) compounds		2.033447	4			2.033447				
Chromium (VI) compounds		0.8722081	4			0.8722081				
Copper & compounds		1.764879	4			1.764879				
Hydrogen sulfide	18.43			0.002736	1	0.002736				
Lead & compounds		1.035907	4			1.035907	6.433433	3		
Mercury & compounds		0.537137	4			0.537137				
Nickel & compounds		4.348252	4			4.348252	21.24073	3		
Oxides of Nitrogen		35800	1,3,4	3471.624	4	39271.624				
Particulate Matter 10.0 um		16194.43	4	250.9601	4	16445.3901				
Particulate Matter 2.5 um		16107.86	4	243.7503	4	16351.6103				
Polychlorinated dioxins and furans (TEQ)		0.00001030593	4			0.00001030593				
Polycyclic aromatic hydrocarbons (B[a]Peq)	0.5709426	1.325816	4	0.01197	4	1.337786				
Sulfur dioxide		4844.566	2,3,4	0.9024883	2	4845.4684883				
Sulfuric acid	99.72			0.000006099762	2	0.000006099762				
Total Volatile Organic Compounds	836.2632	516.1449	3,4	273.2602	4	789.4051				

Appendix B – Monitoring Information and Availability Data

Table 5: Monitoring instrumentation – monitoring duration and frequency – boundary locations

Parameter	Instrument	Monitoring duration and frequency	Responsive monitoring ?	Current status of monitoring
PM_{10}	TEOM	Continuous sampling, recording 5-minute average concentrations	No	Monitoring continues at one location to facilitate development of baseline TSP data
Dust deposition	Dust deposition gauge	Continuous passive sampling for 28, 30 or 31 day period (i.e. monthly). Monthly deposition rate reported	No	Monitoring completed at both locations
Wind speed and direction	Anemometer	Continuous measurement, recording 5-minute average concentrations	No	Monitoring continues at one location to facilitate development of baseline TSP data
Ambient temperature	Thermocouple	Continuous measurement, recording 5-minute average concentrations	No	Monitoring continues at one location to facilitate development of baseline TSP data
Rain gauge	Tipping rain gauge	Continuously available	Yes, only records rainfall when it occurs	Monitoring continues at one location
TSP	High volume air sampler (HVAS)	Sampling for 24 hour duration, every day for 20 days, then every 3rd day for 2 months	No	Monitoring recently commenced at one location as part of co-location study to provide PM_{10}/TSP adjustment factors for baseline TSP data
TSP	MicroVol TSP	Sampling for 24 hour duration, every day for 20 days, then every 3rd day for 2 months	No	Monitoring recently commenced at one location as part of co-location study to provide PM_{10}/TSP adjustment factors for baseline TSP data

Parameter	Instrument	Monitoring duration and frequency	Responsive monitoring ?	Current status of monitoring
TSP	MiniVol TSP	Sampling for 24 hour duration, every day for 20 days	No	MiniVol monitoring completed. Replaced by MicroVol TSP samplers for ongoing monitoring
PM_{10}	HVAS	Sampling for 24 hour duration, every day for 20 days, then every 3rd day for 2 months	No	Monitoring recently commenced at one location as part of co-location study to provide PM_{10}/TSP adjustment factors for baseline TSP data

Table 6: Monitoring duration and frequency – off- site locations

Parameter	Instrument	Monitoring duration and frequency	Responsive monitoring ?	Current status of monitoring
TSP	MiniVol TAS	Sampling for 24 hour duration, every 6 days	No	Replaced by MicroVol TSP samplers at all three off-site locations Frequency of monitoring increased to every 3 days
PM_{10}	ADR1500	Continuous sampling, recording 5-minute average concentrations	No	Decommissioned
Dust deposition	Dust deposition gauge	Continuous passive sampling for 28, 30 or 31 day period (i.e. monthly) Monthly deposition rate reported	No	Monitoring continues at all three off-site locations

