



Yara Pilbara Nitrates

2019 Annual Compliance Report

EPBC 2008/4546

Technical Ammonium Nitrate Plant

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04-06-2020 650-200-ACR-YPN-0007 Rev 1

Declaration of Accuracy

Yara Pilbara Nitrates Pty Ltd (YPN) is pleased to submit this Annual Compliance Report as per Condition 3 of the EPBC 2008/4546 Approval Decision (dated 14 September 2011) and Condition 3 of the directed variation (dated 12 September 2017) requiring reporting to 30 June to be submitted by 6 October each year.

In making this declaration, I am aware that sections 490 and 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed

Full Name Chris Rijksen
Position Plant Manager
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Date

4/6/2020
.....

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1 Introduction

1.1 Purpose

The purpose of this Annual Compliance Report (ACR) is to assess compliance with all conditions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval decision issued 14 September 2011 for the Yara Pilbara Nitrates Pty Ltd (YPN) Technical Ammonium Nitrate (TAN) production facility (TAN Plant) located on Lot 3017 within the Burrup Strategic Industrial Area on the Burrup Peninsula, Western Australia (EPBC 2008/4546).

EPBC 2008/4546 Conditions have been varied by three (3) separate variations, issued in accordance with Section 143 of the EPBC Act:

- Variation to Conditions 8(d), 10 and 11, dated 18 December 2013;
- Variation to Condition 10(c)iv, dated 10 February 2014; and
- Directed variation to Condition 3, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14 (delete), substitute with Conditions 3, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14 and add Conditions 3A, 7 A, 9A, 9B, 10A, 11 A and 11 B, dated 12 September 2017.

Condition 3(a) of the revised approval issued on 12 September 2017 states:

By 6 October each year, the person taking the action must:

- i. Publish a report on their website addressing compliance with each of the conditions of this approval (for the reporting period 1 July of the previous year to 30 June of the reporting year), including implementation of any management plans and monitoring programs as specified in the conditions including an analysis of monitoring data required under condition 9A and 10A that has been collected during the reporting period; and*
- ii. Provide documentary evidence providing proof of the date of publication to the Department.*

In accordance with revised Condition 3 this 2019 ACR addresses the 12-month period 1 July 2018 to 30 June 2019 and is to be published on YPN's website by 6 October 2019.

Preparation of the ACR has been guided by the Annual Compliance Report Guidelines (Commonwealth of Australia, 2014).

1.2 Project Details

The TAN Plant has a production capacity of 350,000 tonnes per annum (TPA) or 915 tonnes per day (TPD) of TAN. The TAN Plant comprises three major process units, each producing a separate product in the manufacturing process:

1. Nitric Acid plant to convert ammonia and atmospheric air into Nitric Acid (NA). The NA plant has a capacity of 760 TPD as 100% weight. The main feedstock, ammonia, shall be delivered from the adjacent ammonia plant.
2. Ammonium Nitrate (AN) Solution plant to convert ammonia and NA into AN solution. This AN wet section has a capacity of 965 TPD in balance with nitric acid production capacity.



3. TAN plant to convert AN solution into TAN prill (final product). This is a dry section for production of TAN prill (0.7 and 0.8 kg/m³ density) with a capacity of 915 TPD. Surplus AN solution shall be sold as liquid.

The TAN Plant also has storage, loading and transport facilities, including an incoming liquid ammonia pipeline, bulk and bagged TAN storage, bulk loading system, bagging unit and truck loading.

The project is adjacent to the Yara Pilbara Fertiliser plant operated by Yara Pilbara Fertilisers Pty Ltd (YPF), which is the source of the liquid ammonia.

1.3 ACR Public Availability

This 2019 ACR is to be placed on the YPN website for the life of the Project. At the time of publication this 2019 ACR is available at:

<https://www.yara.com.au/about-yara/about-yara-australia/pilbara/yara-pilbara-nitrates/>

A URL link to the uploaded report will be sent to the DoEE Compliance and Enforcement Branch through its post.approvals@environment.gov.au email address.



2 Current Status

During the reporting period the TAN plant operated between the 12th of May and 4th of July 2019. The TAN Plant was shut down for most of the reporting period due to works associated with the TAN Recovery Project. Operations are anticipated to restart in February 2020.

The existing YPF Environmental Operating Licence (Licence No. L7997/2002/11 issued under Part V) was amended and issued on the 29th of June 2018. Of relevance to EPBC 2008/4546 is the inclusion of conditions regarding limits on emissions to air. Environmental monitoring and reporting occurred during the operational period of the TAN plant.

As reported in the 2017 ACR Addendum, both the Burrup Rock Art Technical Working Group (BRATWG) and the DWER-managed rock art monitoring program were inactive during the previous audit period, as BRATWG completed its five-year term of engagement on 30 June 2016. Notwithstanding, the resultant monitoring report required by EPBC 2008/4546 Condition 10 was published on the DWER website in September 2017. In the 2018 audit period, YPN received the approval of the Commonwealth Minister for the Environment prior to engaging recognised Heritage experts to conduct rock art monitoring with Murujuga Aboriginal Corporation, at the same sites as previously monitored under Condition 10, as required by new Condition 10A. The draft 2018 Rock Art Monitoring Analysis Report is currently under review by the DoEE Compliance and Heritage Branch. Publication of this report will occur (to Yara website) once approval has been given.



3 Compliance

3.1 Statement of Compliance

The results of the assessment of compliance with EPBC 2008/4546 approval conditions are shown in Table 1.

A total of 15 conditions, comprising of 50 sub-conditions were assessed. The assessment found the following:

- 28 sub-conditions were found to be 'compliant';
- 22 sub-conditions were found to be 'not applicable'.

If a condition falls outside of the scope of the current reporting period (1st July 2018 to the 30th of June 2019) it is considered Not Applicable (N/A). A sub category is also provided in Table 1 to indicate status, i.e. "complete", "not required", "compliant", "in process" (when waiting for a response from the department), "historical non-compliance" or "N/A - refer below", when the condition is an objective.

As reported in the 2017 ACR Addendum YPN identified some gaps in evidence, specifically with reference to historic correspondence between YPN and various regulators that have been cited as evidence in previous ACRs. In these cases where YPN did not have the original or a copy of the evidence, but reference to the evidence has been previously made, the evidence was flagged as "not sighted". For this 2019 ACR, where relevant, reference is made to the 2017 ACR Addendum for these historical items and, if appropriate, noted as "complete" (i.e. Compliant - "complete").

In assessing compliance, the following definitions have been used:

Designations	Definition
Compliant	'Compliance' is achieved when all the requirements of a condition have been met, including the implementation of management plans or other measures required by those conditions.
Non-compliant	A designation of 'non-compliant' is given where the requirements of a condition or elements of a condition, including the implementation of management plans and other measures, have not been met.
Not applicable (N/A)	A designation of 'not applicable' is given where the requirements of a condition or elements of a condition fall outside of the scope of the current reporting period. For example, a condition which applies to an activity that has not yet commenced.



3.2 EPBC2008/4546 Compliance Table

Table 1 EPBC2008/4546 Compliance Table

Condition Number	Condition	Is the Project compliant with this condition?	Evidence / Comments
1	Within 30 days after the commencement of the action, the person taking the action must advise the Department in writing of the actual date of commencement.	N/A - "complete"	Refer to 2017 ACR, letter sent to SEWPaC on the 17 th of February 2013. YPN sought Department agreement that this condition can be considered 'complete' in 2018 EPBC ACR.
2	The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the plan(s) and program(s) required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media.	Compliant	Refer to all other items in this table. Refer to attachments provided. Further documentation is available upon request by DoEE.
3(a)	By 6 October each year, the person taking the action must: <ul style="list-style-type: none"> i. Publish a report on their website addressing compliance with each of the conditions of this approval (for the reporting period 1 July of the previous year to 30 June of the reporting year), including implementation of any management plans and monitoring programs as specified in the conditions, including an analysis of monitoring data required under Condition 9A and 10A that has been collected during the reporting period; and ii. Provide documentary evidence providing proof of the date of publication to the Department. 	Compliant - "in process"	The 2019 EPBC ACR was published on the YPN website on 4 th October 2019, with the Department notified on that date (Attachment 3a (1)). The supporting Air Quality Analysis Report (as per Condition 9A) was completed and published to the YPN website on the 4 th of October 2019 (Attachment 3a (2)). Currently the 2018 draft Rock Art Monitoring Analysis Report (as per Condition 10A) is under review by the DoEE Compliance and Heritage Branch. Publication of this report to the Yara website (https://www.yara.com.au/about-yara/about-yara-australia/pilbara/yara-pilbara-nitrates/) will occur once approval has been received. As approval is pending YPN seeks Department agreement that this condition can be considered Compliant - "in process."
3(b)	Reports required under Condition 3a) must remain published for the life of the approval unless otherwise advised by the Minister in writing.	Compliant	All previous EPBC 2008/4546 ACR's are available on the YPN website: https://www.yara.com.au/about-yara/about-yara-australia/pilbara/yara-pilbara-nitrates/ (Attachment 3b).
3A	The person taking the action must advise the Department of a potential or actual non-compliance with these conditions in writing within 7 days of becoming aware of the potential or actual non-compliance.	Compliant	No potential or actual non-compliances were identified during the reporting period.
4	The person taking the action must ensure that wastewater from the facility meets the requirements set out in Statement 594 for discharges into the Multi User Brine Return Line (MUBRL).	Compliant	Please note Statement 594 applies to its proponent, Water Corporation, and addresses multiple users in the Burrup area (not only YPN). YPN's Environmental Operating Licence (L7997/2002/11 issued under Environmental Protection Act 1986 (EP Act) Part V) reflects the discharge requirements for Statement 594. During the reporting period (1 st July 2018 to the 30 th June 2019) there was no licence limit exceedance for discharge to the MUBRL. Attachment 4 shows laboratory analysis results and continuous data for YPN's discharge during the reporting period.
5	To ensure the protection of listed threatened species and listed migratory species, the person taking the action must only apply larvicide or adulticide within or outside the project area (as shown in Attachment 1) that is an Approved Class 11 insecticide, unless agreed to in writing by the Minister.	Compliant	No mosquito larvicide or adulticide has been applied within the TAN Plant site during the reporting period.
6	To ensure the protection of listed threatened species and listed migratory species, the person taking the action must:	N/A - refer below	Condition objective, sub-conditions refer below.



6(a)	Employ such structures and apparatus as are necessary and agreed by the Western Australian Government to deter birds from entering the contaminated water pond, clean water pond, and sewage wastewater treatment station evaporation pond, as per Statement 870.	Compliant	DPaW (now DBCA) confirmed the bird deterrence systems used on site is acceptable on the 25 th June 2015 (Attachment 6a). Bird deterrent wires have been installed over contaminated water ponds, clean water ponds, and sewage wastewater treatment evaporation pond (refer to Attachment 6b).
6(b)	Ensure these structures and apparatus are in place prior to commissioning and are maintained for the life of the approval.	Compliant	All ponds during the reporting period had bird deterrent wires in place at approximate 5m spacings as per configuration agreed with DBCA. The only exception to this is Pond 5 which is currently undergoing repair works to the liner (pond is dry and not a hazard). Once the liner has been repaired bird deterrents will be reinstalled. Bird deterrent wires are regularly checked during Environmental Inspections as the wires can deteriorate and break due to the harsh conditions on site (heat, salty air etc.). YPN ensures any broken wires are replaced as required. Refer to Attachment 6b for photos of deterrents (January 2019) and Environmental Inspection Checklist (Question 12).
7	To ensure the protection of the listed threatened species; listed migratory species and the values of the Dampier Archipelago (including Burrup Peninsula) National Heritage Place, the person taking the action must submit to the Department the management plans mentioned below:	N/A - refer below	Condition objective, sub-conditions refer below.
7(a)	Construction Environmental Management Plan (CEMP), which must be submitted to the Department at least two (2) months prior to construction and must include, but not be limited to, management measures for the following: <ul style="list-style-type: none"> • Air Quality and Dust; • Water Quality; • Erosion Control and Storm Water; • Waste; • Traffic; and • Blasting (if required). 	N/A - "complete"	Refer to the 2017 ACR Addendum, CEMP sent to SEWPaC on the 22 September 2012 and approved on 22 November 2012. YPN sought department agreement that this condition can be considered 'complete' in 2018 EPBC ACR.
7(b)	Operational Environmental Management Plan (OEMP), must be submitted to the Department at least two (2) months prior to operation and must include, but not be limited to, management measures for the following: <ul style="list-style-type: none"> • Erosion Control and Storm Water; • Water Quality; • Air Quality and Dust; • Waste; • Traffic; and • Blasting (if required). 	N/A - "complete"	As reported in the 2017 ACR Addendum the revised Operational Environmental Management Plan (650-200-PLN-YPN-0001) (OEMP) and revised Emergency Response Management Plan were submitted to the Department for review in December 2016 (approximately 9 months prior to operations commencing – refer to Condition 7[c]). An amended Operational Environmental Management Plan (OEMP) (including Hazardous Materials Management Plan and Aboriginal Heritage Management Plan prepared to address relevant parts of Condition 7[d]) was submitted to the Department for review and approval on 14 September 2017, approval of the OEMP was received on 15 September 2017. YPN sought Department agreement in 2018 EPBC ACR that this condition can be considered 'complete' as current and future plan revisions are addressed under Conditions 12 and 13.
7(c)	Operations must not commence unless the OEMP is approved by the Minister.	N/A - "complete"	The OEMP was approved on 15 September 2017 with operations commencing the same day (Attachment 7c). YPN seeks Department agreement that this condition can be considered 'complete'.
7(d)	Additional management plans covering both construction and operations, must be submitted to the Department at least two (2) months prior to construction, including: <ul style="list-style-type: none"> • Aboriginal Heritage Management Plan; • Hazardous Materials Management Plan; and 	N/A - "complete"	Refer to 2017 ACR Addendum confirmed the approval status of the original Aboriginal Heritage Management Plan (AHMP), approved by SEWPaC on 24 October 2012. The OEMP update included updates to the AHMP and Hazardous Materials Management Plan (HMMP).



	<ul style="list-style-type: none"> Emergency Response Management Plan. 		<p>Emergency response is the subject of a separate plan (YPN code 250-500-PLN-000-0003). The original Emergency Response Management Plan (ERMP) was approved in 2012. A revised plan was submitted to the Department in December 2016, with the OEMP (refer to Condition 7[b]).</p> <p>YPN sought Department agreement in 2018 EPBC ACR that this condition can be considered 'complete' as current and future plan revisions are addressed under Conditions 12 and 13.</p>
7(e)	Once approved by the Minister, all plans required under Condition 7 must be implemented.	Compliant	<p>Refer to Condition 7(b) and 7(d) regarding plan approval and conditions.</p> <p>All plans referred to in Condition 7 were assessed for implementation status for this audit.</p> <p>3 commitments were identified as non-conformant within YPN's OEMP.</p> <ul style="list-style-type: none"> An annual waste audit not conducted. Lack of records available regarding waste disposal (EO no longer manages waste). Hazardous materials which are non-stock items received in the warehouse are not checked against Yara Pilbara's system. <p>As the majority of actions were assessed as conformant, the OEMP is assessed as satisfactorily implemented. Actions have been raised to correct non-conformances.</p> <p>Recently the Emergency Management Plan (EMP) (previously known as the Emergency Response Management Plan 250-500-PLN-000-0003) was updated. On the 12 August 2019 the EMP was submitted to DFES and DMIRS. At the time of submission all actions within the EMP were assessed as conformant. As such the EMP (previously ERMP) is assessed as satisfactorily implemented and can be found as Attachment 7e.</p>
7A	The management plans required under Conditions 7 and 11A must not contain management actions that are inconsistent with these approval conditions or the National Heritage management principles.	Compliant	<p>Refer to Conditions 7 and 11A. Review of the plans by the Department and subsequent approval of plans by the Minister implies consistency with approval conditions and National Heritage (NH) management principles. Furthermore, this assessment has not readily identified any management plan actions that are inconsistent with the seven principles, summarised below for reference.</p> <ol style="list-style-type: none"> Identify, protect, conserve, present and transmit, to all generations, NH values. Use best available knowledge, skills and standards; include ongoing technical and community input to decisions and actions that may have a significant impact on their NH values. Respect all heritage values and seek to integrate government responsibilities. Ensure that NH place use and presentation is consistent with the conservation of their NH values. Make timely and appropriate provisions for community involvement, especially by people who: a) have a particular interest in, or associations with, the place; and b) may be affected by the management of the place. Active participation of Indigenous people in identification, assessment and management is integral to the effective protection of Indigenous heritage values. Provide for regular monitoring, review and reporting on the conservation of NH values.
8	To protect the values of the Dampier Archipelago (including Burrup Peninsula) National Heritage Place, particularly the rock art sites, the person taking the action must ensure that:	N/A - refer below	Condition objective, sub-conditions refer below.
8(a)	There is no unauthorised access by employees or contractors of the person taking the action to the Dampier Archipelago (including Burrup Peninsula) National Heritage Place outside of the project area (shown in Attachment 1) while those employees or contractors are undertaking work duties.	Compliant	<p>YPN maintains a system to authorise access (for monitoring) including access forms and a register (Attachment 8a).</p> <p>No signs of unauthorised access have been observed in the National Heritage area around the site. No incidents regarding unauthorised access have been identified.</p>



8(b)	Chain mesh fencing of at least 2.5 metres in height is installed around the perimeter of the project site prior to construction.	Compliant	Chain mesh fencing of at least 2.5 metres in height is installed around the perimeter of the project site. The fence was installed prior to construction and is checked twice daily by security. Refer to Attachment-Site Photos.
8(c)	Signs of at least 1m ² in size are attached to fencing at the entrance to the project site and at no less than 50 metre intervals along the fence. These signs must clearly indicate the requirements of Condition 8(a).	Compliant	The required signage is attached to fencing at the entrance to the project site. Due to the 2.5 m high security fencing completely surrounding the rest of the project site, fully restricting access to the National Heritage area, the existing signage at the entrance in combination with the high security fence is sufficient and together are measures which effectively 'go beyond compliance' with respect to the intention of this condition. Consequently, YPN asserts it is compliant with this requirement. YPN seeks agreement from the Department regarding this assertion and, if necessary to avoid future doubt, will request the condition be amended accordingly (i.e. to signage at entrance only, in combination with the high security fence on the perimeter of the remainder of the project site). Refer to Attachment- Site Photos.
8(d)	The relevant supervisor of the person taking the action must record the names of all those required to access areas containing rock art sites inside the Dampier Archipelago (including Burrup Peninsula) National Heritage Place boundary and is able to provide these records if asked to do so by the Department.	Compliant	Refer to Condition 8(a) - YPN maintains a NH register, which records the names of all those required to access areas containing rock art sites inside the NH area.
8(e)	Any impact the action has on the heritage values of the Dampier Archipelago (including Burrup Peninsula) National Heritage Place must be reported to the Department in writing within 72 hours. Impacts may include (but will not necessarily be limited to) any impacts caused by construction activity; vandalism perpetrated by personnel involved in plant construction or operations; spillage of potentially corrosive materials into the Dampier Archipelago (including Burrup Peninsula) National Heritage Place; impacts from blasting activity.	Compliant	No impact on heritage values has been identified in the audit period.
9	To protect the National Heritage Place, particularly the rock art sites, the person taking the action must undertake an air quality monitoring program. The air quality monitoring program must:	N/A - refer below	Condition objective, sub-conditions refer below.
9(a)	Undertake air quality monitoring at three (3) sites as shown in Attachment 2. These sites being sites previously selected, designed, fenced off and used in the original Western Australian Department of Environment and Conservation (WA DEC)/CSIRO air quality monitoring program. <ul style="list-style-type: none"> • Site 5 - Burrup Road site; • Site 6 - Water tanks site; and • Site 7 - Deep Gorge site. <p>The air quality monitoring must be undertaken for a period of not less than 24 months beginning from the <u>commencement of construction</u>. The results of this monitoring will be used to establish <u>baseline data</u> on levels of:</p> <ul style="list-style-type: none"> • Ammonia (NH₃); • Nitrogen Oxides (NO_x); • Sulphur Oxides (SO_x); and • Total suspended particulates (TSP), including dust at those rock art sites. 	N/A - "complete"	As described in the 2017 ACR Addendum, YPN carried out this (baseline) air quality monitoring program at the indicated off-site locations. However, construction commenced in February 2013 and monitoring commenced in late Q3/early Q4 2013, which was assessed as a non-compliance. With the non-compliance being historic (related to timing, linked to commencement of construction), this timing element of the requirement could not be remedied. The program was otherwise implemented and completed as required by the Condition. Continuation of the air quality monitoring program after the completion of the baseline program required by this Condition is addressed by Condition 9A, below. As the baseline program has been completed and continuing monitoring is addressed by Condition 9A, YPN sought the agreement of the Department in the 2018 EPBC ACR that this condition can now be considered 'complete'.
9(b)	Ensure that the monitoring of air quality at rock art sites is undertaken by a suitably qualified person (Air Quality).	N/A - "complete"	As described in the 2017 ACR Addendum, the review of the ambient air quality monitoring program and preparation of the baseline monitoring report was undertaken by Dr Peter Forster, Strategen



			Environmental Consultants Pty Ltd's air quality specialist. Peter has over 25 years' experience in air quality assessments, including monitoring of gaseous, semi-volatile and particulate pollutants. Refer to Condition 9(a) above – this condition could be considered 'complete', on the agreement of the Department.															
9(c)	Ensure air quality readings during the twenty four (24) months of baseline monitoring are taken at least four (4) times in every 12 months.	N/A - "complete"	As described in the 2017 ACR Addendum: <ul style="list-style-type: none"> NH₃, NO₂ and SO₂ samples were collected for >24 months and at least once in each quarter for each year. Dust deposition samples were collected for >24 months and at least once in each quarter for each year. TSP samples were collected for >24 months and at least once in each quarter for each year, from the Water Tanks site only. A baseline TSP data set was developed from TAN plant boundary monitoring of PM10 for application to all three sites. Those data were collected for >24 months and at least once in each quarter for each year. Refer to Condition 9(a) above – this condition could be considered 'complete', on the agreement of the Department.															
9A	To protect the values of the Dampier Archipelago (including Burrup Peninsula) National Heritage Place, particularly the rock art sites, the person taking the action must ensure:	N/A - refer below	Condition objective, sub-conditions refer below.															
9A(a)	Ongoing air quality monitoring is undertaken within 30 days after this condition comes into effect (the date the relevant variation to conditions notice is signed), and until expiry of the approval.	Compliant	Air quality monitoring has continued at sites 5, 6 and 7, with the first monitoring after Condition 9A came into effect (on 12 September 2017) commencing on 14 September 2017. Air Quality monitoring reports are available on the YPN website: https://www.yara.com.au/about-yara/about-yara-australia/pilbara/yara-pilbara-nitrates/ .															
9A(b)	Air quality monitoring parameters are monitored at the rock art sites: Site 5 (Burrup Road), Site 6 (Water tanks site) and Site 7 (Deep Gorge site) as shown in Attachment 2.	Compliant	This Condition is consistent with the previous, baseline, monitoring locations. Air quality monitoring has continued at sites 5, 6 and 7 as required (refer to the YPN website as provided in Condition 9A[a]).															
9A(c)	Monitoring of air quality at rock art sites is undertaken by a suitably qualified person (Air Quality). The air quality monitoring parameters in the table below must be monitored at the frequencies indicated in the table below.	Compliant	Refer to Condition 9(b), the continuing ambient air quality monitoring program continues to be overseen by Dr Peter Forster (Strategen Environmental Consultants Pty Ltd), with the support of YPN Environmental personnel. Within the audit period, ambient air concentrations of NH ₃ , NO ₂ and SO ₂ have been monitored continuously from the 29 th June 2018 (Radiellos deployed just before start of audit period) to the 1 st July 2019 (refer to reports on Yara website as provided in Condition 9A[a] for data which has been received to date.) Due to Cyclone Veronica six days (22 nd to the 28 th of March 2019) were missed for continuous ambient air monitoring, Radiellos were brought in after eight days of deployment (14 th to the 22 nd of March). As this event was outside of YPN's control and monitoring was performed before (28 th February to 14 th March) and after (28 th March to 16 th of April) the condition is deemed to have been met. Within the audit period, TSP monitoring occurred every six days from the 1 st July 2018 to the 26 th June 2019 (refer to reports on Yara website as provided in Condition 9A[a]). During the audit period one TSP monitoring event was interrupted at Site 6 (Water Tanks) on the 20 th February 2019, due to the calibration of the instrument. As the monitoring was interrupted and the MicroVol 1100 did not run for a continuous 24 hours, TSP was monitored again on the 22 nd February. As additional monitoring did occur to make up for the interruption it is deemed that this condition has been met. Within the audit period, collection of dust deposition (insoluble and soluble fractions) data occurred every month from the 28 th June 2018 to the 1 st July 2019 (refer to reports on Yara website as provided in															
	<table border="1"> <thead> <tr> <th>Element of air quality to be monitored</th> <th>Specific air quality parameter to be sampled</th> <th>Minimum frequency of monitoring</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Ambient air concentration of gases</td> <td>NH₃ (ammonia)</td> <td rowspan="3">Continuous monitoring for at least 14 consecutive days, every month</td> </tr> <tr> <td>NO₂ (nitrogen oxide)</td> </tr> <tr> <td>SO₂ (sulphur oxide)</td> </tr> <tr> <td>Airborne particulate concentration</td> <td>Total suspended particulates up to 50 µm (TSP)</td> <td>Every 6 days</td> </tr> <tr> <td rowspan="2">Deposited dust</td> <td>Total dust deposition per month (Insoluble Fraction)</td> <td rowspan="2">Quarterly</td> </tr> <tr> <td>Total dust deposition per month (Soluble Fraction)</td> </tr> </tbody> </table>	Element of air quality to be monitored	Specific air quality parameter to be sampled	Minimum frequency of monitoring	Ambient air concentration of gases	NH ₃ (ammonia)	Continuous monitoring for at least 14 consecutive days, every month	NO ₂ (nitrogen oxide)	SO ₂ (sulphur oxide)	Airborne particulate concentration	Total suspended particulates up to 50 µm (TSP)	Every 6 days	Deposited dust	Total dust deposition per month (Insoluble Fraction)	Quarterly	Total dust deposition per month (Soluble Fraction)		
Element of air quality to be monitored	Specific air quality parameter to be sampled	Minimum frequency of monitoring																
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Deposited dust	Total dust deposition per month (Insoluble Fraction)	Quarterly																
	Total dust deposition per month (Soluble Fraction)																	



			<p>Condition 9A[a]). This is more than what is required within the condition and as such it is deemed that the condition has been met.</p> <p>Please note the correct names for NO₂ and SO₂ are nitrogen dioxide and sulphur dioxide, respectively; i.e. 'oxide' is a typographical error within the approval document.</p> <p>Refer to condition 9 A(a) for link to website for published results. Please note the correct names for NO₂ and SO₂ are nitrogen dioxide and sulphur dioxide, respectively; i.e. 'oxide' is a typographical error within the approval document.</p>
9B	To protect the values of the Dampier Archipelago (including Burrup Peninsula) National Heritage Place, particularly the rock art sites:	N/A - refer below	Condition objective, sub-conditions refer below.
9B(a)	Emissions of air pollutants during operations must not exceed the limits described in a Licence under Part V of the <i>Environmental Protection Act 1986</i> issued by the Western Australian Government.	Compliant	<p>The Part V Licence L7997/2002/11 amendment, to include the TAN Plant, was issued on the 29th of June 2018. During the reporting period (1st July 2018 to 30th June 2019) TAN was only operational for a short period between the 12th of May and 4th of July 2019. This was due to planned shutdowns for the TAN repair project.</p> <p>The Licence stipulates quarterly (Common Stack) and continuous (Nitric Acid Stack (CEMS)) monitoring. This includes (point source) discharge air quality limits (i.e. no ambient air quality limits), as follows: includes (point source) discharge air quality limits only (i.e. no ambient air quality limits), as follows:</p> <ul style="list-style-type: none"> • Common stack: <ul style="list-style-type: none"> ○ PM – 15 mg/m³ ○ NH₃ at – 10 mg/m³ • Nitric Acid plant stack: <ul style="list-style-type: none"> ○ NO_x (as NO₂) – 103 mg/m³ ○ NH₃ – 0.75 mg/m³ ○ N₂O – 196 mg/m³ • Nitric Acid plant stack during start-up (2 hour maximum period): <ul style="list-style-type: none"> ○ NO_x (as NO₂) – 1,540 mg/m³ ○ NH₃ – 11.5 mg/m³ <p>There were no exceedances of the licence limits during the reporting period, refer to Attachment 9B(a).</p>
9B(b)	If a reporting requirement is triggered for air emissions in the conditions of the Licence issued by the Western Australian Government under Part V of the <i>Environmental Protection Act 1986</i> , the person taking the action must also report to the Department in writing within the same timeframe as reporting is required to be provided to the Western Australian Government.	Compliant	Refer to Condition 9B(a) – no reporting requirement for air emissions in the Licence was triggered during the audit period.
10	To protect the values of the Dampier Archipelago (including Burrup Peninsula) National Heritage Place, particularly the rock art sites, the person taking the action must participate in monitoring the rock art by:	N/A - refer below	Condition objective, sub-conditions refer below.
10(a)	Contributing a pro-rata amount annually (in line with that currently utilised by the Western Australian Department of Water and Environmental Regulation, but not exceeding \$15,000/year) for a period of not less than two (2) years from the beginning of construction to the Burrup Rock Art Monitoring Program, which is an independent scientific program of monitoring, to detect any changes in patination, including any discolouration, of the surface of the rock art or the surrounding rock surface.	N/A - "complete"	As discussed in the 2017 ACR Addendum, both the Burrup Rock Art Technical Working Group (BRATWG) and the DWER-managed rock art monitoring program were not active during the previous reporting period and as such, YPN were not able to financially contribute through BRATWG to the DWER-managed rock art monitoring program. Previously YPN had financially contributed, with the first payment being made in 2011. The WA Burrup Rock Art Monitoring Program expired in June 2016.



			<p>Also, as discussed in the 2017 ACR Addendum, following monitoring in 2015 and 2016, a report was published by DWER on the BRATWG website in September 2017.</p> <p>As:</p> <ul style="list-style-type: none"> the timing element of the condition ('for a period of not less than two [2] years from the beginning of construction' i.e. the minimum date for completion of this condition was 13 February 2015); and due to the inclusion of Condition 10A, which addresses ongoing - current and future - rock art monitoring. <p>YPN sought the agreement of the Department in the 2018 EPBC ACR that this condition can now be considered in effect no longer applicable and does not require further assessment.</p>
10(b)	Revoked – on-going rock art monitoring is now in Condition 10A.	N/A	Not applicable.
10(c)	In addition to the above Condition 10(a) requirements, the person taking the action must provide for additional monitoring of rock art sites in a manner that is consistent with the Burrup Rock Art Monitoring Program. The monitoring of additional rock art sites must meet the following requirements:	N/A - "complete"	<p>Refer to sub-condition 10(c)(iv) and new Condition 10A below. Sub-condition 10(c)(iv) timing is framed from the date of commencement of construction, with the monitoring to occur for at least two years until 13 June 2016. Condition 10A requires ongoing annual monitoring with the first event completed by 31 December 2017.</p> <p>As:</p> <ul style="list-style-type: none"> previous ACRs have reported on the status of this condition; the timeframe for completion of sub-condition 10(c)(iv); and the capacity of Condition 10A to address ongoing -current and future – monitoring. <p>YPN sought the agreement of the Department in the 2018 EPBC ACR that this condition be considered in effect no longer applicable and does not require further ongoing assessment.</p>
10(c)(i)	Engage a heritage monitor or other suitably qualified person (Heritage) to survey rock art sites within a two (2) kilometre radius of the project site, to provide advice on any changes to the appearance, or cultural value, of rock art sites within the examined area.	N/A - "complete"	Refer to Condition 10(c) above – this condition could be considered no longer applicable, on the agreement of the Department.
10(c)(ii)	The monitoring must be undertaken in a manner that is consistent with and complementary to the monitoring of rock art sites undertaken through the Burrup Rock Art Monitoring Program. If agreed by Department of Water and Environmental Regulation the monitoring of additional rock art sites may be integrated with the Burrup Rock Art Monitoring Program, with the person taking the action providing full contribution to the Department of Water and Environmental Regulation for the additional site monitoring.	N/A - "complete"	Refer to Condition 10(c) above – this condition could be considered no longer applicable, on the agreement of the Department.
10(c)(iii)	Prior to undertaking Condition 10(c) monitoring, provide the Department with written endorsement from a heritage monitor or other suitably qualified person (Heritage) on the suitability of the rock art monitoring proposed under Condition 10(c).	N/A - "complete"	Refer to Condition 10(c) above – this condition could be considered no longer applicable, on the agreement of the Department.
10(c)(iv)	Undertake the Condition 10(c) rock art monitoring at least once annually, where the first rock art monitoring event must be undertaken within 16 months of the commencement of construction, for a period of not less than two (2) years.	N/A - "complete"	Refer to Condition 10(c) above – this condition could be considered no longer applicable, on the agreement of the Department.
10(c)(v)	At least once annually, engage with the Murujuga Aboriginal Corporation in the planning and reporting associated with the annual survey of rock art sites required under Condition 10(c).	N/A - "complete"	Refer to Condition 10(c) above – this condition could be considered no longer applicable, on the agreement of the Department.
10(d)	Revoked – publishing of baseline rock art monitoring is now in Condition 14.	N/A	Not applicable.



10A	To protect the values of the Dampier Archipelago (including Burrup Peninsula) National Heritage Place, particularly the rock art sites, the person taking the action must ensure that on-going rock art monitoring is undertaken to identify any changes to the appearance, or cultural value, of rock art sites, as per the requirements below:	N/A - refer below	Condition objective, sub-conditions refer below.
10A(a)	On-going rock art monitoring must be undertaken at the same 6 sites as monitored under Condition 10 (or other sites if agreed to in writing by the Minister).	Compliant	Rock art monitoring has continued at the same six sites as monitored under Condition 10, refer to Attachment 10A(a) for the rock art monitoring methodology used in 2018.
10A(b)	The first on-going rock art monitoring event must be complete by no later than 31 December 2017. Subsequent rock art monitoring must be undertaken annually (undertaken between 15 July and 15 September) for the life of the approval.	Compliant	The first on-going rock art monitoring event was completed by the 2 nd December 2017 (as referenced in previous EPBC). The 2018 rock art monitoring was performed between the 3 rd and 7 th of September 2018 as referenced in the draft Rock Art Monitoring Report which is currently under review by the DoEE. Once approved the report will be published on Yara Pilbara webpage: https://www.yara.com.au/about-yara/about-yara-australia/pilbara/yara-pilbara-nitrates/ .
10A(c)	On-going rock art monitoring must be undertaken by a suitably qualified person (Heritage).	Compliant	Rock art monitoring is being led by Warren Fish, who is a Masters Degree-qualified archaeologist and an ex-Registrar of Aboriginal Sites with the WA Government, with well over a decade of experience in Indigenous heritage. Mr Fish is supported by Dr Ian MacLeod, who is a highly respected international academic and scientist, specialising in heritage conservation. Dr MacLeod has been instrumental in the various rock art conservation and monitoring campaigns conducted on the Burrup. The Department confirmed on 21 December 2017 that it was satisfied Mr Fish and Dr MacLeod have suitable qualifications and experience to undertake the monitoring under this Condition 10A (Attachment 10A(a)).
10A(d)	On-going rock art monitoring must be undertaken either: i. by the person taking the action, using a methodology approved by the Minister in writing; or ii. through provision of an annual pro-rata amount for the Burrup Rock Art Monitoring Program or another program administered by the Western Australian Government Department of Water and Environmental Regulation.	Compliant	The methodology used was approved by the Minister on 21 December 2017 (Attachment 10A(a)).
10A(e)	At least once annually, the person taking the action must engage with the Murujuga Aboriginal Corporation in the planning and reporting associated with the on-going annual rock art monitoring.	Compliant	In the period July 2018 to June 2019, YPN continued to work closely with Murujuga Aboriginal Corporation (MAC). Specific activities included: <ul style="list-style-type: none"> rock art monitoring in partnership with MAC, including briefing of findings to date, program design and future research opportunities; support for and participation in the MAC Annual Strategic Meeting; hosting the MAC CEO and Project Director with Yara International's Vice President Decarbonise Yara for discussions on the rock art; funding for a capacity-building and planning program for MAC Rangers and two other local ranger groups to deliver better management of the National Park and its rock art; and assisting MAC Chair, CEO and Project Director to meet Members of Parliament in Canberra for discussions on rock art and heritage. <p>In addition, YPN provided formal correspondence to MAC regarding licensing and regulatory requirements and held regular discussions with the MAC CEO, staff and members regarding monitoring and associated issues. YPN also provided a letter of support for a MAC funding application for rock art-related tourism. YPN's Manager Government & External Relations has had over 200 email communications with MAC in this period.</p>



11	To protect the Dampier Archipelago (including Burrup Peninsula) National Heritage Place the person taking the action must ensure that there is no measurable impact from air pollutants to any rock art sites within 2km of the boundary of the action, at any time during the life of the approval. This includes measurable changes in patination, including but not limited to: discolouration of the surface of the rock art motif or the surrounding rock surface including patina; or changes that make the rock art site more difficult to interpret (for example a decrease in definition).	Compliant	YPN has not been notified of any evidence of any measurable impact from air pollutants to any rock art sites within 2 km of the project site.
11A	If the Minister is not satisfied that the outcome described in Condition 11 is being met, the Minister may request (in writing) that the person taking the action submit a Rock Art Impact Mitigation Review (RAIMR) to the Department for approval by the Minister.	N/A	The Minister has not made any request to YPN with respect to this condition.
11A(a)	The RAIMR must: <ul style="list-style-type: none"> i. Be prepared by a suitably qualified person (Heritage) in consultation with a suitably qualified Person (Air Quality); ii. Be submitted within a timeframe specified by the Minister. iii. Include an analysis of the cause or causes of the detected change in the rock art surface; iv. Include a review of operations, including changes to operations to reduce the impact of air emissions on rock art; and v. Include mitigation and management measures to protect rock art sites within 2km of the boundary of the action from further impacts, to meet the requirements of Condition 11. 	N/A	Refer to Condition 11A above.
11A(b)	If the Minister approves the RAIMR required under this condition, then the approved RAIMR must be implemented.	N/A	Refer to Condition 11A above.
12	If the person taking the action wishes to carry out any activity otherwise than in accordance with the management plan(s) and or monitoring program(s) as specified in the conditions, the person taking the action must submit to the Department for the Minister's written approval a revised version of that management plan(s) and or monitoring program(s). The varied activity shall not commence until the Minister has approved the varied management plan(s) and or monitoring program(s) in writing. The Minister will not approve a varied management plan(s) and or monitoring program(s) unless the revised management plan(s) and or monitoring program(s) would result in an equivalent or improved environmental outcome over time. If the Minister approves the revised management plan(s), and or monitoring program(s) that management plan(s) and or monitoring program(s) must be implemented in place of the management plan(s) and or monitoring program(s) originally approved.	Compliant	As discussed in Condition 7(b) a revised ERMP was submitted to the Department for review in December 2016, with the OEMP (refer to Condition 7[b]). Minor updates to the ERMP were made in December 2016, a few days after the original submission, and in January 2017. This new Condition 12 came into effect in September 2017, after the minor updates were made. To ensure YPN continues to remain compliant with this new condition, the amended EMP was submitted to the Department for the Minister's approval on 20 September 2018 (Rev 21). On the 12 th August 2019 the Emergency Management Plan (EMP) (previously known as the Emergency Response Management Plan (250-500-PLN-000-0003)) was updated. Minor changes have been made since the submission in September 2018, please see Attachment 7e (Rev 24) for updated EMP and refer to Page 4 for summary of changes.
13	If the Federal Minister believes that it is necessary or convenient for the better protection of National Heritage Place, listed threatened species and communities and listed migratory species to do so, the Minister may request that the person taking the action make specified revisions to the management plan(s), monitoring program(s) specified in the conditions and submit the revised management plan(s), monitoring program(s) for the Minister's written approval. The person taking the action must comply with any such request. The revised approved management plan(s), monitoring program(s), must be implemented. Unless the Minister has approved the revised management plan(s), monitoring program(s), then the person taking the action must continue to implement the management plan(s), monitoring program(s) originally approved, as specified in the conditions.	N/A	The Minister has made no request during the reporting period.



<p>14</p>	<p>Unless otherwise agreed to in writing by the Minister, the person taking the action must publish on their website, for the life of the approval:</p> <ul style="list-style-type: none"> a) Management plans required under Conditions 7 and 11A, within 1 month of being approved. b) A revised version of any management plans required under Conditions 7 and 11A, within 1 month of being approved under Condition 12 or 13. c) All baseline air quality data collected under Condition 9, by 31 October 2017. d) All ongoing air quality monitoring data required under Condition 9A, within 3 months of collection of each datum. e) All baseline rock art data or reports relating to Condition 10, within 30 days of any data or reports on being provided to the person taking the action. f) All rock art monitoring data or reports relating to on-going rock art monitoring required under Condition 10A, within 30 days of the data or reports being provided to the person taking the action 	<p>Compliant</p>	<p>YPN publishes all management plan(s) and monitoring program(s) on the website, https://www.yara.com.au/about-yara/about-yara-australia/pilbara/yara-pilbara-nitrates/ as follows:</p> <p>Please note that it could be interpreted that to comply with both sub-conditions 14(a) and 14(b) the original management plans <i>and</i> any revised versions are to stay on the website for the life of the approval. To avoid confusion YPN has interpreted that the revised approved versions replace the originals, which can be removed from the website.</p> <ul style="list-style-type: none"> a) Condition 7 plans include the CEMP, OEMP, AHMP, HMMP and ERP; Condition 11A refers to the RAIMR. As discussed in Condition 7 above, the OEMP has incorporated the AHMP and HMMP. All plans are available on the YPN website. b) NA. c) The Baseline Air Quality Monitoring Report is available on the YPN website. d) All ongoing quality monitoring data are available on the YPN website. Each report was posted within 30-60 days of the data becoming available to YPN. e) All baseline rock art monitoring reports are available on the YPN website. As discussed in the 2017 ACR Addendum, following monitoring in August of both 2015 and 2016 a report was published by DWER on the BRATWG website in September 2017. This report was also published on the YPN website. f) 2018 Rock Art Monitoring Analysis Report (as per Condition 10A) is under review by the DoEE, Compliance and Heritage Branch. Once approval has been given report will be published within 30 days on Yara Pilbara's webpage.
<p>15</p>	<p>If, at any time after 2 years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not substantially commence the action without the written agreement of the Minister.</p>	<p>N/A - "complete"</p>	<p>The TAN Plant substantially commenced in 2012, within 2 years of the date of approval.</p> <p>YPN sought Department agreement in 2018 EPBC ACR that this condition can be considered 'complete'.</p>



3.3 Details of Non-Compliance

No non-compliances were identified in the audit period (1st July 2018 to 30th June 2019.)



4 Management Plans

During the reporting period the following management plans were implemented:

- Operational Environmental Management Plan (OEMP) including management measures for:
 - Erosion Control and Storm Water;
 - Water Quality;
 - Air Quality and Dust;
 - Waste; and
 - Traffic.
- Aboriginal Heritage Management Plan (incorporated into OEMP);
- Hazardous Materials Management Plan (incorporated into OEMP); and
- Emergency Response Management Plan:

On 15 September 2017 the OEMP was approved by the DoEE. The OEMP is currently being revised and will be provided to the DoEE for approval in early 2020, following close out of the Appeal on DWER Operating Licence L7997/2002 and the Section 46 Enquiry into Ministerial Statement 870.



5 New Environmental Risks

No new environmental risks that were not contemplated in the Project referral and assessment process have been identified in the audit period.



6 Attachments

The following documents are attached to this 2019 ACR as evidence of compliance:

- Attachment 3a (1): Email from YPN to Department, dated 5 October 2018, regarding submission of 2018 EPBC ACR
- Attachment 3a (2): Screenshots from YPN website showing proof of publication for Air Quality Analysis Report (as per Condition 9A)
- Attachment 3a (3): DoEE email correspondence confirming YPN is waiting on DoEE methodology approval before publication of rock art monitoring report (as per Condition 10A)
- Attachment 3b: Screenshot dated 10 September 2019 showing historical EPBC ACR's remain on YPN website (2014-2018)
- Attachment 4: YPN Discharge to MUBRL- Continuous and Weekly Sample Results
- Attachment 6a: Email Correspondence for Bird Deterrent Approval 25 June 2015
- Attachment 6b: Bird Deterrent Structures (January 2019) and Environmental Inspection Checklist
- Attachment 7c: YPN OEMP Approval Letter 15 September 2017
- Attachment 7e: Updated Emergency Management Plan (250-500-PLN-000-0003, Rev 24)
- Attachment 8a: National Heritage Place Access Register (access form and screenshot)
- Attachment 9B(a): Stack Testing Results 12th May to the 4th of July 2019 (Ektimo Quarterly Stack testing and CEMS data)
- Attachment 10A(a): Letter YPN to Department regarding Rock Art Monitoring, dated 2 July 2018
- Attachment- Site Photos



2018 Annual Compliance Report
EPBC 2008/4546
Technical Ammonium Nitrate Plant

04-06-2020 600-200-ACR-YPN-0007 Rev 1

Attachment 3a (1): Email from YPN to Department, dated 5 October 2018, regarding submission of 2018 EPBC ACR

Nicole Ivory

From: Carly Mott
Sent: Friday, 5 October 2018 3:18 PM
To: post.approvals@environment.gov.au
Cc: YP_Environment; Brian Howarth; Vicki Hood; Susanna Delbost
Subject: Yara Pilbara Nitrates Transmittal 183 - EPBC2008/4546 2018 Annual Compliance Report (email 1/2)
Attachments: Transmittal 0183.pdf; Proof of Publication.pdf; 650-200-ACR-YPN-0006.pdf
Follow Up Flag: Follow up
Flag Status: Flagged

Good Afternoon

In accordance with Yara Pilbara Nitrates Pty Ltd (YPN)'s Federal Approval EPBC 2008/4546, please find attached the 2018 Annual Compliance Report.

The associated reports including Air Quality Monitoring and Analysis Report and Rock Art Monitoring and Analysis Report will be send in a separate email.

The reports relate to the reporting period 30 June 2017 to 1 July 2018 and are required to be submitted by 6 October 2018 to meet compliance with condition 3 of the EPBC 2008/4546 Approval (directed variation dated 12 September 2017).

Submission of the Air Quality Monitoring and Analysis Report and Rock Art Monitoring and Analysis Report relate to Conditions 9A and 10A of the EPBC 2008/4546 Federal Approval, respectively.

A copy of the reports have been published to YPN's website (www.yara.com.au) and the screenshots of the upload are also attached (proof of publication).

Yara Pilbara Nitrates requires acknowledgement that you have received this correspondence. Please acknowledge receipt by return email.

Thank you and kind regards

Carly Mott
Quality Compliance Coordinator
Document Control
HESQ
Production
Site Operations
Office: 08 9183 4125
Email: carly.mott@yara.com



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2018 Annual Compliance Report
EPBC 2008/4546
Technical Ammonium Nitrate Plant

04-06-2020 600-200-ACR-YPN-0007 Rev 1

Attachment 3a (2): Screenshot from YPN website showing proof of publication for Air Quality Analysis Report (as per Condition 9A)

Yara Pilbara Nitrates | Y...
YARA INTERNATIONAL ASA [NO] https://www.yara.com.au/about-yara/about-yara-australia/pilb

- [Air Quality Monitoring Report – May 2018](#)
- [Air Quality Monitoring Report - June 2018](#)
- [Air Quality Monitoring Report - July 2018](#)
- [Air Quality Monitoring Report - August 2018](#)
- [Air Quality Monitoring Report - September 2018](#)
- [Air Quality Monitoring Report - October 2018](#)
- [Air Quality Monitoring Report - November 2018](#)
- [Air Quality Monitoring Report - December 2018](#)
- [Ambient Air Quality Report 2017 - 2018](#)
- [Air Quality Monitoring Report - January 2019](#)
- [Air Quality Monitoring Report - February 2019](#)
- [Air Quality Monitoring Report - March 2019](#)
- [Air Quality Monitoring Report - April 2019](#)
- [Air Quality Monitoring Report - May 2019](#)
- [Air Quality Monitoring Report - June 2019](#)
- [Air Quality Monitoring Report - July 2019](#)
- [Air Quality Monitoring Report - August 2019](#)
- [Ambient Air Quality Monitoring Report 2018 - 2019](#)**

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https://www.yara.com.au/siteassets/about-yara/reports/air-5

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2018 Annual Compliance Report
EPBC 2008/4546
Technical Ammonium Nitrate Plant

04-06-2020 600-200-ACR-YPN-0007 Rev 1

Attachment 3a (3): DoEE email correspondence confirming YPN is waiting on DoEE methodology approval before publication of rock art monitoring report (as per Condition 10A)



2018 Annual Compliance Report
EPBC 2008/4546
Technical Ammonium Nitrate Plant

04-06-2020 600-200-ACR-YPN-0007 Rev 1

Attachment 3b: Screenshot dated 10 September 2019 showing historical EPBC ACR's remain on YPN website (2014-2018)

Environmental Reports

Air Monitoring Reports ▾

Groundwater Monitoring Reports ▾

Rock Art Monitoring Reports ▾

Compliance Assessment Reports MS870 ▾

Annual Environmental Compliance Reports EPBC 2008/4546 ▾

[TAN Plant EPBC Annual Compliance Report 2014](#)

[TAN Plant EPBC Annual Compliance Report 2015](#)

[TAN Plant EPBC Annual Compliance Report 2016](#)

[TAN Plant EPBC Annual Compliance Report 2017](#)

[TAN Plant EPBC Annual Compliance Report 2017 - Addendum](#)

[TAN Plant EPBC Annual Compliance Report 2018](#)

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2018 Annual Compliance Report
EPBC 2008/4546
Technical Ammonium Nitrate Plant