Parameter	Instrument	Monitoring duration and frequency	Responsive monitoring ?	Current status of monitoring
NO_2	Initially, CSIRO passive sampler and more recently, Radiello passive sampler	CSIRO sampling continuously for nominal 4 week period, at least once per quarter Radiello sampling continuously for nominal 2-week period at least once per quarter	No	Monitoring continues at all three off-site locations
NH_3	Initially, CSIRO passive sampler and more recently, Radiello passive sampler	CSIRO sampling continuously for nominal 4 week period, at least once per quarter Radiello sampling continuously for nominal 2-week period at least once per quarter	No	Monitoring continues at all three off-site locations
SO_2	Initially, CSIRO passive more recently, Radiello passive sampler	CSIRO sampling continuously for nominal 4 week period, at least once per quarter Radiello sampling continuously for nominal 2-week period at least once per quarter	No	Monitoring continues at all three off-site locations
Rain sampler	Automatic opening “bucket” to capture rainfall	When rain occurs	Yes, activated when rainfall occurs	Monitoring continues at all three off-site locations
Rain gauge	Tipping rain gauge	Continuously available	Yes, only records rainfall when it occurs	Monitoring continues at all three off-site locations

Table 7: Negative data

Instrument	Reason for negative data	Treatment of negative data
TEOM PM_{10}	Volatiles (moisture or organics) on dust sampled onto filter can volatilise giving a lower weight after sampling than before A negative result will therefore be reported for that 5-minute average	Negative values that reflect volatiles on dust samplers are retained in 5-minute average data set for calculation of 24 hour average concentrations Negative values due to error conditions are rejected as part of quality assurance assessment
MicroVol TSP	Error in gravimetric analyses (filter weighs less after sampling)	Data are rejected
ADR1500 PM_{10}	Instrument zero drift Instrument error condition	Negative values caused by drift are retained in data set for calculation of 24 hour average concentrations Negative values due to error conditions can be identified from the typically constant magnitude of the values. Those values are removed from the data set
Dust deposition	Not possible to generate negative results	Not applicable
Passive samplers NO_2, NH_3, SO_2	Instrument response outside instrument calibration lower limit	Negative data reported as less than detection limit
Rain sampler	Not possible to generate negative results	Not applicable
Rain gauge	Not possible to generate negative results	Not applicable

Table 8: PM_{10}, wind speed and direction 5-minute data availability – TAN Plant boundary locations

Period	West boundary location			East boundary location
	PM_{10}	WS	WDV	PM_{10}
1/7/13 to 31/12/13	73%	71%	71%	74%
1/1/14 to 30/6/14	54%	73%	73%	52%
1/7/14 to 31/12/14	70%	24%	24%	74%
1/1/15 to 30/6/15	46%	15%	15%	54%
1/7/15 to 31/12/15	0%	0%	0%	0%
1/1/16 to 28/2/16	0%	0%	0%	0%
WS = wind speed WDV = wind direction (vector average)				

Construction was completed late February 2016 and monitoring was no longer required thereafter.

Table 9: TSP data availability at off-site locations

Period	Number of 24-hour average samples
	Water Tanks
Sept-Nov 2013	13
Dec 2013-Feb 2014	4
Mar-May 2014	8
Jun-Aug 2014	3
Sept-Nov 2014	3
Dec 2014-Feb 2015	12
Mar-May 2015	9
Jun-Aug 2015	8
Sept-Nov 2015	5
Dec 2015-Feb 2016	4

Period	Number of 24-hour average samples
Mar-May 2016	13
Jun-Aug 2016	8
Sept-Nov 2016	10
Dec 2015-Feb 2017	4
Total	**104**

Table 10: Dust Deposition data availability at off-site locations

Period	Number of monthly average samples		
	Burrup Rd	**Water Tanks**	**Deep Gorge**
Sept-Nov 2013	3	3	3
Dec 2013-Feb 2014	1	1	1
Mar-May 2014	2	2	3
Jun-Aug 2014	3	3	3
Sept-Nov 2014	2	2	2
Dec 2014-Feb 2015	2	2	2
Mar-May 2015	0	2	2
Jun-Aug 2015	2	3	3
Sept-Nov 2015	3	3	3
Dec 2015-Feb 2016	3	3	3
Mar-May 2016	3	3	3
Jun-Aug 2016	1	1	1
Total	**25**	**28**	**29**