04-06-2020 600-200-ACR-YPN-0007 Rev 1

Attachment 4: YPN Discharge to MUBRL- Continuous and Weekly Sample Results

Title	M1 (Incoming Seawater)			Yara Pilbara Nitrates Discharge Point to MUBRL (W4)						YPN Temperature Difference (W4-M1)			W4 Conductivity	W4 pH
	Incoming Brine Temp (WaterCorp)	Incoming Seawater Flow	Back-up SW Inlet Temp (Desal 1)	Temperature	Conductivity	pH	Flow	Flow	°C					
	°C	m3 / hour	°C	°C	mS/cm		kg/hr	m3/hr	W4-M1	Minutes >5°C	Hours >5°C	mS/cm	Monthly Average	
Tag #	T102006	F102001	1-TT5101	61TI001_PV	61AI003_PV	61AI004_PV	87FI005_PV	87FI005_PV*0.0010						
01-July-2018	20.3	1.88	26.7	21.5	62.2	7.9	0.00	0.00	-	0	0			
02-July-2018	11.4	1.06	25.8	21.9	62.2	7.9	0.00	0.00	-	0	0			
03-July-2018	0.0	0.00	22.8	23.2	62.0	7.8	0.00	0.00	-	0	0			
04-July-2018	0.0	0.00	5.9	6.7	18.2	2.3	0.00	0.00	-	0	0			
05-July-2018	0.0	0.00	0.0	0.0	0.0	0.0	0.00	0.00	-	0	0			
06-July-2018	0.0	0.00	11.8	11.3	12.1	4.0	0.00	0.00	-	0	0			
07-July-2018	0.0	0.00	20.2	20.5	25.3	8.0	0.00	0.00	-	0	0			
08-July-2018	0.0	0.00	1.5	1.8	2.6	0.3	0.00	0.00	-	0	0			
09-July-2018	0.0	0.00	0.0	0.0	0.0	0.0	0.00	0.00	-	0	0			
10-July-2018	0.0	0.00	0.0	0.0	0.0	0.0	0.00	0.00	-	0	0			
11-July-2018	0.0	0.00	0.0	0.0	0.0	0.0	0.00	0.00	-	0	0			
12-July-2018	0.0	0.00	0.0	11.3	13.0	3.8	0.00	0.00	-	0	0			
13-July-2018	0.0	0.00	0.0	22.0	28.4	5.2	0.00	0.00	-	0	0			
14-July-2018	0.0	0.00	0.0	22.2	28.5	5.2	0.00	0.00	-	0	0			
15-July-2018	0.0	0.00	0.0	22.4	29.1	8.1	0.00	0.00	-	0	0			
16-July-2018	0.0	0.00	0.0	21.9	47.3	8.1	0.00	0.00	-	0	0			
17-July-2018	0.0	0.00	0.0	21.9	62.1	8.0	0.00	0.00	-	0	0			
18-July-2018	0.0	0.00	0.0	22.8	61.8	8.1	0.00	0.00	-	0	0			
19-July-2018	0.0	0.00	0.0	23.6	62.0	8.1	0.00	0.00	-	0	0			
20-July-2018	0.0	0.00	0.0	23.6	62.1	8.2	0.00	0.00	-	0	0			
21-July-2018	0.0	0.00	0.0	23.4	62.1	8.2	0.00	0.00	-	0	0			
22-July-2018	0.0	0.00	0.0	23.9	62.1	8.2	0.00	0.00	-	0	0			
23-July-2018	0.0	0.00	0.0	23.8	62.0	8.2	0.00	0.00	-	0	0			
24-July-2018	0.0	0.00	14.0	23.9	61.9	8.2	0.00	0.00	-	0	0			
25-July-2018	0.0	0.00	22.2	23.6	62.1	8.3	0.00	0.00	-	0	0			
26-July-2018	0.0	0.00	23.2	24.7	62.1	8.3	0.00	0.00	-	0	0			
27-July-2018	0.0	0.00	22.5	24.3	62.1	8.3	0.00	0.00	-	0	0			
28-July-2018	0.0	0.00	23.1	23.5	62.1	8.3	0.00	0.00	-	0	0			
29-July-2018	0.0	0.00	23.1	23.5	62.2	8.4	0.00	0.00	-	0	0			
30-July-2018	0.0	0.00	23.3	23.4	62.1	8.4	0.00	0.00	-	0	0			
31-July-2018	0.0	0.00	23.4	24.2	62.1	8.4	0.00	0.00	-	0	0			
01-August-2018	0.0	0.00	21.5	23.5	62.2	8.3	0.00	0.00	-	0	0			
02-August-2018	0.0	0.00	20.2	21.5	62.3	8.4	0.00	0.00	-	0	0			
03-August-2018	0.0	0.00	19.5	20.0	62.3	8.1	0.00	0.00	-	0	0			
04-August-2018	0.0	0.00	20.3	15.8	48.5	6.3	0.00	0.00	-	0	0			
05-August-2018	0.0	0.00	21.5	11.8	31.5	4.0	0.00	0.00	-	0	0			
06-August-2018	0.0	0.00	20.3	20.8	62.3	8.0	0.00	0.00	-	0	0			
07-August-2018	0.0	0.00	20.0	20.2	62.3	8.0	0.00	0.00	-	0	0			
08-August-2018	0.0	0.00	20.1	15.5	49.2	6.3	0.00	0.00	-	0	0			
09-August-2018	0.0	0.00	18.8	19.2	55.1	7.1	0.00	0.00	-	0	0			
10-August-2018	0.0	0.00	23.5	23.5	62.2	8.0	0.00	0.00	-	0	0			
11-August-2018	0.0	0.00	20.3	21.3	62.3	8.0	0.00	0.00	-	0	0			
12-August-2018	0.0	0.00	20.2	20.2	62.4	8.0	0.00	0.00	-	0	0			
13-August-2018	0.0	0.00	20.7	20.5	62.3	8.0	0.00	0.00	-	0	0			
14-August-2018	0.0	0.00	20.7	20.3	62.3	8.0	0.00	0.00	-	0	0			
15-August-2018	0.0	0.00	22.8	22.2	62.2	8.0	0.00	0.00	-	0	0			
16-August-2018	0.0	0.00	19.5	23.0	62.2	8.1	0.00	0.00	-	0	0			
17-August-2018	8.3	0.00	21.5	23.6	61.7	8.0	0.00	0.00	-	0	0			
18-August-2018	23.7	0.36	22.2	24.2	61.5	8.0	0.00	0.00	-	0	0			
19-August-2018	23.7	0.03	21.9	24.5	61.9	8.0	0.00	0.00	-	0	0			
20-August-2018	23.4	0.03	21.8	24.8	62.0	8.0	0.00	0.00	-	0	0			
21-August-2018	22.1	0.03	21.9	24.4	57.2	8.0	0.00	0.00	-	0	0			
22-August-2018	22.8	0.03	22.6	25.0	49.4	7.9	0.00	0.00	-	0	0			
23-August-2018	22.6	0.03	22.8	24.5	62.1	7.9	0.00	0.00	-	0	0			
24-August-2018	22.0	0.03	22.4	23.5	62.2	7.9	0.00	0.00	-	0	0			
25-August-2018	22.1	0.03	21.6	23.5	62.1	7.9	0.00	0.00	-	0	0			
26-August-2018	22.7	0.03	21.7	24.2	62.1	7.9	0.00	0.00	-	0	0			
27-August-2018	23.4	1,910.51	22.0	14.6	34.0	5.0	0.00	0.00	-	0	0			
28-August-2018	23.1	2,979.42	22.7	17.4	38.4	5.1	0.00	0.00	-	0	0			
29-August-2018	22.6	2,998.16	22.5	24.5	62.1	7.9	0.00	0.00	-	0	0			
30-August-2018	22.0	2,998.16	21.5	22.5	61.4	7.9	0.00	0.00	-	0	0			
31-August-2018	21.9	2,998.16	21.5	23.5	49.1	7.9	0.00	0.00	-	0	0			
01-September-2018	22.4	2,998.16	21.8	24.8	57.0	7.8	0.00	0.00	-	0	0			
02-September-2018	23.3	2,998.16	22.5	25.7	61.8	7.8	0.00	0.00	-	0	0			
03-September-2018	23.7	2,998.16	23.1	26.3	50.7	7.8	0.00	0.00	-	0	0			
04-September-2018	23.9	2,998.16	23.4	26.1	59.5	7.8	0.00	0.00	-	0	0			
05-September-2018	23.3	2,998.16	23.3	9.9	25.6	3.2	0.00	0.00	-	0	0			
06-September-2018	23.0	2,998.16	23.0	0.0	0.0	0.0	51,698.10	51.70	N/A	0	0			
07-September-2018	23.0	2,998.16	23.0	12.7	44.3	6.0	128,419.84	128.42	N/A	0	0			
08-September-2018	23.1	2,998.16	16.4	23.1	60.2	8.2	40,576.41	40.58	-0.1	0	0			
09-September-2018	9.1	1,190.94	23.3	26.2	61.0	8.2	0.00	0.00	-	0	0			
10-September-2018	0.0	0.00	23.7	26.6	67.2	8.4	0.00	0.00	-	0	0			
11-September-2018	0.0	0.00	24.2	22.7	62.7	8.5	65,534.20	65.53	-1.5	0	0			
12-September-2018	0.0	0.00	24.1	22.0	41.3	8.3	97,256.27	97.26	-2.2	0	0			
13-September-2018	0.0	0.00	23.9	19.3	46.8	8.5	119,171.03	119.17	-4.6	0	0			
14-September-2018	0.0	0.00	24.3	20.1	62.0	8.5	192,479.87	192.48	-4.2	0	0			
15-September-2018	0.0	0.00	24.5	20.4	60.8	8.5	194,484.48	194.48	-4.1	0	0			
16-September-2018	0.0	0.00	24.2	19.3	52.1	8.2	197,003.94	197.00	-4.9	0	0			
17-September-2018	13.5	1,603.18	24.3	20.7	61.1	8.1	142,678.80	142.68	-3.6	0	0			
18-September-2018	25.2	2,998.16	24.7	26.5	63.7	8.4	0.00	0.00	-	0	0			
19-September-2018	24.5	2,998.16	24.4	10.2	25.5	3.4	0.00	0.00	-	0	0			
20-September-2018	24.3	2,998.16	23.9	15.3	32.7	4.3	0.00	0.00	-	0	0			
21-September-2018	24.6	2,998.16	24.0	27.6	63.9	8.4	0.00	0.00	-	0	0			
22-September-2018	25.2	2,998.16	24.2	19.4	46.9	6.2	0.00	0.00	-	0	0			
23-September-2018	27.4	2,998.16	24.8	0.0	0.0	0.0	0.00	0.00	-	0	0			
24-September-2018	29.0	2,998.16	25.3	0.0	0.0	0.0	0.00	0.00	-	0	0			
25-September-2018	28.6	2,998.16	26.0	0.0	0.0	0.0	0.00	0.00	-	0	0			
26-September-2018	28.9	2,998.16	26.4	0.0	0.0	0.0	0.00	0.00	-	0	0			
27-September-2018	28.3	718.05	26.3	0.0	0.0	0.0	0.00	0.00	-	0	0			
28-September-2018	27.5	0.21	26.1	0.0	0.0	0.0	0.00	0.00	-					

Title	M1 (Incoming Seawater)			Yara Pilbara Nitrates Discharge Point to MUBRL (W4)						YPN Temperature Difference (W4-M1)			W4 Conductivity	W4 pH
	Incoming Brine Temp (WaterCorp)	Incoming Seawater Flow	Back-up SW Inlet Temp (Desal 1)	Temperature	Conductivity	pH	Flow	Flow	°C					
	°C	m3 / hour	°C	°C	mS/cm		kg/hr	m3/hr	W4-M1	Minutes >5°C	Hours >5°C	mS/cm	Monthly Average	
Tag #	T102006	F102001	1-TT5101	61TI001_PV	61AI003_PV	61AI004_PV	87FI005_PV	87FI005_PV*0.0010						
10-October-2018	26.5	42.34	26.5	29.7	63.4	8.1	0.00	0.00	-	0	0			
11-October-2018	26.4	229.91	26.5	29.1	64.1	9.0	0.00	0.00	-	0	0			
12-October-2018	26.4	152.81	26.5	28.8	64.0	9.3	0.00	0.00	-	0	0			
13-October-2018	26.2	254.20	26.4	28.3	64.1	9.1	0.00	0.00	-	0	0			
14-October-2018	26.0	238.53	26.2	28.0	64.1	9.0	0.00	0.00	-	0	0			
15-October-2018	26.1	265.76	25.9	28.2	64.0	9.0	0.00	0.00	-	0	0			
16-October-2018	26.4	421.27	26.3	29.1	64.0	8.9	0.00	0.00	-	0	0			
17-October-2018	26.8	310.73	26.7	29.5	64.1	8.9	0.00	0.00	-	0	0			
18-October-2018	27.3	556.03	27.1	28.1	64.2	9.0	0.00	0.00	-	0	0			
19-October-2018	26.6	990.37	26.5	28.5	63.8	8.9	0.00	0.00	-	0	0			
20-October-2018	26.1	123.24	26.1	29.2	64.0	8.9	0.00	0.00	-	0	0			
21-October-2018	26.3	203.93	26.4	29.9	64.0	8.9	0.00	0.00	-	0	0			
22-October-2018	27.1	178.76	27.2	31.3	64.0	8.8	0.00	0.00	-	0	0			
23-October-2018	27.3	14.90	27.3	31.8	64.0	8.7	0.00	0.00	-	0	0			
24-October-2018	26.6	1.55	26.7	29.3	64.2	8.7	0.00	0.00	-	0	0			
25-October-2018	25.4	3.12	25.5	27.1	64.2	8.6	0.00	0.00	-	0	0			
26-October-2018	25.9	14.16	25.6	27.6	64.0	8.5	0.00	0.00	-	0	0			
27-October-2018	26.3	17.72	26.0	28.6	64.1	8.4	0.00	0.00	-	0	0			
28-October-2018	15.2	15.68	27.7	29.8	51.6	8.4	0.00	0.00	-	0	0			
29-October-2018	16.9	1.81	28.6	30.1	63.7	8.5	0.00	0.00	-	0	0			
30-October-2018	28.2	735.56	27.0	29.0	62.9	8.5	0.00	0.00	-	0	0			
31-October-2018	9.9	168.50	27.4	7.2	16.9	2.3	0.00	0.00	-	0	0			
01-November-2018	9.9	168.50	27.4	7.2	16.9	2.3	0.00	0.00	-	0	0			
02-November-2018	0.0	0.00	27.6	29.5	60.3	8.3	0.00	0.00	-	0	0			
03-November-2018	0.0	0.00	27.9	30.7	63.3	8.5	0.00	0.00	-	0	0			
04-November-2018	0.0	0.00	27.5	30.5	62.8	8.5	0.00	0.00	-	0	0			
05-November-2018	0.0	0.00	27.3	30.3	62.9	8.5	0.00	0.00	-	0	0			
06-November-2018	26.7	1.42	26.7	29.9	64.0	7.9	0.00	0.00	-	0	0			
07-November-2018	26.8	4.91	26.4	29.4	64.1	7.9	0.00	0.00	-	0	0			
08-November-2018	27.2	238.23	27.3	33.5	58.6	8.5	0.00	0.00	-	0	0			
09-November-2018	27.9	323.90	27.9	29.2	24.7	8.5	6,295.90	6.30	1.3	0	0			
10-November-2018	28.0	396.33	28.1	29.3	0.7	8.5	0.00	0.00	-	0	0			
11-November-2018	27.0	161.03	27.2	28.0	1.2	8.6	0.00	0.00	-	0	0			
12-November-2018	28.0	81.43	26.6	27.2	13.6	8.5	0.00	0.00	-	0	0			
13-November-2018	28.3	150.08	27.4	28.4	64.0	8.5	0.00	0.00	-	0	0			
14-November-2018	27.7	27.51	27.7	28.9	36.7	8.5	0.00	0.00	-	0	0			
15-November-2018	28.4	128.39	28.5	29.7	40.9	8.5	0.00	0.00	-	0	0			
16-November-2018	27.9	660.06	28.1	32.8	0.8	8.5	0.00	0.00	-	0	0			
17-November-2018	31.0	195.33	27.6	34.0	0.8	8.4	0.00	0.00	-	0	0			
18-November-2018	32.3	290.49	28.8	33.7	29.5	8.4	0.00	0.00	-	0	0			
19-November-2018	31.7	103.61	28.4	33.3	63.8	8.4	0.00	0.00	-	0	0			
20-November-2018	31.5	176.24	28.0	30.9	29.4	8.4	0.00	0.00	-	0	0			
21-November-2018	32.7	127.26	27.9	30.2	59.6	8.5	0.00	0.00	-	0	0			
22-November-2018	27.6	4.18	27.7	29.0	63.4	8.6	0.00	0.00	-	0	0			
23-November-2018	26.4	25.58	26.7	26.7	63.1	8.7	0.00	0.00	-	0	0			
24-November-2018	26.1	145.30	26.2	27.3	60.5	8.7	0.00	0.00	-	0	0			
25-November-2018	26.5	49.71	26.7	28.4	64.2	8.7	0.00	0.00	-	0	0			
26-November-2018	26.0	64.72	26.0	27.6	53.4	8.8	0.00	0.00	-	0	0			
27-November-2018	25.8	16.04	26.0	27.5	64.1	8.8	0.00	0.00	-	0	0			
28-November-2018	25.5	7.22	25.7	26.6	64.1	8.8	0.00	0.00	-	0	0			
29-November-2018	25.4	31.59	25.6	26.3	64.4	8.9	0.00	0.00	-	0	0			
30-November-2018	25.5	21.72	25.7	27.0	64.3	8.9	0.00	0.00	-	0	0	24.7	8.5	
01-December-2018	25.8	55.51	25.9	27.3	64.3	8.8	0.00	0.00	-	0	0			
02-December-2018	28.0	70.42	26.2	27.8	64.2	8.8	0.00	0.00	-	0	0			
03-December-2018	27.6	91.24	26.5	28.1	64.1	8.8	0.00	0.00	-	0	0			
04-December-2018	28.3	105.73	26.8	28.2	64.2	8.8	0.00	0.00	-	0	0			
05-December-2018	27.8	67.80	27.0	28.1	64.3	8.8	0.00	0.00	-	0	0			
06-December-2018	28.9	87.71	27.0	28.2	58.7	8.8	0.00	0.00	-	0	0			
07-December-2018	27.5	150.35	27.7	30.2	61.6	8.7	3,792.34	3.79	2.8	0	0			
08-December-2018	28.2	140.29	28.3	25.3	57.4	8.3	137,506.84	137.51	-2.9	0	0			
09-December-2018	28.3	77.71	28.4	25.5	0.8	8.6	137,502.01	137.50	-2.8	0	0			
10-December-2018	28.9	106.15	28.9	25.8	28.4	8.5	136,020.64	136.02	-3.1	0	0			
11-December-2018	29.4	84.46	29.0	29.5	52.7	8.6	134,180.96	134.18	0.1	0	0			
12-December-2018	30.0	85.07	30.0	23.2	66.1	8.6	131,306.52	131.31	-6.8	0	0			
13-December-2018	29.5	325.64	29.5	27.0	18.2	8.6	133,291.49	133.29	-2.5	0	0			
14-December-2018	29.4	75.84	29.3	24.0	66.1	8.2	144,361.63	144.36	-5.5	0	0			
15-December-2018	28.2	83.27	28.4	23.8	63.6	7.9	205,228.66	205.23	-4.4	0	0			
16-December-2018	27.0	69.91	27.2	21.4	63.8	8.5	172,825.10	172.83	-5.6	0	0			
17-December-2018	26.1	85.87	26.3	19.7	65.1	8.4	153,428.54	153.43	-6.3	0	0			
18-December-2018	27.0	21.16	26.7	20.8	65.3	8.4	152,983.51	152.98	-6.2	0	0			
19-December-2018	26.7	29.14	26.4	23.1	62.0	8.2	151,954.73	151.95	-3.6	0	0			
20-December-2018	26.9	2.24	27.0	22.7	61.8	8.1	141,658.71	141.66	-4.2	0	0			
21-December-2018	27.6	2.17	27.7	23.8	38.8	8.3	143,490.03	143.49	-2.7	0	0			
22-December-2018	27.6	2.01	27.7	23.9	10.7	8.3	143,325.76	143.33	-3.6	0	0			
23-December-2018	28.1	2.18	28.1	24.2	7.5	8.3	144,101.42	144.10	-3.9	0	0			
24-December-2018	29.0	2.14	28.8	26.7	0.7	8.3	144,325.06	144.33	-2.3	0	0			
25-December-2018	29.9	3.39	29.2	26.9	0.6	8.3	144,730.52	144.73	-3.0	0	0			
26-December-2018	29.9	2.75	29.6	27.1	0.6	8.3	145,775.15	145.78	-2.8	0	0			
27-December-2018	29.8	1.77	30.0	28.0	1.7	8.3	144,877.42	144.88	-1.8	0	0			
28-December-2018	30.1	2.57	30.2	27.8	0.6	7.9	117,557.61	117.56	-2.3	0	0			
29-December-2018	30.4	1.71	30.4	30.7	0.6	7.9	0.00	0.00	-	0	0			
30-December-2018	31.0	1.09	30.8	31.2	26.5	8.0	0.00	0.00	-	0	0			
31-December-2018	31.2	1.57	30.8	30.8	38.1	8.0	0.00	0.00	-	0	0	36.1	8.3	
01-January-2019	31.2	2.35	30.7	30.5	59.2	8.1	0.00	0.00	-	0	0			
02-January-2019	32.4	2.14	30.7	30.3	37.8	8.1	0.00	0.00	-	0	0			
03-January-2019	32.2	1.84	30.8	30.8	41.3	8.1	0.00	0.00	-	0	0			
04-January-2019	30.8	2.31	30.8	31.0	20.6	8.1	0.00	0.00	-	0	0			
05-January-2019	31.4	2.00	30.9	31.5	27.6	8.1	0.00	0.00	-	0	0			
06-January-2019	32.0	2.71	31.4	32.3	54.7	8.1	0.00	0.00	-	0	0			
07-January-2019	32.0	2.80	31.4	32.1	26.0	8.1	0.00	0.00	-	0	0			
08-January-2019	34.7	2.12	31.6	33.5	21.0	8.1	0.00	0.00	-	0	0			
09-January-2019	34.7	2.90	31.9	33.9	57.7	8.1	0.00	0.00	-	0	0			
10-January-2019	35.1	2.24	32.2	33.4	56.9	8.0	0.00	0.00	-	0	0			
11-January-2019	36.7	1.94	32.5	32.8	58.9	8.1	0.00	0.00	-	0	0			
12-January-2019	35.3	2.39	32.4	27.9	51.2	7.9	120,906.80	120.91	-7.5	0	0			
13-January-2019	35.5	2.43	32.5	27.4	50.0	8.1	133,481.03	133.48	-8.1	0	0			
14-January-2019	34.5	1.83	32.0	26.6	50.1	8.0	135,853.86	135.85	-7.9	0	0			
15-January-2019	35.1	2.47	32.0	27.9	28.3	8.0	114,374.43	114.37	-7.1	0	0			
16-January-2019	32.4	1.04	32.8	32.6	43.4	7.8	0.00	0.00	-	0	0			
17-January-2019	32.8	0.71	32.8	33.1	51.3	7.7	0.00	0.00	-	0	0</			

Title	M1 (Incoming Seawater)			Yara Pilbara Nitrates Discharge Point to MUBRL (W4)						YPN Temperature Difference (W4-M1)			W4 Conductivity	W4 pH
	Incoming Brine Temp (WaterCorp)	Incoming Seawater Flow	Back-up SW Inlet Temp (Desal 1)	Temperature	Conductivity	pH	Flow	Flow	°C					
Unit	°C	m3 / hour	°C	°C	mS/cm		kg/hr	m3/hr	W4-M1	Minutes >5°C	Hours >5°C	mS/cm		
Tag #	T102006	F102001	1-TT5101	61TI001_PV	61AI003_PV	61AI004_PV	87FI005_PV	87FI005_PV*0.0010				Monthly Average		
18-January-2019	33.5	2.84	32.8	34.0	16.9	7.8	0.00	0.00	-	0	0			
19-January-2019	32.7	1.27	32.5	34.2	62.0	7.8	0.00	0.00	-	0	0			
20-January-2019	32.8	0.41	33.1	34.6	64.9	7.8	0.00	0.00	-	0	0			
21-January-2019	32.9	0.41	41.1	34.7	66.4	7.8	0.00	0.00	-	0	0			
22-January-2019	32.7	92.80	33.4	34.3	66.4	7.8	0.00	0.00	-	0	0			
23-January-2019	32.6	1,303.52	32.3	32.9	66.5	7.8	0.00	0.00	-	0	0			
24-January-2019	32.7	1,366.51	33.0	33.9	53.9	7.8	0.00	0.00	-	0	0			
25-January-2019	32.4	1,400.56	32.7	33.5	50.4	7.8	0.00	0.00	-	0	0			
26-January-2019	32.1	1,403.69	32.3	31.5	60.2	7.8	0.00	0.00	-	0	0			
27-January-2019	31.4	1,387.32	31.6	31.2	65.8	7.9	0.00	0.00	-	0	0			
28-January-2019	31.1	1,360.67	31.3	31.5	66.1	7.9	0.00	0.00	-	0	0			
29-January-2019	31.4	1,336.47	31.3	31.5	65.9	7.9	2,299.68	2.30	0.0	0	0			
30-January-2019	32.0	1,339.64	30.8	31.2	65.2	7.8	0.00	0.00	-	0	0			
31-January-2019	32.0	1,334.69	31.3	31.6	65.2	7.8	0.00	0.00	-	0	0	49.1	8.0	
01-February-2019	32.1	1,357.85	30.1	31.6	43.5	7.7	0.00	0.00	-	0	0			
02-February-2019	32.3	1,334.98	32.0	32.1	0.3	7.7	0.00	0.00	-	0	0			
03-February-2019	33.5	1,306.56	33.8	33.5	1.9	7.7	0.00	0.00	-	0	0			
04-February-2019	33.1	1,326.31	34.5	33.7	0.2	7.7	0.00	0.00	-	0	0			
05-February-2019	33.2	1,385.62	32.2	33.0	0.2	7.7	0.00	0.00	-	0	0			
06-February-2019	31.7	1,650.28	32.0	31.9	0.2	7.8	0.00	0.00	-	0	0			
07-February-2019	32.0	1,672.39	31.8	30.8	0.2	7.8	0.00	0.00	-	0	0			
08-February-2019	33.0	785.68	32.2	31.5	8.1	7.8	0.00	0.00	-	0	0			
09-February-2019	34.1	1,239.46	32.3	33.1	41.5	7.8	0.00	0.00	-	0	0			
10-February-2019	33.9	731.28	36.6	24.0	29.8	5.3	0.00	0.00	-	0	0			
11-February-2019	33.1	1,309.65	33.4	33.2	0.7	7.8	0.00	0.00	-	0	0			
12-February-2019	32.3	1,393.07	32.6	31.8	0.2	7.8	0.00	0.00	-	0	0			
13-February-2019	32.1	1,389.87	32.4	31.6	0.2	7.8	0.00	0.00	-	0	0			
14-February-2019	31.7	1,361.36	32.0	30.9	3.4	7.8	0.00	0.00	-	0	0			
15-February-2019	32.4	1,417.74	32.2	31.8	0.2	7.8	0.00	0.00	-	0	0			
16-February-2019	33.5	1,731.89	32.5	34.7	27.3	7.8	0.00	0.00	-	0	0			
17-February-2019	34.2	1,790.52	32.6	36.6	51.5	7.8	0.00	0.00	-	0	0			
18-February-2019	33.0	1,793.22	32.7	35.1	0.6	7.8	0.00	0.00	-	0	0			
19-February-2019	32.6	1,821.44	32.3	32.7	0.6	7.8	0.00	0.00	-	0	0			
20-February-2019	32.5	1,798.08	32.2	32.1	0.2	7.8	0.00	0.00	-	0	0			
21-February-2019	32.7	1,673.25	32.2	31.7	0.2	7.8	0.00	0.00	-	0	0			
22-February-2019	33.0	1,800.99	32.4	31.6	0.2	7.8	0.00	0.00	-	0	0			
23-February-2019	33.7	1,818.02	32.5	31.7	1.1	7.8	0.00	0.00	-	0	0			
24-February-2019	35.3	1,832.61	32.9	33.3	0.2	7.8	0.00	0.00	-	0	0			
25-February-2019	34.7	1,916.25	33.0	35.9	0.2	7.8	0.00	0.00	-	0	0			
26-February-2019	33.5	1,962.43	32.8	31.8	0.2	8.0	67,302.28	67.30	-1.7	0	0			
27-February-2019	33.0	2,162.56	33.1	28.7	0.2	8.2	174,255.20	174.26	-4.3	0	0			
28-February-2019	32.8	2,147.97	33.0	27.6	0.2	8.2	177,048.91	177.05	-5.2	0	0	0.2	8.1	
01-March-2019	32.5	2,076.44	32.5	27.7	0.2	8.2	179,473.88	179.47	-4.8	0	0			
02-March-2019	32.5	1,922.68	32.5	27.9	0.2	8.2	179,401.88	179.40	-4.7	0	0			
03-March-2019	32.5	1,863.16	32.4	27.3	0.2	8.2	179,843.17	179.84	-5.2	0	0			
04-March-2019	33.5	1,918.45	32.3	25.7	0.2	8.1	180,215.10	180.22	-7.8	0	0			
05-March-2019	31.8	1,985.72	32.1	26.5	0.3	8.2	181,096.26	181.10	-5.3	0	0			
06-March-2019	32.2	1,985.81	32.5	29.4	0.2	8.2	117,590.69	117.59	-2.8	0	0			
07-March-2019	32.2	1,824.24	32.5	31.4	0.2	8.3	0.00	0.00	-	0	0			
08-March-2019	32.4	1,786.15	32.4	31.7	0.2	8.3	0.00	0.00	-	0	0			
09-March-2019	32.9	1,824.80	32.3	31.4	6.9	8.3	0.00	0.00	-	0	0			
10-March-2019	34.6	1,859.28	32.4	32.5	18.2	8.3	0.00	0.00	-	0	0			
11-March-2019	33.6	1,838.71	32.6	32.5	0.4	8.3	0.00	0.00	-	0	0			
12-March-2019	33.7	1,850.89	32.5	31.7	0.2	8.3	0.00	0.00	-	0	0			
13-March-2019	33.0	1,926.44	32.3	30.0	0.2	8.3	74,579.05	74.58	-3.0	0	0			
14-March-2019	32.8	2,080.50	32.6	26.8	0.2	8.2	189,618.01	189.62	-6.0	0	0			
15-March-2019	32.6	2,050.65	32.8	27.6	20.6	8.2	189,613.27	189.61	-5.0	0	0			
16-March-2019	33.2	2,085.97	33.1	26.4	0.3	8.1	189,616.63	189.62	-6.8	0	0			
17-March-2019	33.2	2,071.00	33.0	28.6	0.2	8.2	190,618.85	190.62	-4.6	0	0			
18-March-2019	0.0	0.00	32.7	25.5	52.6	8.1	188,347.04	188.35	-7.3	0	0			
19-March-2019	0.0	0.00	32.5	30.3	0.4	8.3	0.00	0.00	-	0	0			
20-March-2019	1.7	97.99	32.9	31.6	0.3	8.3	0.00	0.00	-	0	0			
21-March-2019	32.6	1,466.65	23.7	31.5	21.7	8.4	0.00	0.00	-	0	0			
22-March-2019	31.3	1,831.58	31.6	30.2	67.2	8.6	0.00	0.00	-	0	0			
23-March-2019	29.9	1,840.10	30.2	28.8	67.2	8.6	0.00	0.00	-	0	0			
24-March-2019	27.2	1,633.14	27.4	21.1	54.2	7.0	26.71	0.03	-6.1	0	0			
25-March-2019	27.8	1.11	31.4	0.0	0.0	0.0	0.00	0.00	-	0	0			
26-March-2019	0.0	0.00	28.5	0.0	0.0	0.0	0.00	0.00	-	0	0			
27-March-2019	4.0	88.79	26.0	7.3	15.8	2.0	0.00	0.00	-	0	0			
28-March-2019	18.7	711.52	27.2	19.2	43.2	5.6	7.21	0.01	0.4	0	0			
29-March-2019	0.0	0.00	32.4	30.9	65.3	8.5	0.00	0.00	-	0	0			
30-March-2019	0.0	0.00	29.5	31.8	65.2	8.4	0.00	0.00	-	0	0			
31-March-2019	0.0	0.00	29.6	32.7	65.3	8.5	0.00	0.00	-	0	0	12.4	7.9	
01-April-2019	0.0	0.00	29.6	32.3	64.7	8.5	0.00	0.00	-	0	0			
02-April-2019	0.0	0.00	29.5	31.7	64.3	8.5	0.00	0.00	-	0	0			
03-April-2019	0.0	0.00	30.5	31.5	64.9	8.5	0.00	0.00	-	0	0			
04-April-2019	0.0	0.00	30.8	31.4	64.3	8.5	0.00	0.00	-	0	0			
05-April-2019	0.0	0.00	31.0	31.6	64.6	8.5	0.00	0.00	-	0	0			
06-April-2019	0.0	0.00	30.8	31.5	65.1	8.5	0.00	0.00	-	0	0			
07-April-2019	0.0	0.00	30.4	30.7	65.2	8.5	0.00	0.00	-	0	0			
08-April-2019	0.0	0.00	26.9	31.5	65.0	8.5	53.63	0.05	4.6	0	0			
09-April-2019	30.4	0.00	0.0	30.8	64.7	8.5	0.00	0.00	-	0	0			
10-April-2019	29.8	0.00	0.0	30.0	65.0	8.5	0.00	0.00	-	0	0			
11-April-2019	31.9	1,832.73	0.0	30.5	64.5	8.5	0.00	0.00	-	0	0			
12-April-2019	30.2	1,916.96	30.4	30.2	63.8	8.5	0.00	0.00	-	0	0			
13-April-2019	30.3	1,949.83	29.9	29.1	56.2	8.2	979.27	0.98	-1.2	0	0			
14-April-2019	29.3	1,960.53	29.6	29.3	42.4	8.2	1,501.61	1.50	0.0	0	0			
15-April-2019	29.9	1,999.03	29.4	29.2	18.1	8.4	2,244.91	2.24	-0.8	0	0			
16-April-2019	30.8	2,078.17	30.2	29.4	8.6	8.5	1,410.45	1.41	-1.4	0	0			
17-April-2019	31.5	2,118.03	30.1	29.5	10.3	8.6	0.00	0.00	-	0	0			
18-April-2019	30.3	330.96	29.3	29.2	40.7	8.3	0.00	0.00	-	0	0			
19-April-2019	30.1	597.08	29.6	29.6	40.8	8.3	0.00	0.00	-	0	0			
20-April-2019	30.2	1,785.31	29.0	31.3	44.7	8.4	0.00	0.00	-	0	0			
21-April-2019	28.4	1,924.60	28.1	27.4	55.9	8.5	0.00	0.00	-	0	0			
22-April-2019	27.4	1,983.90	26.7	25.5	58.5	8.5	0.00	0.00	-	0	0			
23-April-2019	28.1	2,013.41	27.0	25.7	62.5	8.5	0.00	0.00	-	0	0			
24-April-2019	29.0	2,101.99	26.9	26.4	52.3	8.1	4,700.41	4.70	-2.6	0	0			
25-April-2019	29.1	2,084.99	26.8	28.4	46.3	8.1	13,088.93	13.09	-0.7	0	0			
26-April-2019	26.8	2,052.34	26.6	28.0	53.0	8.1	12,201.92	12.20	1.2	0	0	</		

Title	M1 (Incoming Seawater)		Yara Pilbara Nitrates Discharge Point to MUBRL (W4)							YPN Temperature Difference (W4-M1)			W4 Conductivity	W4 pH
	Incoming Brine Temp (WaterCorp)	Incoming Seawater Flow	Back-up SW Inlet Temp (Desal 1)	Temperature	Conductivity	pH	Flow	Flow	°C					
									°C	m3/hour	°C	Minutes >5°C	Hours >5°C	m3/cm
Unit	°C	m3 / hour	°C	°C	mS/cm		kg/hr	m3/hr	W4-M1			Monthly Average		
Tag #	Ti02006	Fi02001	1-TT5101	61Ti001_PV	61AI003_PV	61AI004_PV	87Fi005_PV	87Fi005_PV*0.0010						
28-April-2019	28.5	2,028.90	26.0	27.2	56.2	8.1	9,709.60	9.71	-1.3	0	0			
29-April-2019	29.9	2,112.40	26.2	26.7	63.5	8.5	0.00	0.00	-	0	0			
30-April-2019	27.7	2,123.44	26.7	28.0	69.8	8.5	0.00	0.00	-	0	0	45.4	8.2	
01-May-2019	26.4	2,147.02	26.7	25.2	64.9	7.9	0.00	0.00	-	0	0			
02-May-2019	26.1	2,114.03	26.3	27.8	70.5	8.4	0.00	0.00	-	0	0			
03-May-2019	26.1	2,109.48	26.4	27.4	70.5	8.4	10.51	0.01	1.3	0	0			
04-May-2019	26.2	2,175.81	26.4	22.6	62.4	8.4	45,330.28	45.33	-3.6	0	0			
05-May-2019	26.2	2,159.94	26.3	24.0	63.6	8.3	3,928.61	3.93	-2.2	0	0			
06-May-2019	26.5	2,211.65	26.4	26.5	64.2	8.2	39,142.52	39.14	0.0	0	0			
07-May-2019	26.5	2,261.72	26.6	26.4	63.5	8.5	117,032.71	117.03	-0.1	0	0			
08-May-2019	26.1	2,101.76	26.3	21.2	53.3	6.7	0.00	0.00	-	0	0			
09-May-2019	24.8	2,341.44	25.2	18.2	59.5	8.4	202,148.29	202.15	-6.6	0	0			
10-May-2019	23.6	2,258.43	23.9	20.6	60.9	8.4	181,868.79	181.87	-3.0	0	0			
11-May-2019	23.0	2,258.99	23.2	22.0	62.1	8.4	203,017.89	203.02	-1.0	0	0			
12-May-2019	23.0	2,198.91	23.1	19.9	62.9	8.3	205,961.16	205.96	-3.0	0	0			
13-May-2019	23.1	2,226.06	23.2	22.7	65.0	8.4	204,232.58	204.23	-0.4	0	0			
14-May-2019	23.0	2,203.75	23.2	21.0	64.2	8.4	203,544.18	203.54	-2.0	0	0			
15-May-2019	22.9	2,163.75	23.2	18.7	59.7	8.2	204,822.00	204.82	-4.3	0	0			
16-May-2019	23.1	2,323.19	23.4	21.7	58.8	8.3	203,990.77	203.99	-1.4	0	0			
17-May-2019	23.5	2,297.38	23.7	23.8	64.3	8.3	204,112.97	204.11	0.2	0	0			
18-May-2019	24.2	2,280.08	24.5	23.8	66.1	8.5	205,079.09	205.08	-0.5	0	0			
19-May-2019	23.9	2,267.44	24.1	23.5	66.1	8.6	204,325.91	204.33	-0.4	0	0			
20-May-2019	23.9	2,267.00	24.0	23.7	66.4	8.4	203,344.31	203.34	-0.2	0	0			
21-May-2019	24.5	2,256.13	24.5	24.4	66.9	8.4	203,139.88	203.14	-0.2	0	0			
22-May-2019	24.8	2,314.51	24.7	24.2	66.8	8.5	205,093.27	205.09	-0.5	0	0			
23-May-2019	24.6	2,391.44	24.8	24.8	67.1	8.4	205,092.81	205.09	0.2	0	0			
24-May-2019	24.6	2,402.11	24.7	26.4	65.9	8.2	209,577.35	209.58	1.8	0	0			
25-May-2019	24.9	2,411.74	25.0	25.4	66.6	8.2	207,961.07	207.96	0.5	0	0			
26-May-2019	25.6	2,373.40	25.5	25.8	66.1	8.2	209,031.38	209.03	0.2	0	0			
27-May-2019	24.9	2,390.72	25.2	24.8	66.5	8.2	208,744.17	208.74	-0.1	0	0			
28-May-2019	22.3	2,144.20	22.5	21.7	56.9	7.3	189,770.82	189.77	-0.6	0	0			
29-May-2019	24.5	2,342.84	24.7	25.1	66.0	8.2	209,726.76	209.73	0.6	0	0			
30-May-2019	24.2	2,323.67	24.5	24.8	66.2	8.2	208,839.49	208.84	0.6	0	0			
31-May-2019	23.7	2,359.18	24.0	24.2	66.1	8.2	208,145.38	208.15	0.5	0	0	64.3	8.3	
01-June-2019	23.1	2,339.37	23.4	23.6	65.9	8.2	208,448.25	208.45	0.5	0	0			
02-June-2019	22.0	2,342.02	22.3	23.2	66.2	8.2	207,358.02	207.36	1.2	0	0			
03-June-2019	21.6	2,332.81	21.9	24.0	65.9	8.2	207,607.12	207.61	2.4	0	0			
04-June-2019	21.1	2,284.64	21.4	23.5	65.9	8.2	207,338.31	207.34	2.4	0	0			
05-June-2019	20.7	2,146.43	20.9	23.9	65.8	8.2	207,500.25	207.50	3.2	0	0			
06-June-2019	20.6	970.90	20.8	23.5	65.9	8.3	182,082.31	182.08	2.9	0	0			
07-June-2019	20.3	1,291.41	20.5	24.4	66.0	8.3	208,723.42	208.72	4.1	0	0			
08-June-2019	21.4	1,658.87	22.6	25.8	64.9	8.2	201,615.96	201.62	4.4	0	0			
09-June-2019	22.1	1,380.58	21.8	24.0	65.0	8.2	175,237.24	175.24	1.9	0	0			
10-June-2019	21.5	1,363.17	21.1	22.8	66.2	8.3	208,207.86	208.21	1.3	0	0			
11-June-2019	21.3	1,298.24	20.3	23.7	65.5	8.2	208,667.24	208.67	2.4	0	0			
12-June-2019	20.7	1,306.86	17.9	22.8	65.3	8.3	207,537.18	207.54	2.1	0	0			
13-June-2019	20.6	1,326.43	18.5	22.4	65.5	8.3	210,566.52	210.57	1.8	0	0			
14-June-2019	20.6	1,358.96	19.7	20.2	65.5	8.2	207,907.84	207.91	-0.4	0	0			
15-June-2019	20.5	1,392.54	21.4	19.5	66.1	8.2	208,678.36	208.68	-1.0	0	0			
16-June-2019	20.2	1,401.80	21.6	19.0	66.4	8.2	207,996.78	208.00	-1.2	0	0			
17-June-2019	20.2	1,400.28	21.3	18.9	66.3	8.2	205,205.93	205.21	-1.4	0	0			
18-June-2019	20.3	1,402.19	22.2	18.7	66.8	8.2	204,313.28	204.31	-1.6	0	0			
19-June-2019	20.5	1,655.24	22.5	19.6	66.7	8.2	205,307.45	205.31	-0.9	0	0			
20-June-2019	20.7	1,586.41	24.1	23.3	66.2	8.2	216,214.02	216.21	2.6	0	0			
21-June-2019	21.8	1,877.46	23.5	25.2	64.8	8.2	219,959.26	219.96	3.4	0	0			
22-June-2019	22.0	1,973.34	21.4	24.3	64.9	8.2	218,918.94	218.92	2.3	0	0			
23-June-2019	22.2	2,175.56	22.7	23.8	65.2	8.2	217,251.48	217.25	1.6	0	0			
24-June-2019	22.9	2,164.85	22.9	23.9	65.2	8.2	215,766.84	215.77	1.0	0	0			
25-June-2019	23.1	2,164.69	23.1	22.6	66.2	8.3	214,734.55	214.73	-0.5	0	0			
26-June-2019	23.2	2,232.46	23.9	22.1	66.3	8.3	215,308.78	215.31	-1.1	0	0			
27-June-2019	23.0	2,245.39	23.2	23.4	66.0	8.2	216,121.41	216.12	0.4	0	0			
28-June-2019	23.4	2,138.84	23.8	23.6	66.2	8.3	214,982.78	214.98	0.2	0	0			
29-June-2019	22.9	2,114.19	23.2	23.0	66.1	8.3	216,085.77	216.09	0.1	0	0			
30-June-2019	22.1	2,252.51	22.2	23.0	65.9	8.3	216,020.67	216.02	0.9	0	0	65.8	8.2	

Date Sampled	Nitrogen, Ammonia (NH3-N)	Nitrogen, Nitrite (N_NO2)	Nitrogen, Nitrate (N_NO3)	Nitrate + Nitrite Nitrogen (N_NOx)	Total Nitrogen	Nickel (filtered)	Total Nickel	Reactive Phosphorus	Total Phosphorus	Lead (filtered)	Total Lead	Sulphate	Selenium (filtered)	Total Selenium	Vanadium (filtered)	Total Vanadium	Zinc (filtered)	Total Zinc	Confirmed Thermotolerant Coliforms	Methanol	C6-C9 (TRH)	C10-C14 (TRH)	C15-C28 (TRH)	C29-C36 (TRH)
UNITS	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	/100mL	mg/L	ug/L	ug/L	ug/L	ug/L
Licence Limits	30.164					0.427				0.134			0.183		3.05		0.419							
2-Jul-2018	0.35	0.04	0.19	0.23	0.7	<0.020	<0.020	0.01	0.031	<0.0020	<0.010	3500	<0.020	<0.020	<0.0020	<0.020	<0.025	0.1	<10	<1.0	<25	<50	<100	<100
9-Jul-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
16-Jul-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
23-Jul-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
30-Jul-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
6-Aug-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
13-Aug-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
20-Aug-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
27-Aug-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
3-Sep-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
10-Sep-2018	2	<0.01	0.05	0.06	2	<0.020	<0.020	<0.01	0.016	<0.0020	<0.010	3500	<0.020	<0.020	<0.0020	<0.020	<0.025	<0.05	<10	<1.0	<25	<50	<100	<100
17-Sep-2018	<0.01	<0.01	<0.01	0.01	0.12	<0.020	<0.020	0.01	<0.010	<0.0020	<0.010	3100	<0.020	<0.020	<0.0020	<0.020	<0.025	<0.05	<10	<1.0	<25	<50	<100	<100
24-Sep-2018	0.06	<0.01	0.01	0.02	0.08	<0.020	<0.020	<0.01	<0.005	<0.0020	<0.010	3100	<0.020	<0.020	0.0021	<0.020	<0.025	<0.05	NS	NS	NS	NS	NS	NS
1-Oct-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
8-Oct-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
15-Oct-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
22-Oct-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
29-Oct-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
5-Nov-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
12-Nov-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
19-Nov-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
26-Nov-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
3-Dec-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
10-Dec-2018	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
17-Dec-2018	0.4	<0.01	0.32	0.33	0.75	0.025	<0.020	<0.01	<0.010	<0.0020	<0.010	3000	<0.020	<0.020	<0.0020	<0.020	<0.025	<0.05	<10	<1.0	<25	<50	<100	<100
24-Dec-2018	<0.01	<0.01	0.03	0.03	0.22	<0.020	0.022	<0.01	0.012	<0.0020	<0.010	3300	<0.020	<0.020	0.0026	<0.020	<0.025	<0.10	<1	<1.0	<25	<50	<100	<100
31-Dec-2018	0.02	<0.01	0.05	0.06	0.24	<0.020	<0.020	<0.01	<0.010	<0.0020	<0.010	NS	<0.020	<0.020	<0.0020	<0.020	<0.025	<0.10	NS	NS	NS	NS	NS	NS
7-Jan-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
14-Jan-2019	0.02	<0.01	0.03	0.03	0.59	<0.020	<0.020	<0.01	<0.010	<0.0020	<0.010	3500	<0.020	<0.020	<0.0020	<0.020	0.033	<0.05	<10	<1.0	<25	<25	<100	<100
21-Jan-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
29-Jan-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
4-Feb-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
11-Feb-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
18-Feb-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
25-Feb-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
5-Mar-2019	0.34	<0.01	0.49	0.5	0.95	<0.020	0.039	0.01	0.021	<0.0020	<0.010	2900	<0.020	<0.020	<0.0020	<0.020	0.029	<0.05	<10	<1.0	<25	<100	<100	<25
11-Mar-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
18-Mar-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
27-Mar-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1-Apr-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
8-Apr-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
15-Apr-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
22-Apr-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
29-Apr-2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
6-May-2019	0.04	<0.01	0.06	0.06	0.38	<0.020	<0.020	0.01	0.015	<0.0020	<0.010	NS	<0.020	<0.020	0.002	<0.020	0.078	0.08	NS	NS	NS	NS	NS	NS
13-May-2019	0.03	0.04	0.07	0.11	0.38	<0.020	<0.020	<0.01	<0.010	<0.0020	<0.010	3300	<0.020	<0.020	<0.0020	<0.020	<0.025	<0.10	<10	<1.0	<25	<50	<100	<100
20-May-2019	1.9	0.02	1.5	1.5	3.4	<0.020	<0.020	<0.01	0.011	<0.0020	<0.010	2800	<0.020	<0.020	<0.0020	<0.020	<0.025	<0.05	<10	<1.0	<25	<25	<100	<100
27-May-2019	0.74	0.02	2.5	2.5	3.3	<0.020	<0.020	<0.01	<0.010	<0.0020	<0.010	3500	<0.020	<0.020	0.0021	<0.020	<0.025	<0.05	<10	<1.0	<25	<25	<100	<100
4-Jun-2019	2.5	0.07	3.9	4	6.6	<0.020	<0.020	0.01	<0.010	<0.0020	<0.010	2800	<0.020	<0.020	<0.0020	<0.020	<0.025	<0.05	<10	<1.0	<25	<25	<100	<100
10-Jun-2019	0.82	0.07	2.7	2.8	3.7	<0.020	<0.020	0.01	0.011	<0.0020	<0.010	3400	<0.020	<0.020	<0.0020	<0.020	<0.025	<0.05	<10	1.9	<25	<25	<100	<100
17-Jun-2019	0.25	0.06	1.2	1.3	1.6	<0.020	0.027	<0.01	<0.010	<0.0020	<0.010	3300	<0.020	<0.020	<0.0020	<0.020	<0.025	<0.05	<10	5.5	<25	190	<100	<100
24-Jun-2019	1.1	0.02	1.9	1.9	3.4	<0.020	<0.020	<0.01	<0.010	<0.0020	<0.010	3000	<0.020	<0.020	<0.0020	<0.020	<0.025	<0.05	<10	<1.0	<25	<25	<100	<100