Table 11: Gases data availability at off-site locations

Period	Number of monthly average samples		
	Burrup Rd	Water Tanks	Deep Gorge
Sept-Nov 2013	3	3	3
Dec 2013-Feb 2014	1	1	2
Mar-May 2014	3	3	3
Jun-Aug 2014	3	3	3
Sept-Nov 2014	2	2	2
Dec 2014-Feb 2015	3	3	3
Mar-May 2015	0	3	2
Jun-Aug 2015	2	3	3
Sept-Nov 2015	3	3	3
Dec 2015-Feb 2016	2	2	3
Mar-May 2016	1	1	1
Jun-Aug 2016	0	0	0
Sept-Nov 2016	6	6	6
Total	**29**	**33**	**34**

Table 12. PM_{10} data availability at off-site locations

Period	Burrup Rd	Water Tanks	Deep Gorge
1/1/13-30/6/13	0.5%	0.01%	3.1%
1/7/13-31/12/13	20%	23%	20%
1/1/14-30/6/14	0.1%	0.07%	1.1%
1/7/14 to 31/12/14	0.6%	0.02%	0.02%
1/1/15 to 30/6/15	0.0%	0.0%	0.0%
1/7/15 to 31/12/15	32%	0.02%	9.5%
1/01/16 to 30/6/16	0.0%	0.0%	0.0%
Note: Refer to comments on PM10 data in section 3.9			

Attachment A – Safety Critical Elements (Related to section 2.10)

Performance Standards

No.	Safety Critical Element	Safety Goal	YPFPL	YPNPL
1	Primary Containment Systems (Vessel/Piping)	Inherent Safety	X	X
2	Basic Process Control and Alarm	Control	X	X
3	Safety Instrumented System (SIS)	Control	X	X
4	Emergency shutdown Manual system	Control	X	X
5	Flare and Vent System	Control	X	
6	Firefighting system	Mitigation	X	X
7	Fire and Gas detection	Control	X	X
8	Classified Hazardous Area	Inherent Safety	X	X
9	Spill Containment (Bunding) and Drain System	Mitigation	X	X
10	Pressure Relieving & Overpressure protection System	Control	X	X
11	Emergency communication equipment	Mitigation	X	X
12	Emergency power supply system	Mitigation	X	X
13	Escape Routes, Muster point & Traffic Management system	Mitigation	X	X
14	Emergency response PPE	Mitigation	X	X
15	Ammonia Transfer Pipeline Leak Detection System	Control	X	
16	Emergency Shutdown and ammonia suppression system	Control	X	
17	Training and competence	Mitigation	X	X
18	Emergency Response Plan (ERP)	Mitigation	X	X
19	Management of Change Procedure	Control	X	X
20	Permit to Work procedure	Control	X	X
21	Critical Independent Protection Layer (LOPA case MI Controls)	Control	X	X
22	Motor Control Center	Control		X

Attachment B – Burrup TAN Plant Emission Comparison with Best Available Techniques Reference Documents; dated 19/09/2012, Document No: 15626-F16-002 (Related to section 3.8)

Burrup TAN Plant Emission Comparison with Best Available Techniques Reference Documents

Date: **19/09/2012**
Document Nº: **15626-F16-002**

1 Purpose

This document compares Ammonium Nitrate (AN) dust and Ammonia release limits from Burrup TAN Project Ammonium Nitrate Plant with existing Fertilizers Europe and European Commission Best Practice Guidelines.