Monthly Rolling Average (0 is represented as "-" to reduce visual noise)																
Date Sampled	Total TRH	Arsenic III	Arsenic V	Cadmium	Chromium III	Chromium VI	Copper	Cobalt	Vanadium	Silver	Selenium	Mercury	Ammonia as ammoniacal nitrogen (NH3-N)	Nickel	Lead	Zinc
UNITS	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Licence Limits		0.14	0.275	0.036	0.459	0.0085	0.011	0.061	3.05	0.049	0.183	0.0014	30.164	0.427	0.134	0.419
2-Jul-2018	<280	-	0.003	-	-	-	-	-	-	-	-	-	0.340	-	-	-
9-Jul-2018	NS	-	0.002	-	-	-	-	-	-	-	-	-	0.328	-	-	-
16-Jul-2018	NS	-	0.001	-	-	-	-	-	-	-	-	-	0.088	-	-	-
23-Jul-2018	NS	-	0.001	-	-	-	-	-	-	-	-	-	0.088	-	-	-
30-Jul-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6-Aug-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Aug-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-Aug-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Aug-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Sep-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Sep-2018	<280	-	0.001	-	-	-	0.001	-	-	-	-	-	0.500	-	-	-
17-Sep-2018	<280	-	0.001	-	-	-	0.001	-	-	-	-	-	0.500	-	-	-
24-Sep-2018	NS	-	0.001	-	-	-	0.001	-	0.001	-	-	-	0.515	-	-	-
1-Oct-2018	NS	-	0.001	-	-	-	0.001	-	0.001	-	-	-	0.515	-	-	-
8-Oct-2018	NS	-	0.001	-	-	-	-	-	0.001	-	-	-	0.015	-	-	-
15-Oct-2018	NS	-	0.000	-	-	-	-	-	0.001	-	-	-	0.015	-	-	-
22-Oct-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Oct-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nov-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Nov-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Nov-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Nov-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Dec-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Dec-2018	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Dec-2018	<280	-	0.001	-	0.009	-	-	-	-	-	-	-	0.100	0.006	-	-
24-Dec-2018	<280	-	0.001	-	0.009	-	-	-	0.001	-	-	-	0.100	0.006	-	-
31-Dec-2018	NS	-	0.002	-	0.009	-	-	-	0.001	-	-	-	0.105	0.006	-	-
7-Jan-2019	NS	-	0.002	-	0.009	-	-	-	0.001	-	-	-	0.105	0.006	-	-
14-Jan-2019	<250	-	0.002	-	-	-	-	-	0.001	-	-	-	0.010	-	-	0.008
21-Jan-2019	NS	-	0.001	-	-	-	-	-	-	-	-	-	0.010	-	-	0.008
29-Jan-2019	NS	-	0.001	-	-	-	-	-	-	-	-	-	0.005	-	-	0.008
4-Feb-2019	NS	-	0.001	-	-	-	-	-	-	-	-	-	0.005	-	-	0.008
11-Feb-2019	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Feb-2019	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Feb-2019	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Mar-2019	<250	-	0.001	-	-	-	-	-	-	-	-	-	0.085	-	-	0.007
11-Mar-2019	NS	-	0.001	-	-	-	-	-	-	-	-	-	0.085	-	-	0.007
18-Mar-2019	NS	-	0.001	-	-	-	-	-	-	-	-	-	0.085	-	-	0.007
27-Mar-2019	NS	-	0.001	-	-	-	-	-	-	-	-	-	0.085	-	-	0.007
1-Apr-2019	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8-Apr-2019	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Apr-2019	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Apr-2019	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Apr-2019	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6-May-2019	NS	-	0.001	-	-	-	0.001	-	0.001	-	-	-	0.010	-	-	0.020
13-May-2019	<280	-	0.001	-	-	-	0.001	-	0.001	-	-	-	0.018	-	-	0.020
20-May-2019	<250	-	0.001	-	-	-	0.001	-	0.001	-	-	-	0.493	-	-	0.020
27-May-2019	<250	-	0.001	-	-	-	0.001	-	0.001	-	-	-	0.678	-	-	0.020
4-Jun-2019	<250	-	0.001	-	-	-	-	-	0.001	-	-	-	1.293	-	-	-
10-Jun-2019	<250	-	0.001	-	-	-	-	-	0.001	-	-	-	1.490	-	-	-
17-Jun-2019	<250	-	0.001	-	-	-	-	-	0.001	-	-	-	1.078	-	-	-
24-Jun-2019	<250	-	0.001	-	-	-	-	-	-	-	-	-	1.168	-	-	-



2018 Annual Compliance Report
EPBC 2008/4546
Technical Ammonium Nitrate Plant

04-06-2020 600-200-ACR-YPN-0007 Rev 1

Attachment 6a: Email Correspondence for Bird Deterrent Approval 25 June 2015

Nicole Ivory

From: Rajan Sinha
Sent: Wednesday, 28 September 2016 1:20 PM
To: Susan Giles
Subject: FW: Request to get approval of bird deterrents as per condition 7.1 of MS 870 of YARA PILBARA NITRATE Project

Rajan Sinha
Technical Services & Business Development Manager
Operations
Production
Site Operations
Mobile: 0410840369
Office: (08) 9183 4139
Email: rajan.sinha@yara.com



Yara Pilbara Fertilisers Pty Ltd
Lot 564, Village Road Burrup
WA 6714 Karratha, Australia
www.yara.com



From: Corbellini, Michelle [mailto:Michelle.Corbellini@DPaW.wa.gov.au]
Sent: Thursday, June 25, 2015 1:48 PM
To: Rajan Sinha
Cc: Wessels, Nigel
Subject: RE: Request to get approval of bird deterrents as per condition 7.1 of MS 870 of YARA PILBARA NITRATE Project

Hi Rajan

Yara fertiliser Pilbara's proposed methodology appears to align directly with the Department of Parks and Wildlife's (Parks and Wildlife) Pilbara Region advice dated 23 April 2015. Parks and Wildlife has no further comments on the proposed bird deterrent methods.

Kind regards

Michelle Corbellini
Environmental Project Coordinator
Pilbara Region

Department of Parks and Wildlife
Locked Bag 104, Bentley Delivery Centre, WA, 6983
Ph: (08) 9334 0260
Michelle.Corbellini@DPaW.wa.gov.au



From: Rajan Sinha [<mailto:rajan.sinha@yara.com>]
Sent: Thursday, 18 June 2015 9:47 AM
To: Corbellini, Michelle
Cc: Wessels, Nigel
Subject: RE: Request to get approval of bird deterrents as per condition 7.1 of MS 870 of YARA PILBARA NITRATE Project

Hi Michelle,

Please find the attached document with regards to the information requested under your mail below as per your advice and it is related with overhead wires. Enclosed please see updated Bird Deterrent System Assessment report.

Please feel free to contact me for any further information. Your approval on the above is highly appreciated.

Regards,

Rajan Sinha
Technical Services and Business Development Manager
Operations
Upstream
Production
Mobile: +61 410 840 369
Office: +61891834139
Email: rajan.sinha@yara.com



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WA 6714 Karratha, Australia
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From: Corbellini, Michelle [<mailto:Michelle.Corbellini@DPaW.wa.gov.au>]
Sent: Thursday, April 23, 2015 2:24 PM
To: Rajan Sinha
Cc: Wessels, Nigel
Subject: RE: Request to get approval of bird deterrents as per condition 7.1 of MS 870 of YARA PILBARA NITRATE Project

Hi Rajan

Thank you for providing the Department of Parks and Wildlife (Parks and Wildlife) Pilbara Region with further information regarding Yara Fertilisers proposed bird deterrents at the Technical Ammonium Nitrate Production Facility, on the Burrup Peninsula, approved under Ministerial Statement 870. Ministerial Statement 870 includes the following requirement in relation to deterring birds from entering the contaminated water pond, clean water pond and sewage wastewater treatment station evaporation pond.

7-1 The proponent shall employ such structures and apparatus as are necessary and agreed by the DEC to deter birds from entering the contaminated water pond, clean water pond, and sewage wastewater treatment station evaporation pond.

Parks and Wildlife considers that the proposed deterrent techniques appear to be appropriate, provided that Yara Fertilisers commit to a monitoring program being developed and undertaken, to measure the effectiveness of the deterrent devices on the presence and abundance of bird species over time. If monitoring systems detect no effect

of the devices, or a reduction in effectiveness is noted over time then other methods should be considered and implemented.

The preparation and implementation of a monitoring program is highly recommended as the effectiveness of ultrasonic and audio devices is variable, and highly dependent on how they are deployed, and dependent on target species present within the area. The range of sounds able to be detected between species varies markedly and the successfulness of an audio or ultrasonic devices in deterring birds can vary based on the activity that the bird is undertaking. There are concerns about relying solely on audio repellents for birds because they have not been demonstrated to be an effective long term solution. Some species become habituated to the devices over time. An effective deterrent system requires a variety of methods to be successful, whether in combination or in rotation, as well as frequently changing the type, timing and location of the equipment. Other deterrent methods which may be used in combination include, modifying the surface banks to make them less desirable to shorebirds (e.g. covering the banks with rocks to prevent nesting and foraging in the mud), or the installation of non-electrified string lines parallel across the ponds to prevent birds from landing or entering the water. Trials at BHP's Olympic dam have been successful in using string lines spaced at 5m intervals to deter birds (reducing presence by 99.2%). These additional methods should be considered if monitoring detects that the devices are not effective, or are decreasing in effectiveness over time.

If you have any further queries please do not hesitate to contact me.

Kind regards

Michelle Corbellini
Environmental Project Coordinator

Department of Parks and Wildlife - Pilbara Region

17 Dick Perry Ave, Kensington
Locked Bag 104, Bentley Delivery Centre, WA, 6983
Ph: (08) 9334 0260
Michelle.Corbellini@DPaW.wa.gov.au



Department of
Parks and Wildlife



From: Rajan Sinha [<mailto:rajan.sinha@yara.com>]

Sent: Monday, 30 March 2015 8:23 PM

To: Corbellini, Michelle

Cc: Wessels, Nigel

Subject: RE: Request to get approval of bird deterrents as per condition 7.1 of MS 870 of YARA PILBARA NITRATE Project

Hi Michelle,

Please find the attached document with regards to the information requested under your mail below ref.: "Request to get approval of bird deterrents as per condition 7.1 of MS 870 of YARA PILBARA NITRATE Project", dated on 19/December/2014. We were trying to source out the information from the vendor, and we received the detailed information just recently.

Please feel free to contact me for any further information. Your approval on the above is highly appreciated.

Regards,

Rajan Sinha

Technical Services and Business Development Manager

Operations

Upstream

Production

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Office: +61891834139

Email: rajan.sinha@yara.com



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Lot 564, Village Road Burrup
WA 6714 Karratha, Australia
www.yara.com



From: Corbellini, Michelle [<mailto:Michelle.Corbellini@DPaW.wa.gov.au>]

Sent: Friday, December 19, 2014 8:20 AM

To: Rajan Sinha

Cc: Wessels, Nigel

Subject: RE: Request to get approval of bird deterrents as per condition 7.1 of MS 870 of YARA PILBARA NITRATE Project

Hi Rajan

Thanks for your email and phone call to discuss yesterday.

I've had one of Parks and Wildlife's fauna experts review the deterrent methods proposed by Yara Pilbara Nitrate. They have requested that a bit more information is provided on how this method is implemented and what other options have been considered by Yara Pilbara Nitrate. If you could please provide the following information this would assist with a timely review of your request:

- State the model of the devices (i.e. brand, model number/series)
- Indicate the number of devices to be installed in total, and the number per pond, indicate the location of the installation on the map
- Indicate how the devices will be applied - frequency of use
- Provide information on other deterrent methods/devices which Yara has considered. How were other options assessed to be appropriate or inappropriate in this circumstance? Examples of other methods include noise cannons, physical barriers etc. Were other methods considered to be applied in combination (i.e. more than one method)?
- State the common bird species at this site, which may use these ponds. This is required as it appears that certain species are more sensitive than others to these particular deterrent devices. The use of the device should be justified based on the bird species found in this area.

Please note that our fauna expert and I will be taking leave over the Christmas / New Year period, and therefore based on the supply of the above information we should be able to provide you with a response during January.

If you do have any questions please do not hesitate to give me a call on the number below.

Kind regards,

Michelle Corbellini

Environmental Project Coordinator

Department of Parks and Wildlife - Pilbara Region

17 Dick Perry Ave, Kensington

Locked Bag 104, Bentley Delivery Centre, WA, 6983

Ph: (08) 9334 0260

Michelle.Corbellini@DPaW.wa.gov.au



Department of
Parks and Wildlife



From: Rajan Sinha [<mailto:rajan.sinha@yara.com>]

Sent: Wednesday, 17 December 2014 11:29 AM

To: Corbellini, Michelle

Cc: Esszig, Fiona; David Hegerty; Jason Roberts; Guillaume Holweck

Subject: Request to get approval of bird deterrents as per condition 7.1 of MS 870 of YARA PILBARA NITRATE Project

Hi Michelle,

Please note that YARA PILBARA NITRATE (YPNPL) is currently constructing a Technical Ammonium Nitrate Plant in Burrup Peninsula. You may get more information about this project in the website www.ypnpl.com.au . Please find the attached letter to get the approval of bird deterrents as per advice from Department of Environment Regulation.

Please feel free to contact me for any further information.

Regards,

Rajan Sinha

Deputy General Manager (TAN Project)

Yara Pilbara

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Office: +61 (8) 91834139

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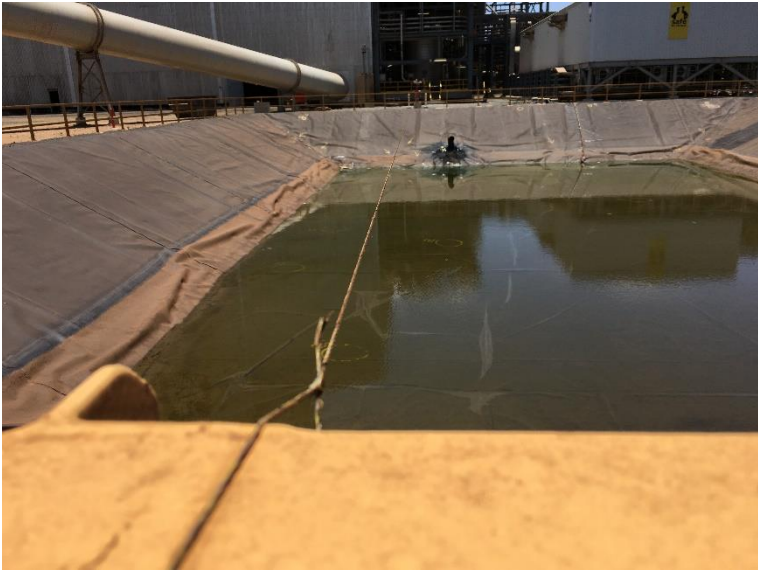


2018 Annual Compliance Report
EPBC 2008/4546
Technical Ammonium Nitrate Plant

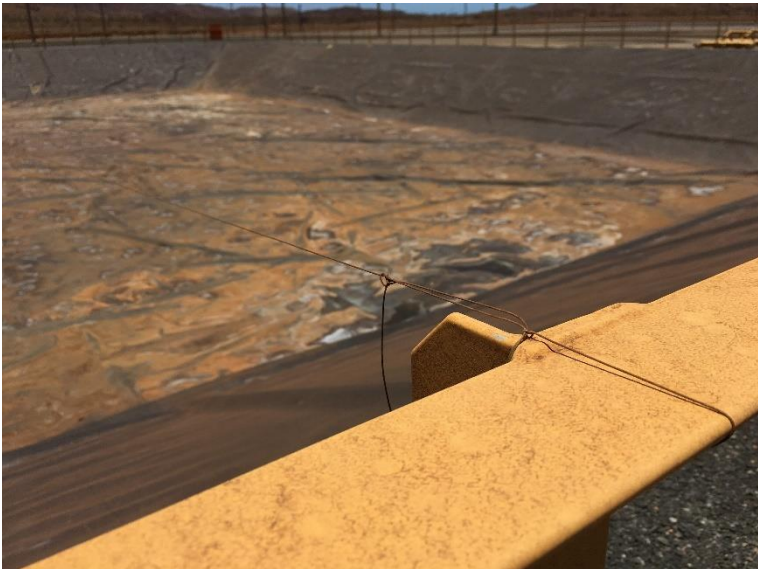
04-06-2020 600-200-ACR-YPN-0007 Rev 1

Attachment 6b: Bird Deterrent Structures (January 2019) and Environmental Inspection Checklist

1. Clean Surface Water Pond 1



2. Clean Surface Water Pond 2



3. Clean Surface Water Pond 3



4. Contaminated Surface Water Pond 4



5. Contaminated Water Pond 5



6. Clean Surface Water Pond 6



Environmental Inspection Checklist



YARA PILBARA



LOCATION:	
DATE: 17/05/18	TIME:

SYSTEMATIC INSPECTION FORM ELEMENT 16: ENVIRONMENT

A = Acceptable NI = Needs Improvements UA = Unacceptable N/A = Not Assessed

No.	ITEM	COMPLIANCE ACHIEVED				COMMENTS
		A	NI	UA	N/A	
1	Are hydrocarbon spill kits available, ideally located, fully stocked and free of debris / rubbish?					
2	Are chemical spill kits available, ideally located, fully stocked and free of debris / rubbish?					
3	Are bins being used correctly? Is waste being disposed of in correct bin?					
4	Are available bins adequate? Are additional bins required?					
5	Is bin signage adequate?					
6	Is hazardous waste being disposed of appropriately (i.e. no evidence of oil, chemicals, batteries etc. in general waste bins)?					
7	Is waste container capacity/replacement frequency adequate for purpose?					
8	Does hazardous waste storage area require servicing?					
9	Is housekeeping adequate? Is waste present on ground/in drains?					
10	Are ponds/sedimentation basins in good condition?					
11	Do ponds/sedimentation basins require emptying?					
12	Are birds present in ponds/sedimentation basins? Do bird deterrents appear effective?					
13	Are tanks adequately bunded?					
14	Are hazardous materials stored correctly?					
15	Are there any noticeable spills to ground?					
16	Are there any obvious atmospheric emissions?					
17	Is there evidence of a loss of containment, i.e. is there an Ammonia or Nitric Acid smell?					
18	Are weeds in evidence on site? Are drainage channels weed free?					
19	Are animals in evidence on site?					
20	Are the waste water treatment plants operating effectively? Are any alarms in evidence?					
21	Are the off-site infiltration beds adequately storing YPF waste water?					
22	Is plant and equipment free of drips / seepage?					
23	Are water drainage features sufficient?					
24	Is erosion in evidence?					
25	Are heightened noise levels in evidence?					
26	Is there evidence of unseasonal biological growth (green vegetation, algae growth etc.)? Take photos.					

Required Action:

Inspection Team

Name:	Signature:	Name:	Signature:
Name:	Signature:	Name:	Signature:



2018 Annual Compliance Report
EPBC 2008/4546
Technical Ammonium Nitrate Plant

04-06-2020 600-200-ACR-YPN-0007 Rev 1

Attachment 7c: YPN OEMP Approval Letter 15 September 2017



Mr Brian Howarth
Health, Environment, Safety & Quality Manager
Yara Pilbara Fertilisers Pty Ltd
Lot 564 Village Road Burrup
KARRATHA WA 6714

**EPBC 2008/4546 – Proposed Technical Ammonium Nitrate Production Facility –
Operational Environmental Management Plan**

Dear Mr Howarth,

Thank you for submitting for approval the Operational Environmental Management Plan required in accordance with Condition 7(b) of the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) approval for EPBC 2008/4546.

Officers of this Department have advised me on the adequacy of the plan, with particular regard for the above conditions of approval. I am satisfied the plan:

- meets the requirements of Condition 7(b) of the conditions of approval for EPBC 2008/4546; and
- in accordance with Condition 7A of the conditions of approval for EPBC 2008/4546, does not contain management actions that are inconsistent with the approval conditions or the National Heritage management principles.

On this basis, and as a delegate of the Minister for the Environment and Energy, I have decided to approve the *Operational Environmental Management Plan, EPBC 2008/4546, Technical Ammonium Nitrate Plant, Revision 3*, dated 14 September 2017.

The approved plan must now be implemented. Please note that in accordance with Condition 14 of the approval, the approved plan must be published on your website within one month of this approval letter, and for the life of the approval.

The Department has an active monitoring program which includes monitoring inspections, desk top document reviews and audits. Please ensure that you maintain accurate records of all activities associated with, or relevant to, the conditions of approval so that these records can be made available to the Department on request.

Should you require any further information please contact Vaughn Cox on (02) 6274 2005 or by email: postapproval@environment.gov.au.

Yours sincerely,



Charmayne Murray
Acting Assistant Secretary
Assessments and Governance Branch
Environment Standards Division

15 September 2017



2018 Annual Compliance Report
EPBC 2008/4546
Technical Ammonium Nitrate Plant

04-06-2020 600-200-ACR-YPN-0007 Rev 1

Attachment 7e: Updated Emergency Management Plan (250-500-PLN-000-0003, Rev 24)



Yara Pilbara

Ammonia Plant & Technical Ammonium Nitrate Production Facility

Emergency Management Plan

Person to be contacted in relation to Emergency Management:

Ty Hibberd – Acting Health, Safety, Environment & Quality Manager

Yara Pilbara

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WA 6714

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Registered Office:

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Facsimile: +61 8 9327 8199

**Distribution List**

No.	Location / Recipient	
1	Yara Pilbara Ammonia Plant Control Room	Hardcopy
2	Yara Pilbara TAN Control Room	Hardcopy
3	Yara Pilbara Karratha SRT Control Room	Hardcopy
4	Yara Pilbara Perth Office (CRT)	Hardcopy
5	Yara Pilbara HESQ Manager	Hardcopy
6	Yara Pilbara Emergency Response Coordinator	Hardcopy
7	Yara Pilbara Emergency Centre	Hardcopy
8	Yara Pilbara Site Document Control	Hardcopy
9	Yara Pilbara Security Control	Hardcopy
10	Yara Pilbara TAN Project Office	Hardcopy
11	DFES - Karratha Regional office	Electronic
12	Police - Officer In Charge Karratha	Electronic
13	Department of Mines, Industry Regulation and Safety (DMIRS)	Electronic
14	Pilbara Ports – Dampier BLB Control Room	Electronic
15	Department of Environment and Energy	Electronic
16	Woodside Energy	Electronic



Revision Record

This plan shall be reviewed / revised:

- Where a Risk Assessment identifies a need to review the plant during the Management of Change (MoC) process.
- Following a MHF Major Accident Event or exercise.
- When an EMP audit/assessment indicates a deficiency.
- At least every 2 years.

The following review team shall be notified of amendments to this plan:

- Plant Manager
- HESQ Manager
- Emergency Response Coordinator
- Production Manager, Ammonia
- Production Manager, TAN
- Maintenance & Reliability Manager

Document Approval

Rev	Custodian	Approver	Signature	Date
20	J Bartlett	Rob Stevens	RS	08-12-2016
	pp. HESQ Manager	Plant Manager		
21	As above	Chris Rijksen	CR	14-03-2017
	Review Team	Plant Manager		
22	Willie Bezuidenhout	Brian Howarth	BH	29-10-2018
	Security & ER Coordinator	HESQ Manager		
23	Willie Bezuidenhout	Brian Howarth	BH	28-01-2019
	Security & ER Coordinator	HESQ Manager		
24	Willie Bezuidenhout	Justin Zis		02-08-2019
	Security & ER Coordinator	Acting HESQ Manager		



Document Revision History

Rev	Date	Description	Author
20	08-12-2016	Update TAN DG Manifest and Quadrant Energy contact numbers.	B Brookman Smith
21	18-01-2017	Update to reflect new Refuge Chambers as Muster Points/Building and remove EAP3 and update Appendix D Remove reference to PIPS 15 and 18. Remove CRT from Crisis Management Plan.	N Corker / Dynamiq
22	04-09-2018	Periodic review, update references and nomenclature throughout – refer to DCRF 1757 for details. Change of custodian and approver.	W.Bezuidenhout
23	15-01-2019	Revised as per 1860 - DMIRS review & comments. Update to include TAN Project Office, updated muster and assembly points and maps, re-introduction of CRT.	W.Bezuidenhout
24	30-08-2019	Reviewed and removed Chlorine Duty card and PIP from the EMP, Changed Quadrant Energy to Santos Ltd. Addition of PIP No. 20 for Earthquake and Flooding. Update of Emergency Radio Communications. Temporary Addition of muster points for TAN Remediation Project. Refer to DCRF 3172 for detail.	W.Bezuidenhout

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**1 Annexure 1**

YARA PILBARA CONTACT LIST		
General Enquires Only:	Yara Pilbara Ammonia Plant Reception	08 9183 4000 / 4100 (Mon - Fri 0715 -1530)
24hr Emergency Line:	Ammonia Plant Control Room	1800 117 506
	TAN Plant Control Room	
Emergency only	Yara Pilbara Radio Channel	Channel 4
Security Enquires	Security Gate	08 9183 4111

Hardcopies of Yara Pilbara's internal and external emergency contact lists are available in the Ammonia Plant Control Room, Technical Ammonium Nitrate (TAN) Plant Control Room, the SRT Control Room and Perth Head Office. An electronic version is also available from Yara Pilbara Intranet / Sharepoint page [Emergency Response](#) and in the online Yara Crisis Management system (EMQnet) at www.emqnet.com



2 Purpose

This Emergency Management Plan (EMP) has been prepared to meet the on-site and off-site emergency planning and response requirements for Yara Pilbara's Ammonia Plant (YPF) and Yara Pilbara Nitrates Technical Ammonium Nitrate Production Facility (TANPF).

Please note:

- Yara Pilbara Fertilisers (YPF) Ammonia Plant will hereafter be referred to as Ammonia Plant
- Yara Pilbara Nitrates (YPN) Technical Ammonium Nitrate Production Facility will hereafter be referred to as TAN Plant

Both Ammonia Plant and TAN Plant are classified as a Major Hazard Facility (MHF) under the Dangerous Goods Safety (MHF) Regulations 2007.

The purpose of this EMP is to establish the organisational structure and identify procedures and available resources to enable Yara Pilbara and Emergency Service personnel to manage an emergency within Yara Pilbara's operations by providing a safe and practicable response.

This EMP will provide generic guidelines to initiate actions to achieve a safe and desired response. This EMP covers emergency preparedness and response in the following areas:

- Ammonia & TAN Plant – Inside Battery Limits (ISBL);
- Ammonia & TAN Plant – Outside Battery Limits (OSBL);
- Ammonia Export Pipeline Corridor – 5.2 km above ground pipeline; and
- Ammonia Ship Loading Operations – Dampier Bulk Liquids Berth (BLB) Jetty.
- TAN Remediation Project Temporary Office (OSBL)

This EMP also outlines the procedures to notify and communicate with emergency services, neighbouring facilities, regulators and local administration/community.