2 Fertilizers Europe (former EFMA) Best Available Techniques

The reference document from Fertilizers Europe is *"Best Available techniques for Pollution Prevention and Control in the European Fertilizer Industry Booklet 6 – Production of Ammonium Nitrate and Calcium Ammonium Nitrate, 2000"*

8. SUMMARY OF BAT EMISSION LEVELS

Emission levels are generally associated with the efficiency of the abatement equipment which has been installed. Such equipment has an efficiency which is related to both the quantity of the effluent stream (water or air) and to the concentration of the pollutant. Emission levels are often quoted in legislation as a residual concentration of the pollutant because this is normally defined once the BAT equipment has been selected. The quantity of pollutant (in $kg.t^{-1}$ of product, for example) will depend upon the volumetric flow of the stream.

8.1 Achievable Emission Levels For New Plants

The following emission levels can be achieved for new plants. These levels relate to steady-state production and take no account of peaks which may occur during the unsteady transient conditions of start-up and shut-down or during emergencies.

8.1.1 Emissions into air

Ammonium nitrate production when no insoluble solids are present

Prill towers and granulators using molten ammonium nitrate	$15mg.Nm^{-3}$ particulates $10mg.Nm^{-3}$ ammonia
Other individual emission points	$30mg.Nm^{-3}$ particulates $50mg.Nm^{-3}$ ammonia

Ammonium nitrate production when insoluble solids are present, including CAN production

$50mg.Nm^{-3}$ particulates
$50mg.Nm^{-3}$ ammonia

The balance of losses between the various atmospheric emission points varies with the technology employed but in total, should not exceed 0.5kg particulates and 0.2kg ammonia per tonne of product.

BNPL Burrup TAN Project Team

Postal Address
Gorbea 5
Avda. Burgos
28050 Las Tablas
Madrid - Spain

Visiting Address
Gorbea 5
Avda. Burgos
28050 Las Tablas
Madrid - Spain

Telephone
+32 27 73 52 1107

Indicated BAT emissions (10 mg/Nm^3 for ammonia and 15 mg/Nm^3 for AN dust) refer to ammonium nitrate production for prilling towers and granulators where no insoluble solids are available.

For other individual emission points (e.g. drying/cooling equipment) the reference BAT is 30 mg/Nm^3 for dust and 50 mg/Nm^3 for ammonia.

The Burrup TAN plant has a common stack for prilling tower and drying/cooling equipment where about 25 % of the mass flow comes from the prilling tower, the rest from fluid bed cooler and rotating drum dryers.

Burrup TAN emission limits are 10 mg/Nm^3 for ammonia and 15 mg/Nm^3 for AN dust in this common stack.

Therefore, considering the total committed emission level of the Burrup TAN Project is equal to the BAT level for prilling tower stack only, this demonstrates that the emission levels from both the prilling tower and the other individual emissions points are well below the BAT levels quoted by Fertilizer Europe.

3 European Commission (EC) Best Available Techniques

3.1 Reference Documentation

The reference EC best practice document for emissions from Technical Ammonium Nitrate plants is *"Reference Document on Best Available techniques for the Manufacture of Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilisers, August 2007"*

3.2 Best Available Techniques

As stated in paragraph 9.5 of the reference document, as the data available is insufficient, no BAT figures could be established by EC for emissions to air from neutralisation, evaporation, granulation, prilling, drying, cooling and conditioning.

9.5 BAT for AN/CAN

BAT is to apply the common BAT given in Section 1.5.

BAT for storage is to apply BAT given in [5, European Commission, 2005].

BAT is to optimise the neutralisation/evaporation stage by a combination of the following techniques:

- using the heat of reaction to preheat the HNO_3 and/or to vapourise NH_3 (see Section 9.4.1)
- operating the neutralisation at an elevated pressure and exporting steam (see Sections 9.4.1)
- using the generated steam for evaporation of water from ANS (see Section 9.4.3)
- recovering residual heat for chilling process water (see Section 9.4.2)
- using the generated steam for the treatment of process condensates
- using the heat of the reaction for additional water evaporation.

BAT is to effectively and reliably control pH, flow and temperature.