3 Scope and Objective

This EMP is intended to function as a guideline for emergency preparedness and response to incidents at Yara Pilbara's;

- Ammonia Plant
- Technical Ammonium Nitrate Production Facility (TAN Plant)
- Ammonia Shipping Pipeline
- Dampier Bulk Liquids Berth (DBLB) Ship Loading Facilities
- TAN Remediation Project Temporary Office (OSBL)

The objectives of this EMP are to:

1. Provide awareness about emergency events that can occur at Yara Pilbara;
2. Demonstrate emergency response capability & preparedness;
3. Identify Yara Pilbara's emergency response personnel, their roles and methodology to safely and effectively mitigate or manage an emergency; and
4. Ensure a continuous improvement process is applied through auditing, exercises and reviews to this EMP.

This EMP is seen as a dynamic document subject to changes, updates and revisions which are recorded as per Yara Pilbara's Document Control System.



4 Definitions and Abbreviations

Term	Definition
AEGL	Acute Exposure Guideline Levels
AIIMS	Australasian Inter-Service Incident Management System
AN	Ammonium Nitrate
ANSOL	Ammonium Nitrate Solution
AS	Australian Standards
ASDS	Aspirating Smoke Detection Systems
BIC	British Instantaneous Coupling
BIEMC	Burrup Industries Emergency Management Committee
BLB	Bulk Liquids Berth
CCM	Critical Control Module
CCR	Central Control Room
CCTV	Closed Circuit Television
CEMS	Continuous Emissions Monitoring
CMP	Crisis Management Plan
CRT	Crisis Response Team
CO	Carbon monoxide
CO2	Carbon Dioxide
DCS	Distributed Control Systems
DFES	Department of Fire & Emergency Services
DGSA	Dangerous Goods Safety Act
DGSR	Dangerous Goods Safety (Major Hazard Facility) Regulations
DMIRS	Department of Mines, Industry Regulation and Safety
DPI	Department of Primary Industry
EAA	Evacuation Assembly Area
EAC	Electronic Access Card
ECM	Engineered Construction Maintenance
EMA	Emergency Management Act



Term	Definition
Emergency	An emergency is defined as “an event or situation, due to an actual or imminent occurrence, that endangers or threatens to endanger the safety or health of persons, destroys/ damages or threatens to destroy/damage the environment or property”.
EMP	Emergency Management Plan
EMQnet	Crisis Management System
EMR	Emergency Management Regulations
EPA	Environmental Protection Act
EPABX	Electronic Private Automatic Branch Exchange
EPR	Environmental Protection Regulations
ERT	Emergency Response Team
ERTL	Emergency Response Team Leader
ESD	Emergency Shut Down
ESO	Emergency Services Officer
FACP	Fire Alarm Control Panel
FM 200	Factory Mutual 200 Fire Suppression System
H2S	Hydrogen sulfide
HESQ	Health, Environment, Safety and Quality
HMA	Hazard Management Agency
HSE	Health Safety & Environment
I/O cards	Input / Output cards
IC	Incident Controller
ICS	Incident Control System
INCIDENT	An event or issue that can have the potential to seriously threaten Yara's operations, reputation and the safety and well-being of its employees. Such an incident might attract intense public, shareholder and customer scrutiny; create financial, legal and governmental impacts on the business; and threaten Yara's reputation, or even its survival
IR	Infrared
ISBL	Inside Battery Limits
kPa	Kilopascal



Term	Definition
LEL	Lower Explosive Limit
m3	Cubic Meter(s)
MAE	Major Accident Event
MHF	Major Hazard Facility
MP	Muster Point
N2O / NOX	NITROUS OXIDE
NA	Nitric Acid
NFPA	National Fire Protection Association
NH3	Ammonia
O2	Oxygen
OEMP	Operations Environmental Management Plan
OSHA	Occupational Safety and Health Act
OSHR	Occupational Safety and Health Regulations
PA	Public Address
PES	Process Electronic System
PIP	Pre-Incident Plan
PLC	Programmable Logic Controller
PM	Plant Manager
PO	Panel Operator
PPA	Pilbara Ports Authority
PVC	Plastic Polyvinyl Chloride
SCBA	Self-contained breathing apparatus
SIS	Safety Instrumented System
SMS	Safety Management System
SOP	Standard Operating Procedures
SRT	Site Response Team
SRTCR	Site Response Team Control Room
SRTL	Site Response Team Leader



Term	Definition
TAN	Technical Ammonium Nitrate
TANPF	Technical Ammonium Nitrate Production Facility
UPS	Un interruptible Power Supply
VESDA	Very Early Smoke Detection Apparatus
VNET	Virtual Network
VNET/IP	Virtual Network /Internett Protocol
WAPOL	Western Australian Police
YPF	Yara Pilbara Fertilisers
YPN	Yara Pilbara Nitrates

5

References

- Dangerous Goods Safety (Major Hazard Facility) Regulations 2007.
- *Dangerous Goods Safety Act 2004 (WA)*.
- AS 3745-2010 Planning for Emergencies in Facilities
- Guidelines for the Preparation of an Emergency Plan and Manifests: Guidance Note s310 Rev 5.
- Occupational Safety and Health Act 1984.
- Occupational Safety and Health Regulations 1996.
- Emergency Management Act 2005.
- Emergency Management Regulations 2006.
- Environmental Protection Act 1986
- Environmental Protection Regulations 1987
- Environmental Protection (Unauthorised Discharges) Regulations 2004



6 Yara Pilbara Emergency Response Overview

6.1 Shift Superintendent Responsibility

In the event of an emergency at the Technical Ammonium Nitrate Production Facility (TAN Plant) including the Remediation Project Office, the Shift Superintendent of the TAN Plant will assume the role of the Incident Controller (IC).

In the event of an emergency at the Ammonia Plant or Shipping Pipeline the Shift Superintendent of the Ammonia Plant will assume the role of the Incident Controller (IC).

In the event of an emergency at the Dampier Bulk Liquids Berth, the Ship Loading Officer at the Berth will assume the role of the Incident Controller (IC).

The Incident Controller will command the Emergency Response Team with support from the Site Response Team and Corporate Response Team (crisis management).

6.2 Emergency Notification Flow Chart

Emergency Notification Flow Chart is contained in Appendix A.

6.3 Pre-Incident Plans (PIP)

Pre Incident Plans (PIPs) provide guidelines to manage various foreseeable emergency scenarios and are listed in Appendix B. These PIPs provide initial guidance to response organisations in terms of potential impacts, response requirements and notifications. The PIPs must be reviewed in alignment with this EMP.

6.4 Plant Operations

An overview of the plant, including general operations of both the Ammonia Plant and TAN Plant is contained in Appendix D.

6.5 Plant Populations During Normal Operations

Populations of the Ammonia Plant, TAN Plant & TAN Remediation Project Office during normal hours is tabulated in Appendix F.

6.6 Information on Plant & Emergency Escape, Evacuation, First Aid & Medical Information

Appendices G, H & I contain information on the respective plants and outlines the emergency escape evacuation routes, first aid and medical information.

6.7 Map of Surrounding Areas

A map of the surrounding areas showing the built and natural environment and the neighbouring facilities that may be affected in the event of a major accident is contained in Appendix J.



6.8 Inventory of Dangerous Goods On Each Site

An inventory of dangerous goods and a description of the hazardous properties of those goods located at both the Ammonia Plant and the TAN Plant are contained in Appendix K.



7 Emergency Scenarios

The development of this EMP included identifying major hazards using risk assessments and in consultation with employees, external consultants, BIEMC & regulatory agencies etc.

7.1 Major Hazards & Emergency Scenarios

The major hazards at the Ammonia Plant are:

- Natural Gas;
- Hydrogen Enriched Process Stream;
- Sulphuric Acid;
- Anhydrous Ammonia, and
- Catalyst Fires

The major hazards the TAN Plant are:

- Ammonium Nitrate (solution & prills form)
- Anhydrous Ammonia;
- Nitric Acid;
- Hydrogen; and
- Nitrogen Oxides (NO_x)

These hazards can give rise to a range of emergencies including flash fires, jet fires, explosions and toxic releases. These events can occur in various parts of each plant including:

- Ammonia Plant
 - Natural Gas Feed & Conditioning;
 - Primary and Secondary Reformer, Shift Converter;
 - CO₂ Absorber/ Methanator;
 - Purification, Compression, Synthesis and Refrigeration;
 - Ammonia Storage Tanks and Export Pumps; and
 - Utilities.



- TAN Plant
 - Ammonia Supply Transfer Pipeline (units 20, 61 & 63);
 - NA Process (unit 12);
 - ANSOL Process (unit 31);
 - TAN Process (unit 32);
 - Storage, loading & transport facilities (units 35, 52, 71, 72, 73, 74, 75*);
 - Utilities; and
 - Buildings

In addition, emergencies may arise both onsite and offsite:

- Onsite Emergency Scenarios:
 - Medical emergency;
 - Ammonia spill (both on & offsite);
 - Ammonium Nitrate spill (both on & offsite);
 - ANSOL spill;
 - Saline Water (both on & offsite);
 - Collisions and impacts from 3rd party activities inside the plant;
 - Bomb threats;
 - Security breaches;
 - Bush fires;
 - Vehicle collisions etc.
- Offsite Emergency Scenarios:
 - Loss of containment within the Quadrant Energy Natural Gas Metering Station;
 - Loss of containment within the Ammonia Export and Recirculation Lines; and
 - Loss of containment within the Ammonia Ship Loading Facilities.
- External Events
 - Natural disasters (cyclones, earth quake, flooding etc.);
 - Localised bush fires;
 - Collisions and impacts from 3rd party activities to the ammonia export and recirculation line; and
 - Catastrophic events at Pilbara Ports Authority Lease Port that may damage Yara Pilbara ship-loading facilities.



8 Emergency Preparedness and Response Training

Yara Pilbara employs an Emergency Response Coordinator with necessary skills, experience, training, and knowledge necessary to:

- Train and coach Yara Pilbara's Emergency Response Team in regards to the EMP, PIPs and SOPs;
- Maintain Yara Pilbara's EMP and emergency response equipment;
- Conduct audits and emergency management reviews as part of continuous improvement process and Yara Pilbara's Safety Management System (SMS);
- Coordinate any necessary external training as per emergency preparedness and response planning; and
- Plan and execute emergency drills and exercises with on-site and external agencies.

All employees and visitors shall receive relevant training and awareness as part of the site induction program. This includes necessary knowledge and awareness in emergency systems, evacuation procedures and preparedness.

8.1 Pre-Incident Plans

Pre-incident plans have been prepared to provide specific guidance on the appropriate response to emergency scenarios that may occur as a result of the Major Accident Events identified in the Formal Safety Assessment during operational design. These plans also advise on the potential escalation scenarios and the equipment (including clean-up disposal) and resources available onsite and elsewhere that can be deployed. Potential scenarios are identified as follows.

8.1.1 Flammable Releases

- Natural gas unignited release (potential for explosion, flash fire);
- Natural gas ignited release (jet fire); and
- Process stream (auto-ignited) release (jet fire).
- Non Process Fires (Catalyst)



8.1.2 Toxic Releases

- Ammonia Release - loss of ammonia containment from process plant, loss of containment from ammonia storage, loss of ammonia containment from export pipeline;
- Loss of containment from Acid Storage area;
- Loss of ammonia containment from ship loader (Ship Loading and Jetty);
- Natural Gas release; and
- Process Stream release.

8.1.3 Others

- Major injury or fatality (plant, pipeline or port);
- Non Process Fires (electrical, bush, building fire, oil, diesel);
- Cyclone Contingency Planning;
- Bomb & Terrorist Threats;
- Substation, Transformer Bay or Generator Fire;
- Ammonium Nitrate Prill incident;
- ANSOL incident; and
- Nitric Acid incident.
- Vehicle Interaction and/or Roll Over
- Security Breach
- Earthquake & Flooding Contingency



9 Plant Safety Features

9.1 Ammonia Plant

The Yara Pilbara Ammonia Plant, pipeline and ship loading facilities are provided with a number of risk control features designed to prevent a major accidental event or mitigate the consequences of such an event.

These features include:

- Ammonia Plant Control Room - this facility monitors and controls all aspects of the plant's operation including the pipeline;
- Emergency Isolation & Shutdown Systems - the shutdown is initiated either automatically through instrument logic on detection of upset condition without the Operator's intervention or manually by the personnel in the Control Room on visual detection through process upset condition;
- Process Electronic System (PES) – the main component of the system is the ProSafe-PLC CCM (Critical Control Module), which provides basic logic solving capabilities. The shutdown systems are aimed at equipment protection and isolation of a particular section of the plant during an emergency;
- Emergency Manual Trips – actuation of these buttons will shut down each machine leading to a partial trip of that area, plant shutdown will be initiated by the Emergency Shut Down (ESD) system. All main pumps and motors have local shut down buttons;
- Bunded areas;
- Isolation valves;
- Interface communication with Ammonia Plant via router which connects the existing plant network (Vnet) and the new plant network (Vnet/IP)
- Plant Fire Protection Systems – this includes fire alarm system, fire water network, double fire hydrants, fire monitors, dry chemical, portable extinguishers including portable CO2 extinguishers, and FM 200 flooding agent for the Control Room;
- Emergency Communications – this includes an emergency siren and an all clear alarm (common between the Ammonia and TAN Plants), EPABX system, and portable communications systems (radio & telephones);
- Closed Circuit Television (CCTV) coverage of entrances, process areas and over watch of the Bulk Loading Berth;
- Fire and Gas Detection – fire, flammable gas and toxic gas detection systems are provided at the plant; and



- A Weather Station - to measure precise wind speed and indicate wind direction across the plant. The weather station also gives information on ambient temperature, relative humidity etc. The weather station information is available in the Control Room and will assist in determining if any neighbouring facilities could be affected in the event of a major accidental event.

9.2 Technical Ammonium Nitrate Production Facility

The TAN Plant is provided with a number of risk control features designed to prevent a major accidental event or mitigate the consequences.

These features include:

- Plant Control Room - this facility monitors and controls all aspects of the plant's operation and includes Distributed Control Systems (DCS) and Safety Instrumented System (SIS);
- Continuous Emissions Monitoring (CEMS) in U-12 stack and De-NOx system;
- Online emission analysers have been implemented in U12 stack for monitoring and measuring N₂O, NO_x, oxygen and ammonia during operation.
- Closed Circuit Television (CCTV) in process areas, storage areas the fence line and infrared (IR) cameras in the AN Bulk Storage Building;
- Emergency Isolation & Shutdown Systems - shutdown is initiated either automatically through instrument logic on detection of upset condition without the Operator's intervention or manually by the personnel at Control Room on visual detection through process upset condition;
- Process Electronic System (PES) – the main component of the system is the ProSafe-PLC CCM (Critical Control Module), which provides basic logic solving capabilities. The shutdown systems are aimed at equipment protection and isolation of a particular section of the plant during an emergency; The SIS system consists principally of system cabinets for ProSafe-RS (Yokogawa Safety System) including the following internal equipment:
 - Redundant configuration (1oo2D) ProSafe-RS completely programmed, which provides the basic logic solving capabilities;
 - Necessary I/O cards, cards of interface and wires;
 - Redundant feeding sources;
 - Isolators and equipment of interconnection; and
 - SIS Matrix console.



- Emergency Manual Trips – actuation of these buttons will shut down each particular machine leading to a partial trip of that area plant will be initiated by the Emergency Shut Down (ESD) system. All main pumps and motors have local shut down buttons;
- Bunded areas;
- Isolation valves;
- Interface communication with Ammonia Plant via router which connects the existing plant network (Vnet) and the new plant network (Vnet/IP);
- Plant Fire Protection Systems – this includes fire alarm system, fire water network, double fire hydrants, fire monitors, dry chemical portable extinguishers and CO₂ portable extinguishers;
- Emergency Communications – this includes emergency siren and all clear alarm (common between the Ammonia Plant and TAN Plant), EPABX system and Portable communications system (radio), beacons, horns, IP PBX based digital and analogue telephone systems, radio communications system digital mobile radio, public address system, CCTV and security (CCTV and Access Control System);
- Fire and Gas Detection – fire, thermal detectors and gas detection (hydrogen detectors, ammonia detectors, NO_x detectors) are provided at the plant. In addition the bulk storage is equipped with N₂O detectors as an early warning of AN decomposition; and
- A weather station - to measure precise wind speed and indicate wind direction across the plant. The weather station also gives information on ambient temperature, relative humidity etc. The weather station information is available in the Control Room and will assist in determining if any neighbouring facilities could be affected in the event of a major accidental event.



10 Emergency Notification

10.1 Raising the Alarm On Site (Ammonia Plant and TANPF)

Personnel, contractors and visitors on site must report all emergencies immediately to the respective Control Room or Site Security. This notification can be via:

Site	Emergency No.	Control Room	Security (direct)	2 Way Radio Channel	Manual Call Points
Ammonia Plant	1800 117 506 (directed to Security)	08 9183 4165	Extension: 4111 External: 08 9183 4111	Channel 4 clearly announcing "emergency, emergency, emergency"	Red break glass alarm devices located throughout both facilities.
TAN Plant/TAN Remediation Project Office		08 9183 4007 / 4008	Extension: 4111 External: 08 9183 4111		

The relevant person, on receiving the notification, shall document the name of the caller, details of the incident, location of incident, injuries and chemicals involved. The person shall immediately report the incident to the Shift Superintendent who will commence management of the incident.

Where the emergency call is received by a Control Room Operator they shall also notify Security Control.

10.2 Raising the Alarm Off Site

Personnel, contractors, the public and visitors off-site must report all emergencies immediately via:

- Yara Pilbara's Two Way Radio: Channel 6 analogue or 26 Digital Yara
Emergency number 1800 117 506 or Security 08 91 834 111

The person receiving the call shall document the name of the caller, details of the incident, location of incident, injuries and chemicals involved. The person receiving the call shall immediately report the incident to the Shift Superintendent and Security Control.



10.3 Notification to the Emergency Services

DFES & Police should be contacted through the following means:

- Telephone: Dampier and Karratha dial 000 (preferred method of contact)
- Dedicated Radio: Channel 136 (DFES channel) on the four dedicated radios located in the following:
 - Emergency Centre (SRT Room);
 - Ammonia Plant Control Room;
 - TAN Plant Control Room; and
 - The Security Gatehouse.

10.4 Notification by Third Parties

State Emergency Services (WA Police, DFES etc), contractors, PPA, members of the public, police or neighbouring facilities may contact Yara Pilbara Security to report an emergency by dialling 1800 117 506.

10.5 Site Fire Alarm

The site fire alarms can be activated manually by an individual or automatically by the activation of a fire detector. The Control Room of the respective facility will receive immediate notification on activation of these alarms.

10.6 Control Room Alarms – Ammonia Plant

The Ammonia Plants Control Room contains facilities to monitor and control plant operation including the export pipeline (except loading arm operation). The plant has been provided with

- Isolation valves at strategic locations which can be operated remotely from the Control Room depending upon their criticality and role in process safety.
- Gas detectors for ammonia, chlorine and flammable gas.
- Smoke & flame detectors are located across the plant.
- Manual call points installed at different locations.

When activated, detectors and manual call points send signal directly to the Ammonia Plant Control Room and automatically sound the emergency siren.



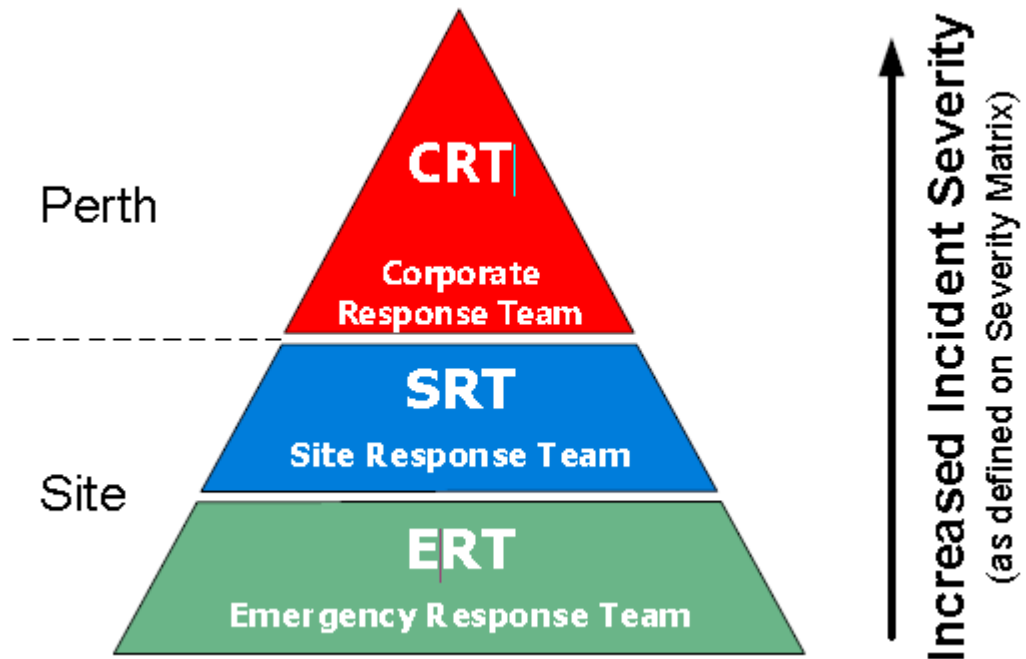
10.7 Control Room Alarms – TAN Plant

The TAN plant is provided with a Central Control Room that contains facilities to monitor and control plant operation. The plant has been provided with:

- Toxic Gas Detection: point ammonia detectors and nitric oxide gas detectors;
- Flammable Gas Detection: hydrogen/ hydrocarbon flammable gas detectors;
- Smoke detectors are installed in local instrument rooms, switchgear/electrical equipment rooms, cable trenches inside substation and occupied buildings;
- Manual Call Points strategically located indoors and outdoors around escape routes, exits, walkways and roads;
- Aspirating Smoke Detection Systems (ASDS) installed in buildings producing, storing or transporting ammonium nitrate;
- Thermal detectors are provided in areas where smoke detection is inappropriate;
- Duct smoke detectors - in the compressor shelter, shift Laboratory, bulk TAN storage, conveyor galleries, Control Room building, Transporter Workshop and Emergency Centre; Duct N₂O detectors in bulk TAN storage as an early warning of ammonium nitrate decomposition; and
- Signals from fire and smoke detectors will be connected to the fire detection signal processing control unit (FACP) at the TAN Control Room. A 'low alarm' will be activated if a low alarm is triggered from one detector. A 'confirmed fire' alarm will be activated from a manual call point or if a high alarm is triggered from one detector.

11 Emergency / Crisis Response Structure

The Emergency and Crisis Management System structure consists of the following elements, some or all of which may be mobilised to deal with an Incident:



Yara have a three-tier structure in place to manage and respond to incidents affecting the site. The structure and function of the Corporate Response Team (CRT) and Site Response Team (SRT) is detailed in the Crisis Management System, with the structure of the Emergency Response Team (ERT) at site being the subject of the Yara Pilbara Emergency Management Plan (this document).

11.1 Corporate Response Team (CRT)

The CRT is based in Perth and its primary role is to minimise the financial impact on the Company by assessing the consequences of any incident or issue and managing those with potential enterprise-wide impact whilst supporting and advising any response at site.

Its focus will be on strategic issues which may affect the company's future operability, business continuity, profitability and reputation. The CRT will also investigate legal issues associated with the incident, communication and liaising with Government.

The structure and function of the CRT is detailed in this Crisis Management System document. The CRT is made up of the following members:

- CRT Leader
- CRT Spokesperson
- CRT Coordinator
- CRT Log Keeper



- CRT Human Resources
- CRT External Relations
- CRT Legal
- CRT Finance
- CRT Commercial Services

11.2 Site Response Team (SRT)

The primary role of the SRT is to oversee the operational emergency response and the wellbeing of people involved in, or affected by, an incident or issue. This is achieved by providing shelter, support and advice to any response on site and developing plans to get operations back to normal as quickly as possible whilst liaising with the CRT.

The SRT makes operational plans to mitigate the effects of the emergency as well as identifying and communicating strategic issues (which affect the company's future operability, business continuity, profitability and reputation) arising from the event to the CRT. Elements of the SRT will also assist in the investigate legal issues associated with the incident, conduct communications and liaise with Government.

The structure and function of the SRT is detailed in this Crisis Management System document. The SRT includes the following roles:

- SRT Leader
- SRT Spokesperson
- SRT Coordinator
- SRT Log Keeper
- SRT Human Resources
- SRT Operations
- SRT Safety
- SRT Environmental
- SRT Governance and Compliance
- SRT Emergency Services
- SRT Recovery
- SRT Security
- SRT Legal
- SRT Finance
- SRT Commercial Services
- SRT External Relations

The SRT Leader (SRTL), as required by the Incident Controller will coordinate the planning, logistics, resource, plant, community, and regulator liaison functions and shall give technical and services support to the Incident Controller as required.



The SRT Control Room for both the Ammonia and TAN Plant is located in the Administration building within the Ammonia Plant boundaries, and alternative location is the SRT TAN room in the TAN Security Gatehouse.

The SRTL will give consideration to locating the SRT to an offsite location if or when the need arises.

11.3 Emergency Response Team (ERT)

The primary role of the ERT is to organise and carry out the tactical response operations at the incident scene. The ERT is made up of the first responders from each plant who undertake the physical response to an incident with support from the SRT.

The ERT will consist of the Incident Controller (Shift Superintendent / Senior Control Room Operator), ERT Leader and a minimum of five (5) additional trained members and an ESO (Emergency Services Officer). This will allow appropriate numbers to maintain a fire team operating under self-contained breathing apparatus(SCBA)), a backup team under SCBA, and operation of pumps and the fire appliance.

11.3.1 ERT Duty Cards

In the event of an emergency the roles of key personnel are vital to ensure a successful response. Duty cards summarising the process to be followed by key personnel listed below are outlined in Appendix L.