BAT is to improve environmental performance of the finishing section by one or a combination of the following techniques:

- apply plate bank product cooling (see Section 7.4.5)
- recycling of warm air (see Sections 7.4.6 and 9.4.5)
- select proper size of screens and mills, e.g. roller or chain mills (see Section 7.4.7)
- apply surge hoppers for granulation recycle control (see Section 7.4.7)
- apply product size distribution measurement and control (see Section 7.4.7).

BAT is to reduce dust emissions from dolomite grinding to levels <10 mg/Nm^3 by applying, e.g. fabric filters.

Because of an insufficient data basis, no conclusions could be drawn for emissions to air from neutralisation, evaporation, granulation, prilling, drying, cooling and conditioning.

3.3 Current Emission and Consumption Levels

In *Chapter 9.3 – Current Emission and consumption levels*, typical emissions from reference plants are mentioned for Dust and Ammonia in tables 9.3 and 9.4, but as mentioned in 3.2 the document does not recommend any BAT figures.

For Ammonium Nitrate prilling tower emissions, the 2 references included in these tables are Fertilizer Europe best practice figures (which Burrup TAN Plant complies with as described in paragraph 2) as well as operating data from AMI Linz in Austria, which are 5 mg/Nm^3 for Dust and 4.25-6.55 mg/Nm^3 for Ammonia.

Extract from EC Reference Document - Dust

Pollutant	mg/Nm^3	g/tonne product	Remark	Reference
Dust	14.5 – 14.8	17.4	Central waste gas scrubber (waste gas volume 92250 Nm^3/hour)	AMI, Linz UBA, 2002] [9, Austrian
	5 – 6.5	13.5	From cooling drum, cyclones (waste gas volume 107750 Nm^3/hour)	AMI, Linz UBA, 2002] [9, Austrian
	5		From cooling drum, cyclones (waste gas volume 91500 Nm^3/hour)	AMI, Linz UBA, 2002] [9, Austrian
	5	20.5	From prilling tower producing technical grade AN, about 100000 Nm^3/hour, scrubbing in a packed column, emission volume flow of 10000 Nm^3 treated with candle filters	AMI, Linz UBA, 2002] [9, Austrian
	15		From prill tower of new plants, no insoluble solids	[148, EFMA, 2000]
	30		New plants, other point sources than prilling, no insoluble solids	[148, EFMA, 2000]
	50		New plants, with insoluble solids present, including CAN	[148, EFMA, 2000]
	72	12	Concentration, high efficiency scrubber	DSM Geleen [52, infoMil, 2001]
	1	1	Granulation, rotary drum dryer 1, fabric filter	DSM Geleen [52, infoMil, 2001]
	1	2	Granulation, rotary drum dryer 2, fabric filter	DSM Geleen [52, infoMil, 2001]
	1	2	Granulation, rotary drum dryer 3, fabric filter	DSM Geleen [52, infoMil, 2001]
	37	86	Fluid bed cooling 1	DSM Geleen [52, infoMil, 2001]
	44	99	Fluid bed cooling 2	DSM Geleen [52, infoMil, 2001]
	26	70	Fluid bed cooling 3	DSM Geleen [52, infoMil, 2001]
	25	17	Dedusting system granulation	DSM IJmuiden, [52, infoMil, 2001]
		400	From prill towers and coolers, CFCA shroud abatement	Terra, Billingham [28, Comments on D2, 2004]
		30	From prilling tower ("with state-of-the-art abatement")	Terra, Severnside [28, Comments on D2, 2004]

Extract from EC Document - Ammonia

Pollutant	mg/Nm^3	g/tonne product	Remark	Reference
NH_3	2	4	Fluid bed cooling 1	DSM Geleen [52, infoMil, 2001]
	2	4	Fluid bed cooling 2	DSM Geleen [52, infoMil, 2001]
	2	4	Fluid bed cooling 3	DSM Geleen [52, infoMil, 2001]
	36	47	Rotary drum dryer 1, fabric filter	DSM Geleen [52, infoMil, 2001]
	38	47	Rotary drum dryer 2, fabric filter	DSM Geleen [52, infoMil, 2001]
	41	49	Rotary drum dryer 3, fabric filter	DSM Geleen [52, infoMil, 2001]
	0	0	Concentration, high efficiency scrubber	DSM Geleen [52, infoMil, 2001]
	1.30 – 5.07	1.6	Central waste gas scrubber (waste gas volume 92250 Nm^3/hour)	AMI, Linz UBA, 2002] [9, Austrian
	2.75 – 3.65	6.7	From cooling drum, cyclones (waste gas volume 107750 Nm^3/hour)	AMI, Linz UBA, 2002] [9, Austrian
	3.2 – 3.05		From cooling drum, cyclones (waste gas volume 91500 Nm^3/hour)	AMI, Linz UBA, 2002] [9, Austrian
	4.25 – 6.55	13.7	From prilling tower producing technical grade AN, about 100000 Nm^3/hour, scrubbing in a packed column, emission volume flow 10000 Nm^3 treated with candle filters	AMI, Linz UBA, 2002] [9, Austrian
	10		From prill tower of new plants, no insoluble solids	[148, EFMA, 2000]
	50		New plants, other point sources than prilling, no insoluble solids	[148, EFMA, 2000]
	50		New plants, with insoluble solids present, including CAN	[148, EFMA, 2000]
F as HF	0.40 – 0.44	0.5	Central waste gas scrubber (waste gas volume 92250 Nm^3/hour). CAN plant uses raw materials obtained from an ODDA plant	AMI, Linz UBA, 2002] [9, Austrian

Table 9.4: Emissions to air from the production of CAN fertilisers

3.4 Emissions from AMI Linz, Austria

The reference mentioned in the EC document for emissions from AMI Linz is *"Austrian UBA (2002). "State-of-the-Art Production of Fertilisers", M-105"*

The source data for the Tables 9.3 and 9.4 in the EC document can be found in Table 22 of this reference as shown below.

The Agrolinz plant uses the same principle for off-gas treatment as the Burrup TAN facility.

Production of technical grade ammonium nitrate

Off-gases released from Prill tower (about 90,000 Nm^3) and the falling film evaporators (about 1,400 Nm^3) contain AN dust and NH_3. Off-gases from the prill tower are treated by wet scrubbing in a packed column. In the scrubber, NH_3 reacts with HNO_3, which is added to the AN scrubbing solution dependent on the pH.

After off-gas treatment, a major part of the cleaned air is recycled as cooling air into the prill tower. The recirculating air is pre-heated in order to prevent remoistening. The rest of the off-gas (about 10,000 Nm^3) is used for cooling the AN product to about 35 °C and is finally cleaned in an aerosol filter subsequent to the cooling drum. Table 22 presents emission levels of the production of prilled AN (technical grade).

Table 22: Emission levels of the production of technical grade ammonium nitrate at Agrolinz Melamin GmbH [Agrolinz 2001].

Pollutant	Emission levels			Permit/Emission limits according to state-of-the-art[d] [mg/Nm^3]
	Emission value 2001 (2000) [mg/Nm^3][a]	Annual load 2001 (2000) [t/a]	Emission factor [g/t product][c]	
Dust (AN)[b]	5.0 (5.0)	0.26 (0.26)	20.5	< 25
NH_3[b]	6.55 (4.25)	0.34 (0.22)	13.7	< 20

[a] *Emission concentrations from the annual emission report 2001; Indicated emission values are averages on measured half-hour mean values.*

[b] *Measurements 2 times/a*

[c] *Calculation referring to a production of 14,600 t/a*

[d] *The indicated emission values mostly represent emission limit values of the installations at Agrolinz Melamin GmbH. In case of state-of-the-art technologies allow for considerable lower emission levels (due to recent developments in state-of-the-art technologies, such as dust separation), lower emission limit values (according to state-of-the-art) than the current emission limits are indicated. In that case the indicated values (that are lower than current emission limits) have been agreed on by the competent authority (Magistrat Linz) and by Agrolinz Melamin GmbH. The indicated emission values are based on half-hour mean values.*

This table shows that the values 4.25-6.55 mg/Nm^3 for ammonia and 5 mg/Nm3 are operating values which have been recorded during twice per year, half an hour-long measurements.
This data is therefore not a permit/emission limit, but only a spot check of current operating emission values of the AMI Linz plant.