The ERT leader, under the direction of the Incident Controller, coordinates the team members, and any support personnel including ESO etc. as required. Any further resources required by the ERT will be determined by the Incident Controller based on their assessment of the specific incident response requirements and passed through the SRT Emergency Response Coordinator.

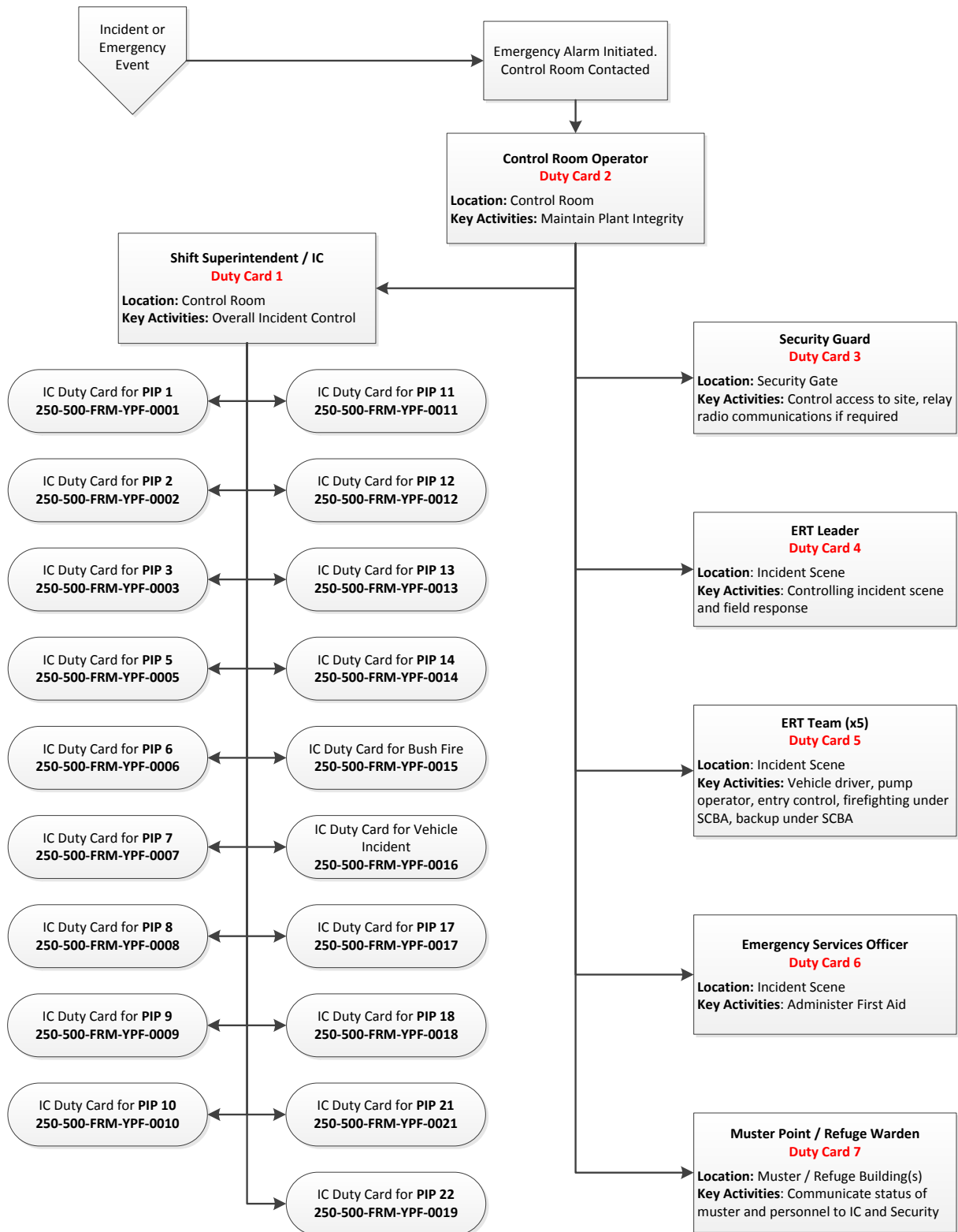
To allow the Shift Superintendent to maintain the required team strength, the names of ERT Members from both plants on shift are placed on the ERT board in each Plant Control Room's, SRT Room and TAN Gatehouse. Security personnel will provide the Shift Superintendent with the names of available ERT Members who have entered site using their EAC card.

11.3.2 Incident Controller Duty Cards

The Incident Controller is required to coordinate the ERT Team dependent upon the type of emergency. Individual PIP dependent Incident Controller Duty Cards summarising the process for different types of emergencies are contained in Appendix M. This process is designed to be flexible and requires the Incident Controller to adapt to the changing circumstances of the emergency.



Emergency Management Plan





11.4 Muster Warden Structure

The current warden structure includes nominated Muster Warden who account for persons at their muster point or refuge building and pass the information to Security via radio or phone. Wardens then remain on standby to receive further instruction.

Each muster point/refuge building has multiple nominated personnel to assist in completing designated tasks. Muster Points/Buildings are identified in Section 20.

11.5 Primary and Alternate Team Roles

The 'primary' person is the first-choice for each role (IC , ERT TL).

If this person is not available, the 'alternate' position will fill the role.

If the 'primary' person is available, the 'alternate' may be required to act in a 'support' role.

11.6 Links with External Emergency Services Incident Control System (ICS)

The ERT has been structured to facilitate the interface with Australasian Inter-Service Incident Management System (AIIMS). This allows for liaison and support between Yara Pilbara Incident Controller and external emergency services / other 3rd parties in the local area.



12 Determination of Emergency Level

Emergency events do not always require the same level of response. The level of response is dictated by the severity of the event and its potential effect on health and safety, as well as community perception and risk or potential threat.

On notification of an incident or alarm the Shift Superintendent of the respective plant shall determine the emergency level. In the case of control alarms, the Duty Panel Operator shall comply with the requirements of the “Yara Pilbara Fertilisers Process Operations Alarm “Philosophy” in order to confirm if any process alarm is spurious.

Whilst emergencies are categorised as on-site and off-site, they are further defined as Levels 1 through 3, and once the emergency or incident has been escalated to the SRT, the Severity Matrix will be used to identify relevant incident issues and outcomes from the event.

12.1 Level One Emergency – Local Alert

An incident where the effects are expected to be confined to a limited area within the plant boundaries and can be adequately managed by personnel within the immediate location.

Its characteristics are that it:

- Is unlikely to worsen and be easily contained;
- Can be dealt with using local resources, e.g. fire extinguishers;
- Requires the ERT to be activated;
- May require the SRT to assemble;
- Requires internal notification but may not require any external notification immediately;
- Does not require evacuation to muster point;
- Only requires limited first aid; and
- Is unlikely to attract media interest in a local or national sense.

The Shift Superintendent must be notified. They shall assume the role of Incident Controller and activate the ERT but may not mobilise the SRT. Examples include a small-contained acid or ammonia leak, a leaking flange or a small fire.

This emergency level may not require the mobilisation of external emergency services. Command and control of the emergency will remain with the Incident Controller.



12.2 Level Two Emergency – Site Alert

An incident where the effects will remain contained to a limited area but may spread to other areas within the respective plant boundaries. Such incidents will not cross the plant boundary nor will they be harmful but may create perceptions / panic amongst neighbouring facilities and/or community.

Its characteristics are that it:

- Is contained to an area onsite and within the perimeter;
- Is not harmful to neighbouring facilities or community;
- Requires the ERT and the SRT to assemble and be activated;
- May require CRT to be advised and/or activated;
- Page 35/116 changes to be made. May require injury treatment;
- “Requires the immediate notification to nominated regulatory agencies by the SRT;”;
- Evacuation to Muster Points/Buildings and/or evacuation of site may be required;
- Incident, until controlled, has the potential to escalate to a Level Three incident; and media interest is possible both at local and state level.

Examples include an acid spill that is not contained, a small ammonia leak or a developing fire visible from distance.

This emergency level may or may not require the mobilisation of external emergency services to assist site personnel and augment site resources.

If the incident escalates and triggers a Westplan response, the role of Incident Controller will be filled by a civil emergency services officer (Police, DFES District Officer). The Yara Pilbara Incident Controller will not maintain control of the incident but will provide whatever the designated Incident Controller requires in relation to personnel, assets, technical assistance, etc. As the civil Incident Controller has little or no knowledge of the plant and the hazards involved, it is likely the Yara Pilbara senior person (previously the Incident Controller) will fill the role of Deputy Incident Controller or Operations (as defined by the AIIMS

The Incident Controller and SRT will maintain close coordination of the incident in order to mobilise resources required to ensure an effective response to an incident or emergency.



12.3 Level Three Emergency – External Alert

An incident where the effect may spread and impact the people, property and the environment inside and outside of the plant.

Its characteristics are that it:

- Is significant and has the capacity to worsen;
- Requires the ERT and the SRT to activate;
- Requires CRT to be advised/activated;
- Requires the immediate notification to internal and external stakeholders;
- Requires the immediate notification to nominated regulatory agencies by the SRT;
- Likely to require external support from local emergency services;
- May require evacuation to Muster Points/Refuge Buildings and/or offsite as necessary;
- May involve casualties; and
- Media interest is expected at local, state or national level.

Examples include an uncontrolled fire or a large toxic gas release.

This emergency level will require the mobilisation of external emergency services to protect public persons, property and the environment and to assist site personnel and augment site resources. Onsite command and control of the emergency will remain with the Incident Controller.

The Loading Master will assume command and control of emergencies on the jetty during ship loading.

Control of other offsite aspects of the emergency becomes the responsibility of the designated HMA, which under the Emergency Management Regulations 2006 are allocated to DFES.

The Incident Controller and SRT will maintain close coordination of the incident in order to mobilise resources required to ensure decisive response to an incident or emergency. The SRT will regularly update CRT with detail of the event.



13 Emergency Warning Systems

13.1 On Site Warning System

If required, the Incident Controller (Shift Superintendent of respective plant) shall authorise the activation of an emergency alarm, common to both plants, to alert all personnel to evacuate to Muster Points/Buildings. Confirmation of the site emergency alarm is carried out via the radio and PA system. If the Shift Superintendent is not immediately available, the Panel Operator shall initiate the alarm. The alarm should be sounded for the following situations;

- Any explosion;
- A fire (other than a minor fire that can be controlled);
- An uncontrolled ammonia gas or liquid release;
- An uncontrolled process gas release; or
- Any other situation where persons need to be accounted for and/or protected from an event.

The emergency alarm is to be raised whenever there is an unplanned medium-to-large release (or leak) at either plant.

In all cases, it is preferential to raise the alarm as it allows personnel to take precautionary actions.

Emergency sirens are provided in the different plant areas to alert personnel in emergency situations. These sirens are also audible at the Water Corporation Desalination Plant. The emergency alarm sounds like an air raid siren and is tested every Monday at 0900 hours at the Ammonia Plant and 0915 hours at the TAN Plant.



13.2 Off Site Communication System

This notification is required when a neighbouring facility, building or organisation may be affected by an emergency. In the case of a toxic release it is vital that neighbouring facilities in the path of such a release are notified immediately so that they can take appropriate safety measures.

In the event that an emergency is classified as a Level Two or Level Three emergency, Yara Pilbara will immediately notify neighbouring facilities, DFES, WAPOL, regulators, local administration and all concerned agencies using the Message Manager System (EMQnet); which assists in alerting third party agencies through their nominated person(s).

Listed Message Manager recipients will receive a pre-defined and pre-approved SMS and/or email alert advising them of the nature of the onsite emergency.

Yara Pilbara maintain a hardcopy of the names and emergency contact numbers of external emergency departments, statutory authorities and neighbouring facilities in the area which is revised and updated on a quarterly basis by the Emergency Response Coordinator.

The contact listing is also maintained in the SRT Control Room. The Incident Controller will initiate contact with the required neighbouring facilities in consultation with the SRTL.

Yara Pilbara will update neighbouring facilities and DFES with latest status about the incident and future course of action during a significant incident.



14 Emergency Coordination

The location of the emergency will determine the appropriate emergency response, command and control.

14.1 Emergencies within the Site Boundaries

For emergencies located within the plant boundaries, including the TAN Remediation Project Office and the Water Corp Desalination Plant, the initial response will be made by Yara Pilbara ERT under the command of the respective site Incident Controller.

14.2 Emergencies within the Pipeline Corridor

For emergencies within the export pipeline corridor that arise from or impact the ammonia export line, response will be made by Yara Pilbara ERT under the command of the Ammonia Plant Incident Controller. Yara Pilbara will advise DFES, LandCorp and PPA if any emergency exists in the Yara Pilbara East / West Service Corridor.

14.3 Emergencies within the Dampier Port at the Ship Loading Facility

For emergencies located at the PPA Dampier Port that arise on the BLB Jetty, Yara will firstly notify DFES and then commence first response by the Yara ERT under the command of the Loading Master acting as Incident Controller. In this case, the Incident Controller will immediately notify the Ammonia Plant Control Room and then PPA.



15 Action on Hearing the Alarm – On-Site

The emergency alarm sounds like an oscillating air raid siren and will be sounded throughout the plant for one minute.

Upon hearing the emergency alarm all personnel onsite (both Ammonia and TAN Plants) shall move to the closest Muster Point/Building as follows:

- Stop work, immediately observe the windsock and evacuate across and upwind to the nearest and safest Muster Point/Building.
Escape hoods to be used when safe evacuation across and upwind to the nearest and safest Muster Point/Building is not possible.
- The first staff member from site who reaches a Muster Point/Building shall become the Muster Warden for that area.
- For the **Ammonia Plant**, when a Muster Point is reached, you are to enter the Refuge Chamber, proceed through the airlock and await instructions from the Muster Warden to swipe your EAC at the swipe reader, then walk to and sit on the farthest available seat.
- For the **TAN Plant**, when a Muster Building is reached, you are to assist in securing the building as directed and await instruction from the Muster Warden. When entering the Muster Building swipe the Muster Reader then move away from this area after confirming your swipe visually and audibly on the reader. As soon as practicable, give your name to the Muster Warden or Muster Warden delegate.
- For the TAN Remediation Project, when a Muster Building is reached, you are to assist in securing the building as directed and await instruction from the Muster Warden. When entering the Muster Building provide your name to the Muster Warden or delegate. They will provide Security with the accounted number of persons mustered.
- The Muster Warden takes the names of everyone at the Muster Point/Building and confirms the names/numbers with the security guard by telephone or radio.
- Security guard to print out Emergency Muster report through Gallagher and keep it as a hardcopy.

Muster Points/ Buildings are equipped with public address system speakers and two way radios to communicate with the Incident Controller and Security.

All personnel will remain at the Muster Points/Buildings until the all clear alarm is sounded (continuous siren or tone).

Evacuation Assembly Area EAA1 and EAA2 (Ammonia) and Emergency Assembly Area EAA2 (TAN Plant) are only to be used when there is a complete evacuation of the Ammonia and/or TAN Plant.

See Appendix I for Muster Points and Evacuation Assembly Areas



15.1 All Clear and Re-Entry

Prior to terminating an emergency the Incident Controller will assess the situation and ensure that the risk has been controlled and there is no possibility of the incident reoccurring. The Incident Controller shall also initiate actions related to site clean-up, barricading, spill containment and safe disposal of any contaminated material resulting from the emergency. The all clear alarm is recognised as an continuous air raid siren on the Ammonia Plant and a continuous tone on the TAN Plant PA System and will indicate the all clear has been given. This will be confirmed via the two-way radio and the public address system. After the all clear has sounded, all employees shall report to their department.

ALL Work Permits shall stand '**SUSPENDED**' as soon as emergency is declared.

ALL jobs must be reassessed for risk prior to recommencing work.

ALL work permits must be revalidated and reissued before recommencement of work.



16 Roles & Responsibilities

ROLE	ACCOUNTABILITIES
<p>Incident Controller - Shift Superintendent (or Senior Panel Operator in their absence)</p>	<p>Emergency Preparedness</p> <ul style="list-style-type: none"> Participate in desk top, field and multi-agency exercise for emergency throughout the year; Be aware of the ERT members present / available during shift; and Be prepared to take all decisions regarding managing the emergency and plant operation during the period of emergency. <p>Emergency Response</p> <ul style="list-style-type: none"> Assume role of Incident Controller in an emergency situation, In the event of an emergency at the Dampier Bulk Liquids Berth, the Ship Loading Officer at the Berth will assume the role of the Incident Controller (IC).; <ul style="list-style-type: none"> If the incident is on a plant site, locate at the Control Room of the effected plant If the incident is within the shipping pipeline boundary, locate at the Ammonia Plant Control Room. If at the BLB Jetty, locate at the BLB Load Control Room Place vest on to display Incident Controller; Declare interim emergency level; If in doubt, treat the situation as a worst case scenario; Declare emergency, sounds the site muster alarm and mobilise ERT if appropriate; If required order evacuation of all personnel including employees, contractors and visitors. Ring 000 to notify external emergency services; Notify 3rd parties as required (or delegate to SRTL); Liaise with DFES once direct contact is established. Inform SRTL; Instruct Security to account for all personnel on site; Get feedback from Security of each Muster Point/Building to confirm the accounting of site personnel; Manage the emergency and liaise between Emergency Response Team, Site Response Team, Security and Plant Operators; Maintain communication with ERTL and the SRTL; Liaise with and seek assistance from emergency services as required; Initiate Message Manager Third Party notification protocols in EMQnet. Direct panel operators in the operation of the plant; Organise shutdown, isolation, outside service requirements, etc. as situation demands to make the area safe; Provide predictions of incident potential or escalation to SRTL and external emergency services; Communicate with regulators or delegate to SRTL and provide regular updates; and Order termination of emergency or alternative actions. Refer to PIPs to formulate plan: <div data-bbox="671 1870 1161 2132" style="text-align: center;"> <pre> graph TD Threat((Threat)) --> Task((Task)) Task --> Resources((Resources)) Resources --> Time((Time)) Time --> Threat </pre> </div>



ROLES	ACCOUNTABILITIES
<p>Emergency Response Team Leader</p>	<p>Emergency Preparedness</p> <ul style="list-style-type: none"> • Undertake emergency response training as required to maintain competency level; • Ensure emergency response equipment is maintained and ready for use; • Ensure ERT members attend regular emergency response training and are familiar with the location of emergency response equipment; • Organise with HESQ Manager to conduct desktop, field and multi-agency exercises throughout the year; and • Be aware of ERT members present / available during shift. <p>Emergency Response</p> <ul style="list-style-type: none"> • Upon notification of emergency by the Incident Controller, proceed to the Central Control Room (YPF or TAN provided it is safe to do so) as soon as practicable; • Account for all ERT Members and EMR and contact the Incident Controller with confirmation of numbers. • Mobilise, command and coordinate the onsite EMR <ul style="list-style-type: none"> Communicate with the Incident Controller with particular reference to, Intentions of the ERT in combatting the incident: <ul style="list-style-type: none"> ▪ Providing accurate information on incident; ▪ Gaining more information on current weather and operating conditions; ▪ Making safe access to incident site; ▪ Shut down requirements; ▪ Minimising damage; ▪ Containing major spills / leaks and making area safe; ▪ Liaison with HESQ to clean up and dispose of the spill in accordance with the OEMP; and ▪ Requirement of external emergency assistance. • Assist the Incident Controller with information and situational understanding as required by external emergency services personnel; and <p>Call upon the ESO to treat any casualties.</p>
<p>Emergency Response Team</p>	<p>Emergency Preparedness</p> <ul style="list-style-type: none"> • Undertake emergency response training as required to maintain competency level; and • Participate in desktop, field and multi-agency exercises throughout the year. <p>Emergency Response</p> <ul style="list-style-type: none"> • The ERT will be mobilised by the ERTL if required; • Upon mobilisation of the site siren, if safe to do so, immediately move to the Central Control Room, or the location advised by the ERTL, and prepare for a briefing from the ERTL • The ERT will follow instructions given by the ERTL.



ROLES	ACCOUNTABILITIES
<p>Emergency Services Officer</p>	<p>Emergency Preparedness</p> <ul style="list-style-type: none"> • Ensure first aid equipment is maintained and ready for use; • Participate in desktop, field and multi-agency exercises throughout the year; and • Identify the ERT members on each shift and notify the Shift Superintendent ,and • Be aware of whom the ERTL is on each shift. <p>Emergency Response</p> <ul style="list-style-type: none"> • When mobilised, receive commands and ensure coordination with the ERTL; • Remain at medical centre unless responding to requests for assistance from ERTL; • Assess the need for treatment of injuries and triage of casualties; • Provides transportation for sick or injured persons from site to Karratha Health Campus • Advise the ERTL of the need for further medical assistance from both internal and external resources, and • Communicates with Dr or Karratha Health Campus regarding status of Injured Person
<p>Panel Operator</p>	<p>Emergency Preparedness</p> <ul style="list-style-type: none"> • Participate in desktop, field and multi-agency exercises throughout the year; • Ensure familiarisation with emergency isolation and shutdown procedures; and • Ensure familiarisation with the information required to be collected when an emergency is reported. <p>Emergency Response</p> <ul style="list-style-type: none"> • The most senior operator will assume the Incident Controller role in the absence of the Shift Superintendent; • Receive emergency reporting call on radio or telephone; • Repeat information given by caller to ensure accuracy; • Immediately notify the Shift Superintendent; • If the Shift Superintendent unavailable and the emergency requires immediate site muster, sound the emergency alarm; • Remain in contact with and operate plant as directed by the Shift Superintendent; and • Follow all further instructions given by Shift Superintendent.



ROLES	ACCOUNTABILITIES
<p>Gatehouse Security Officer</p>	<p>Emergency Preparedness</p> <ul style="list-style-type: none"> • Participate in desktop, field and multi-agency exercises throughout the year; • and • Ensure all personnel, contractors and visitors are issued with swipe cards and swipe in and out when entering or leaving the facility. <p>Emergency Response</p> <ul style="list-style-type: none"> • Access the Gallagher personnel onsite screen. This screen accounts for the number of personnel onsite at any time (as personnel reach Muster Point/Building and swipe their card it will register and display their location); • Record and account for personnel using the site Electronic Access Control System and compare with the number of persons present at each Muster Point / Building from the Muster Marshalls; • Contact the Incident Controller with the headcount results; • Follow all instructions given by the Incident Controller; • Maintain a log of activities and times relating to the incident; • Control vehicle access through the main gate; and • Assist emergency services and crew and inform the Incident Controller when they arrive; and <p>Direct emergency vehicles to the pick up point as instructed by the Incident Controller.</p>
<p>Jetty Operator (BLB Incidents)</p>	<p>Emergency Preparedness</p> <ul style="list-style-type: none"> • Participate in desktop, field and multi-agency exercises throughout the year; • Ensure all personnel, contractors and visitors operating near the Berth are aware of the emergency arrangements when entering or leaving the facility; • Ensure familiarisation with emergency isolation and shutdown procedures for the BLB; and • Ensure familiarisation with the information required to be collected when an emergency is reported. <p>Emergency Response</p> <ul style="list-style-type: none"> • Upon hearing evacuation alarm immediately conduct isolation and make safe activities; • Contact the Incident Controller with headcount if appropriate; • Follow all instructions given by the Incident Controller; • Assist emergency services and crew and inform the Incident Controller when they arrive; and • Direct emergency vehicles to the location as instructed by the Incident Controller.



ROLES	ACCOUNTABILITIES
All Employees, Visitors & Contractors	<i>Emergency Response</i> <ul style="list-style-type: none">• Follow all site evacuation procedures upon hearing the emergency siren;• Obey all directions given by the Incident Controller;• Only use Yara Pilbara communication systems for emergency communication only;• Monitor two-way radio emergency channel 4. Unless directly involved, keep emergency channel clear;• Remain at Muster Point/Refuge Building until the all clear is sounded and confirmed by Incident Controller; and• Follow any further directions given by the Incident Controller.



17 Notification and Liaison

Yara Pilbara may have a responsibility to notify external emergency service agencies, government authorities, local administration and neighbouring facilities.

17.1 Department of Fire and Emergency Services (DFES) Notification

Once DFES has been notified of the emergency, the Incident Controller is then responsible for further liaising with DFES.

Contact Number for DFES is 000

Once a direct contact is established, the Incident Controller will liaise with DFES Communications Centre (COMCEN) 1800 198 140 to update them on the following:

- If the hazard has or could spread beyond the plant limits or export pipeline (impact off-site);
- If the emergency is beyond the experience and resources of Yara Pilbara or its contractors;
- If the protective equipment available is not adequate to deal with the event; and
- Any employees or members of the public are or could be at risk.

Calls for attendance by external agencies shall be directed to the DFES Communications Centre on 000 ("Police, fire or ambulance" to be stated on answering) and the following information provided:

- Location of the emergency;
- Nature of emergency;
- Escalation potential;
- Details of any actual or potential life involvement; and
- The plant contact number for further details if required.

The SRTL is the second point of contact for emergency services for any strategic information. Whilst onsite the SRTL can be contacted in SRT Control Room.

Contact Numbers for Yara Pilbara SRT Control Room are

08 9183 4101 / 08 9183 4161 for conference calls

WHEN CALLING DFES, INFORM THE OPERATOR THAT A DFES EMERGENCY RESPONSE GUIDE

- **No. 55 for AMMONIA PLANT; and**
- **No. 54 for TAN PLANT**

IS IN PLACE FOR THE FACILITIES AND CONFIRM THAT ALL REQUIRED INFORMATION HAS BEEN GIVEN BEFORE TERMINATING THE CALL

Yara Pilbara Security will advise the Incident Controller of the arrival of Emergency Services. Security will direct emergency vehicles to the location Pick up point as instructed by the Incident Controller



17.2 Statutory Notification

Notification is required under applicable legislation and may include:

17.2.1 Department of Mines, Industry Regulation and Safety (DMIRS) Critical Risks Section

in the case of incidents where:

- A death, serious injury or significant damage occurs in connection with either plant or export pipeline
- A death or serious injury is sustained by a person at either plant or export pipeline,
- Any incident that impacts the licence to operate;
- An incident involving a Dangerous Good; and/or
- Any incident that occurred that could have resulted in the above.