As per this document, Emission limits for AMI Linz plant are 25 mg/Nm^3 and 20 mg/Nm^3 for Dust and Ammonia respectively.
Emission limits of the Burrup TAN Project (15 and 10 mg/Nm^3 respectively) will therefore be below the AMI Linz plant which is used as a reference in the EC document.

As for the AMI Linz plant, normal operating figures from the Burrup TAN plant is expected to be substantially lower than the emission limits.

4 Summary

The Burrup TAN Project emission limits are below the Fertilizer Europe BAT.

European Commission does not indicate any BAT for air emission of TAN plant ; however The Burrup TAN Project emission limits are below the emission limits quoted for the reference plant used in the European Commission reference document.

Attachment C – Letter from YPN to Department of Environment and Energy (DoEE), dated 10 March 2017 (Related to section 3.9)

10th March 2017

Our Reference: 200-200-LET-DOE-0005

Your Reference: EPBC 2008/4546

Mr Matt Cahill
First Assistant Secretary
Environment Standards Division
Department of the Environment & Energy
GPO Box 787
CANBERRA ACT 2601
Email: Matt.Cahill@environment.gov.au

Dear Matt,

Subject: Federal Approval EPBC 2008/4546 Baseline Monitoring

Thank you for the opportunity to brief Officers from the Department of Environment & Energy (DoEE) on Thursday 2nd March 2017 and on-going constructive discussions with the Department on Yara Pilbara Nitrates Pty Ltd (YPN) Technical Ammonium Nitrate plant on the Burrup Peninsula. As discussed at the meeting, Yara along with its Joint Venture partner, Orica Ltd, acknowledges the significance of the area and the need for appropriate measures to ensure protection of the rock art.

As outlined at our briefing, issues have been identified with the data collection for the baseline air quality monitoring as required under the above EPBC approval. As advised, Yara Pilbara Nitrates (YPN) engaged an independent air quality management expert to assess all data and equipment within the monitoring program. In conducting their analysis, Strategen identified issues relating to the data collection for the baseline monitoring for Total Suspended Particulates (TSP). TSP is one of five components of the air quality baseline monitoring. It became apparent from Strategen's analysis that TSP monitors were not installed at two monitoring points and that PM10 monitors may have been installed in place to provide a reference calculation to TSP. This was only confirmed to Yara Pilbara after the Senate Inquiry hearing. Investigations into the data supplied by these monitors and other matters are still continuing.

Yara Pilbara Nitrates Pty Ltd

Postal Address
Locked Bag 5009
Karratha WA 6714
Australia

Visiting Address
Lot 564, Village Road
Burrup WA 6714
Australia

Telephone
+61 8 9183 4100
Facsimile
+61 8 9185 6776
ABN
33127391422

Perth Office:
Level 5,
182 St. Georges Terrace
Perth WA 6000, Australia
Telephone: +61 8 9327 8100
Facsimile: +61 8 9327 8199

Yara Pilbara's air quality monitoring expert is still conducting baseline monitoring, and analysing the data prior to the company submitting a report to the Department. YPN is not yet in a position to submit Air Quality Monitoring data to establish a pre-operational baseline as required by Condition 9. YPN will advise once the baseline monitoring is complete.

YPN welcomes the opportunity to work with DoEE on establishing a TSP baseline that is scientifically credible, consistent with the original intent of the condition and safeguards the rock art.

YPN acknowledges that the DEE will have the baseline monitoring methodology and results independently assessed before further considering YPN's request for approval and compliance with Condition 9.

Please do not hesitate to contact me if you have any queries. Further details can and will be provided as soon as they become available.

Yours Sincerely,

Brian HOWARTH
Health, Environment, Safety & Quality Manager
Yara Pilbara Nitrates Pty Ltd

cc Monica Collins
Alex Taylor
Kate Reid