17.2.2 Western Australian Police (WAPOL)

WAPOL have a statutory duty to investigate incidents within the state of Western Australia. They have a statutory duty to inform the next-of-kin of personnel who sustain fatal injuries in an incident.

All Level Two and Level Three incidents shall be reported by the SRT or Incident Controller to regulators and other agencies through the Message Manager system and/or by direct telephone contact. Updates will be given during the course of controlling the incident.

17.3 Notification to Gas Supplier (Santos Ltd)

All Level Two and Level Three incidents shall be reported by SRT or Incident Controller to the gas supplier, Santos Limited, through the Message Manager system and/or by direct telephone contact.

Depending on the situation there may be a need to restrict gas supply to the plant. The SRT will notify Santos Ltd regarding restricting the gas supply.

Contact Numbers for Santos Ltd:

Varanus Island Control Room	6218 7637
24/7 Radio Room	6218 7600
Field Supervisor	6218 7601
Duty Incident Commander	0498 988 010



17.4 Notification to Pilbara Ports Authority (PPA)

All Level Two and Level Three incidents shall be reported by the SRT or Incident Controller to the PPA through the Message Manager system and/or by direct telephone contact.

If the incident is on the Bulk Loading Berth Jetty, the Chief Maritime Officer shall notify PPA. A separate notification through Message Manager shall also be issued.

17.5 Notification to Pipeline Corridor Owner (Landcorp)

All Level Two and Level Three incidents shall be reported by the SRT or Incident Controller to Landcorp through the Message Manager system and/or by direct telephone contact.

17.6 Notification to Neighbouring Facilities

Notification will be made where a neighbouring facility, building or organisation may be affected or perceived to be affected by an emergency, so they may take appropriate action to protect life safety.

Yara Pilbara will notify neighbouring facilities using the Message Manage system and/or by direct telephone contact.

Monthly Testing of the Neighbours Message Manage system is conducted and contact list updated when required.

Each neighbouring facility has also been given an information pack as part of requirements of the Dangerous Goods Safety (Major Hazard Facilities) Regulations (Schedules 1 and 4). The information pack outlines information about the Yara Pilbara Plants, their contact details, safety measures, appropriate response and other information to assist neighbouring facilities in the event of an emergency.



18 Communication Systems

18.1 Fixed Communication System

Two types of fixed communication system are installed at the plants:

- EPABX system; and
- Public Address (PA) system.

18.2 Intrinsically Safe Portable Communication Systems

Two-way radio communications channels are designated as per the Yara Radio Communications Procedure ([650-119-PRO-YPF-0001](#)) (refer to attachment 4 for detail).

- Channel 4 is a dedicated strictly for emergency use only and for contacting Medic or First Aid / Ambulance support.
- Channel 11 is a dedicated backup for emergency channel 4.

It may be noted that digital channels 1 to 6 and 12-13 operate using repeaters. In the event of a site blackout these channels will be available for 2 hours using battery backup. In the event of prolonged power failure these channels may become non-operational. In such situations channels 7 to 11 will be operational as long as the individual radio battery has sufficient charge.

Yara Pilbara has 5 designated “external emergency services only” radios. These radios shall be located at the Emergency Centre / Security Gate for immediate use by external emergency services arriving onsite.



19 Emergency Power Supply

The emergency power supplies comprise of the Emergency Generator and Emergency Switchboard, Uninterruptible Power Supply (UPS), batteries and associated power cabling.



20 Escape, Muster, Refuge and Evacuation Points

In order to facilitate the rapid evacuation of personnel following an emergency, escape routes, Muster Points and Evacuation Assembly Areas are provided. Each of these areas or buildings have been selected for the following criteria:

- Occupancy (majority of personnel operate in these areas)
- Ease and speed of access
- Located indoors (protection from atmospheric issues)

20.1 Ammonia Plant

The Ammonia Plant Muster Points & Evacuation Assembly Areas are as follows:

- **Muster Point 1** – Northeast of the Control Room paralleling North Road
- **Muster Point 2** – Southeast corner of the Administration Building paralleling East Road.
- **Muster Point 3** – Northwest of the Fire and Safety Building adjacent to East Road.
- **Muster Point 4** – Contractors Offices area adjacent to Evacuation Assembly Area 2
- **EAA 1** – Ammonia Gatehouse Northern side of the Complex along the main exit route.
- **EAA 2** – Evacuation point on the south of ammonia plant / desalination plant along the main exit route of desalination plant.
- **EAA 3** – Evacuation point South Western side of Flare
- **EAA 4** – Evacuation point North of Natural Gas Knockout Drum

Each Muster Point has swipe card access, telephones and radios available for communications. The Muster Points also have first aid kits and fresh water supply.

Location of Muster Points and Evacuation Assembly Areas are shown/listed in Appendices D & I.



20.2 Technical Ammonium Nitrate (TAN) Plant

The Muster Buildings and Evacuation Assembly Areas at the TAN Plant are as follows:

- **Muster Building 5** – TAN Control Room.
- **Muster Building 6** – The Security and Emergency Centre
- **Muster Building 7 – The Administration Building**
- **EAA 5** – Evacuation Assembly Area near the Security and Emergency Centre
- **EAA 6** – Evacuation Assembly Area in the North-East corner of the plant.

Each Refuge Building is used as a muster point and has swipe card access, telephones and radios available for communications. The Refuges also have first aid kits and fresh water supply.

Location of Muster Points and Evacuation Assembly Areas are shown/listed in Appendices D & I.

The evacuation assembly areas have been located in accordance to table 4.1 in the Safe Storage of Ammonium Nitrate – Code of Practice.

Location of Muster Points and Evacuation Assembly Areas are shown/listed in Appendices D & I

20.3 TAN Remediation Project

For the duration of the TAN Remediation Project including commissioning phase of the TAN Remediation Project additional muster buildings and evacuation assembly areas have been provided as follows

- **Muster Building 8** – TAN Remediation Project Office Conference Room (western flank of the building)
- **Muster Building 9a, 9b, 9c** – East of Transporter Workshop
- **EAA 7** – Northern side of the Remediation Project Office Entry/Exit gate
- **EAA 6** – Evacuation Assembly Point near the North-East corner of the plant

For the duration of the construction phase of the TAN Remediation Project additional muster buildings and evacuation assembly areas have been provided as follows

- **Muster Buildings 10a & 10b** – Between Unit 35 and TAN Bulk Storage
- **Muster Buildings 11a & 11b** – Laydown area east of unit 32

Location of Muster Points and Evacuation Assembly Areas are shown/listed in Appendices D & I



20.4 Off-Site Evacuation Assembly Area

The Off-Site Evacuation Assembly Area has been nominated as the Woodside Visitor Centre on Burrup Peninsula Road. Evacuation will depend on prevailing winds at the time and the decision will be made by the SRT Leader.



21 **Protective Equipment**

Protective equipment is provided at each plant and at the ship loading facility to enable personnel to escape during an emergency, to enable rescue personnel to assist injured personnel and to operate critical items of the plant in order to control the emergency.

A list of fire protection equipment which is located at each plant and the ship loading facility is contained in Appendix C.

A list of protective and emergency equipment available on site is contained in Appendix G.



22 First Aid & Medical Facilities

First aid kits, safety showers and eyewash stations are provided at strategic locations throughout each plant and at the ship loading facility.

First aid will be provided by a qualified ESO 24 hours a day. Support may be provided to the ESO by other senior first aid qualified Yara Pilbara personnel on site.

A site ambulance equipped with appropriate first aid supplies is located at the Emergency Centre. This ambulance will be used to transport sick and injured personnel to the hospital, where transportation to hospital is time critical.

The nearest external medical facilities are located in Karratha at Karratha Health Campus I approximately 20 km from the plant.

A list of first aid equipment is found in Appendix H.



23

Chemical Spill Kits

Chemical Spill Kits are available on each plant and are contained in appropriately marked wheelie bins. Each wheelie bin contains coveralls, a number of chemical absorbent materials, rubber gloves, goggles and other associated materials and equipment to assist in the clean-up of small spills.

The fire tender has further supporting equipment to assist in larger or more toxic chemical spill situations. The fire tender also contains required PPE.

Disposal of spill clean-up material (including spent / used absorbent) must comply with the Waste Management Standard within the OEMP. Liaise with HESQ for advice.

Yara Pilbara has in place the Operations Hazardous Materials Management Procedures (OHMP) - 250-508-PRO-BFP-0004, 250-508-PRO-BFP-0029 & 250-508-PRO-BFP-0041 which specifies the response required to minimise environmental impacts of the use of hazardous materials. This procedure links to the overall Operations Environmental Management Plan (OEMP) - 200-200-PLN-BFP-0008 and the objectives of the procedure are to contain the spill of hazardous materials and minimise the potential for groundwater and surface water contamination or risk to public health (and safety).



24 Gas Monitors

24.1 Hand Held Gas Monitors

Yara Pilbara has hand held gas monitors, which measure numerous gases (NH_3 , Cl_2 , LEL, O_2 , CO , NO_x and H_2S). The hand held gas monitors are able to give quick and accurate gas readings in emergency situations. The hand held monitors are located in the Control Room at each plant.

Operations personnel have been trained in the use of hand held gas monitors.

The Emergency Response Team have their own gas monitor and pump in the fire tender.

24.2 Fixed Plant Gas Monitors

24.2.1 Ammonia Plant Control Room

The following inputs from the field feed to the Ammonia Plant Control Room

- Gas (methane) detectors x 2;
- Ammonia detectors x 18; and
- Fire detectors x 10.

Fixed gas monitors are strategically mounted in locations in the field where there is a possibility of a release of gas or fire. The operator in the Ammonia Plant Control Room is alerted by an alarm upon activation of the detectors. The Control Room Operator will send the respective Field Operator to investigate alarm activations.

24.2.2 Technical Ammonium Nitrate (TAN) Plant Control Room

The following inputs from the field feed to the TAN Plant Control Room

- Ammonia detectors
- Hydrogen detectors
- NO_x detectors
- N_2O detectors;
- Flame detectors; and
- Smoke, thermal and laser detectors

The fixed detectors are strategically mounted in locations in the field. The operator in the TAN Plant Control Room is alerted upon activation of the detectors. The Control Room Operator will send the respective Field Operator to investigate alarm activations.



25 Site Ingress / Egress

25.1 Common to both Ammonia and TAN Plant

The main access to both Plants is from Village Road which runs off Burrup Peninsula Road.

There is a Security Gatehouse with boom gates to control ingress and egress of vehicles and personnel. To avoid entry of unwanted vehicles and personnel from outside, during emergency situations, the boom gates will be monitored by Security Officers when the emergency siren is sounded.

The Security Gatehouse is manned 24 hours a day by Yara Pilbara Security.

During a major incident, Security staff will assist the Police if required.

A secondary access road to both plants is a dirt road that runs off Burrup Peninsula Road to the Water Corporation Desalination Plant. There are keys on both sides of the gates in break glass key boxes.

25.2 Ammonia Plant Only

There is a third access road to the Ammonia Plant located south of the Quadrant Energy Skid for the Natural Gas Pipeline. This can be used, if required, as an alternate entry or exit point to the Ammonia Plant if the other access points are inaccessible.



26 Off-Site Migratory Action

Yara Pilbara is an active member of the Burrup Industries Emergency Management Committee (BIEMC) and supports other industries if mutual aid is required.

This support is also reciprocated and emergency equipment and resources can be called upon from the BIEMC neighbours if required.

DFES will assist in coordinating neighbour mutual aid through a signed Memorandum of Understanding.



27 Training & Competency

Yara Pilbara has competent people to deal with emergencies.

The content of this Emergency Management Plan will be presented and explained to all Yara Pilbara employees.

Attendance at training courses is recorded and maintained for audit purposes and to ensure relevant people are receiving training. The HESQ Manager, Training Coordinator, Security & ER Coordinator & ESO's are responsible for ensuring that the required training is provided to the employees and all training records are updated on regular basis.

Yara Pilbara has personnel trained in the following areas:

- First Aid: All ERT personnel are trained in First Aid and ESO's have a minimum of Certificate IV in Health Care (Ambulance) and will be located in the Emergency Centre. The facility also has 24 hour first aid coverage by trained Emergency Services Officers. There will be a minimum of four first aid trained personnel on each shift.
- Fire Fighting: Contact information for personnel trained, in firefighting and rescue procedures is located in the SRT Control Rooms, Administration Building and the Emergency Centre.
- All operational and production personnel are trained and active members of the ERT and there will be an appropriate number of employees trained in relevant Emergency Response capabilities on each shift.
- All employees, contractors and visitors shall be trained in generic emergency procedures and escape apparatus applicable to their work area during induction.

Refresher training will be scheduled for all people to maintain their competencies as depicted by the Yara Pilbara Training and Development System. Refresher training for ERT personnel will be on-going as required to maintain Currency of Certification.



The HESQ Manager / Security & ER Coordinator ,ESO's and Training Coordinator will ensure training is provided for the following positions:

Position	Competencies Required
SHIFT SUPERINTENDENT (Incident Controller)	<ul style="list-style-type: none"> • Site Specific Intermediate Fire Fighting • Self-Contained Breathing Apparatus • Site Specific Hazmat Overview • Site Specific Site Fire Tender & Pump • Site Specific Incident Management System • Senior First Aid • EMQnet Message Manager Training
EMERGENCY RESPONSE TEAM LEADER	<ul style="list-style-type: none"> • Site Specific Intermediate Fire Fighting • Site Specific Incident Management System • Self-Contained Breathing Apparatus • Site Specific Hazmat Overview • Site Specific Site Fire Tender & Pump • Senior First Aid
EMERGENCY RESPONSE TEAM	<ul style="list-style-type: none"> • Site Specific Intermediate Fire Fighting • Self-Contained Breathing Apparatus • Site Specific Hazmat Overview • Site Specific Site Fire Tender & Pump • Senior First Aid
EMERGENCY SERVICES OFFICER	<ul style="list-style-type: none"> • Certificate III in Mine Emergency Response & Rescue • Certificate IV in Health Care (Ambulance) • Site Specific Site Fire Tender & Pump
SECURITY & ER COORDINATOR	<ul style="list-style-type: none"> • Certificate III in Mine Emergency Response & Rescue • Certificate IV in Health Care (Ambulance) • Site Specific Site Fire Tender & Pump • EMQnet Message Manager Training • Certificate IV in Security and Risk Management • Certificate IV in Public Safety (Firefighting Supervision)



28 Exercises, Testing, Auditing and Review

A schedule of planned simulated emergencies to physically test the emergency management system is in place.

Regular exercises will be scheduled accordingly by the Emergency Response Coordinator. These include:

- Site Emergency Muster drill (monthly)
- Level 1 ERT Pre-Incident Plan Field Exercises (4 x per annum).
- Level 1 / 2 Maritime Security Drills with ERT/Security (4 per annum).
- Level 2 Desk Top Exercise (1 x per annum).
- Level 3 Full Scale Mock Exercise (1 x per annum).
 - Inclusion of external emergency services as appropriate

As many persons as practical will be involved in simulated emergency exercises as a refresher program.

These events are to be monitored to record system deficiencies so that improvements may be implemented.

Every significant emergency response event is formally reviewed to identify system deficiencies. Results of all audits and reviews will be communicated to all employees.

Internal / external audits and self-assessments will be conducted on a regular basis to monitor compliance with the requirements of the Emergency Response standard and procedures, in addition to equipment sufficiency and application. The objectives of the audits are to test the effectiveness of the emergency response and as part of the continuous development process, to identify and make recommendations for further improvement.



29 Incident Investigations

The Plant Manager and the HESQ Manager have the following responsibilities in relation to incident investigations:

- To organise an internal or independent investigation of incidents that occur;
- To assist external agencies in the event of a statutory investigation; and
- To ensure that all evidence is preserved when it is likely that a statutory investigation will be conducted.

All employees of Yara Pilbara are responsible for reporting all incidents to their supervisor. This process is outlined in the Yara Pilbara Hazard, Incident and Accident Investigation and Reporting Procedure.



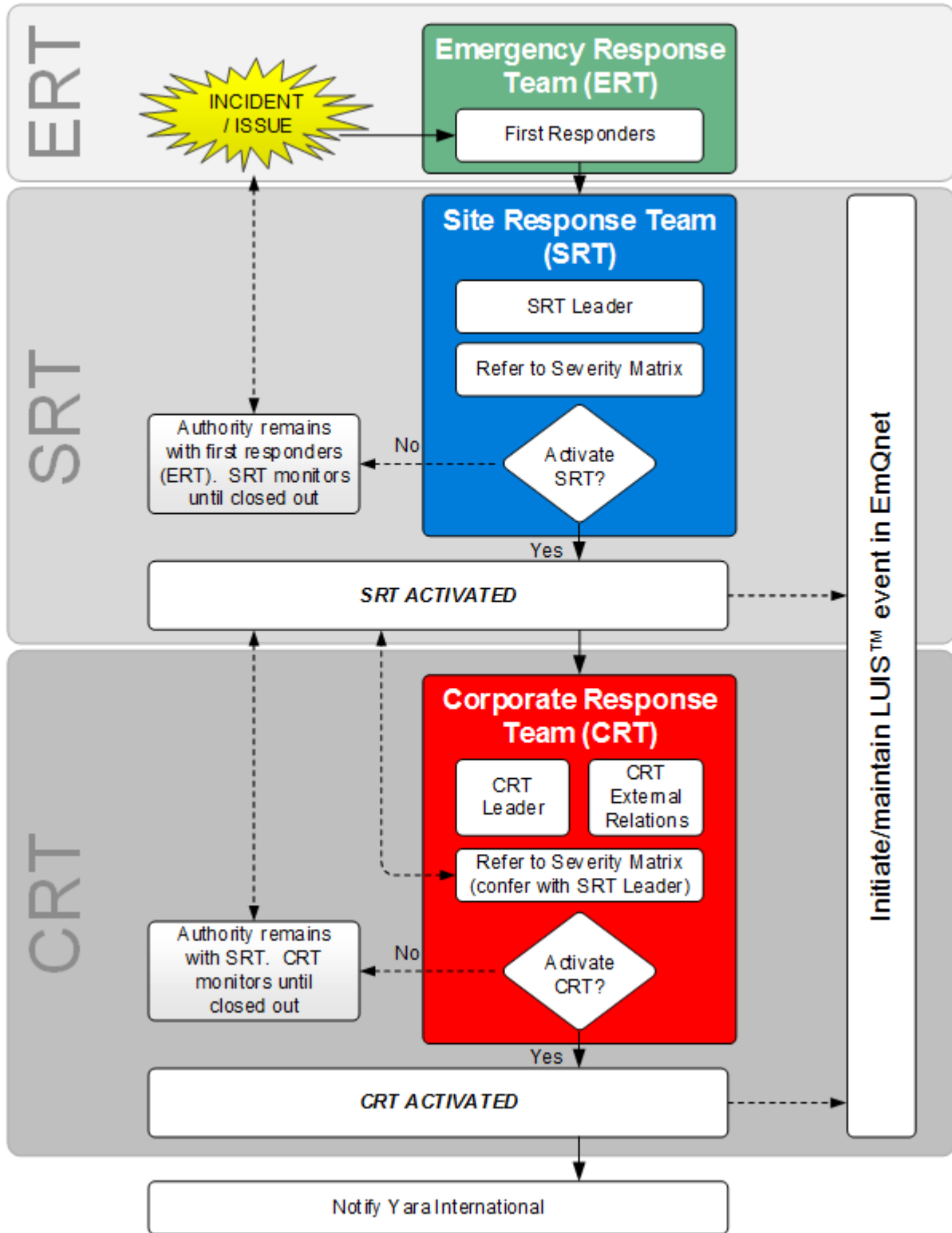
30 Debriefing

The Plant Manager and the HESQ Manager are responsible to ensure a debriefing of all personnel involved in the emergency, and that the debriefing takes place within a reasonable time following the stand-down phase.

“Hot” debrief conducted for all personnel involved and immediately after the incident conducted by the ERT TL.

Incident De briefing to all ERT Team members once all equipment was made up and the Emergency Response capabilities restored by the IC.

APPENDIX A – Emergency Notification Flow Chart





APPENDIX B – Pre Incident Plans

Plan No	Pre-Incident Plan No.
Flammable Releases	
1.	250-500-PLN-YPF-0003.1 Natural Gas Release
2.	250-500-PLN-YPF-0003.2 Process Stream (Flammable Gas) Release
3.	250-500-PLN-YPF-0003.22. Non Process Catalyst Fire
Toxic Releases	
4.	250-500-PLN-YPF-0003.3 Ammonia Release (Export Pipeline, TAN and/or Ammonia Plant)
5.	Deleted
6.	250-500-PLN-YPF-0003.5 Ammonia Release (Ship Loading & Jetty)
Others	
7.	250-500-PLN-YPF-0003.6 Major Injury or Fatality
8.	250-500-PLN-YPF-0003.7 Non-Process Fire
9.	250-500-PLN-YPF-0003.8 Extreme Weather
10.	250-500-PLN-YPF-0003.9 Bomb or Terrorist Threat
11.	250-500-PLN-YPF-0003.10 Substation, Transformer Bay, Generator or Crude Oil Tank Fire
12.	250-500-PLN-YPF-0003.11 Ammonium Nitrate Prills Fire
13.	250-500-PLN-YPF-0003.12 ANSOL Incident
14.	250-500-PLN-YPF-0003.13 Nitric Acid Solution Incident
15.	250-500-PLN-YPF-0003.14 NOx Gas Incident
16.	250-500-PLN-YPF-0003.15 Bush Fire **No. reserved only**
17.	250-500-PLN-YPF-0003.16 Vehicle Interaction / Roll Over **No. reserved only**
18.	250-500-PLN-YPF-0003.17 Security Breach
19.	250-500-PLN-YPF-003.18 Other Environmental Incident **No. reserved only**
20.	
21.	250-500-PLN-YPF-003.21 Earthquake & Flooding Contingency Planning

**APPENDIX C – Location of Emergency Fire Equipment**

Location	Fire Protection Equipment at Plant
Ammonia Plant - General	
Firewater Storage Tank	There is a designated Firewater Tank, 2005-MF which has a capacity of: Effective Volume 4,971 m ³ and nominal Volume of 5,269 m ³ . Desalinated Water tank of 6376 m ³ capacity is connected with main fire water tank to provide additional emergency water.
Firewater pump	To pump discharge pressure of 860 kPa with 700 kPa at the hydraulically remotest point of the fire water network. Main Fire Water pump is provided with automatic starting facilities as per NFPA-20. If the pressure in the pump discharge header falls below 400 kPa the electric pump will start. Firewater pump start buttons are located in the Fire Control Room. Pumps available are one electric and one diesel driven pump, 570 m ³ /h, discharge pressure 860 kPa, diff. head 88 m.
Ring Main	Distributed throughout the plant by a network looped around the plant so that all hydrants will have source of water at least from two directions. Isolating valves are located in the system to permit fire water to reach any particular area regardless of a failure in any single line.
Fire Tenders	1 x Scania P310 Fire Tender with 1500ltr capacity water tank delivering 4,300ltr/min with a foam capacity of 300 litres.
Hydrants	Fire Hydrants: - (AS 2419.1-1994) – Wet Barrel tube type, each fitted with 2x 2 ½ inch hose connections, 1x 4 inch hose connection and 1x 3 inch connection for monitor. Hydrants are located such that possible damage by road traffic is avoided.



Location	Fire Protection Equipment at Plant
Ammonia Plant - Process Plant	
Inside Battery Limits (ISBL)	4x Monitors at Strategic locations. Each monitor is rated for 120 m ³ /hr capacity at 7 bar supply pressure. Monitors are fitted with an isolation valve and adjustable stream nozzle. The maximum water jet throw is 60 m horizontally at 45° trajectory and 28 m vertically in still air at 7 bar pressure. Monitors have traversing mechanism to give 360° rotation in either direction of the horizontal plane and 125° in the vertical plane (+80° to 45°) with separate swivels through a quick acting handle bar. For unattended operation of the monitor at the desired angles, suitable locks or swivel joints are provided. One handle for traversing both the horizontal and vertical rotation of the monitor is provided on the monitor body.
Ammonia Plant - Ammonia and Diesel Storage	
Ammonia Storage	4x Monitors at strategic locations. Each monitor is rated for 120 m ³ /hr capacity at 7 bar supply pressure. Monitors are fitted with isolation valve and adjustable stream nozzle. The maximum water jet throws is 60 m horizontally at 45° trajectory and 28 m vertically in still air at 7 bar pressure. Monitors have traversing mechanism to give 360 degree rotation in either direction of the horizontal plane and 125° in the vertical plane (+80° to 45°) with separate swivels through a quick acting handle bar. For unattended operation of the monitor at the desired angles, suitable locks or swivel joints are provided. One handle for traversing both the horizontal and vertical rotation of the monitor is provided on the monitor body.
Diesel Storage	Fire hoses & 50 kg foam extinguisher, wheel mounted type, suitable for Class A B rated fires (flammable liquid fires)
Ammonia Plant - Utilities	
Cooling Tower	Reinforced rubber lined hose, 30 m long, 64 mm diameter complete with BIC couplings.
Utility Units	Reinforced rubber lined hose, 30 m long, 64 mm diameter complete with BIC couplings.
Sub-stations	Reinforced rubber lined hose, 30 m long, 64 mm diameter complete with BIC couplings.
Buildings	Reinforced rubber lined hose, 30 m long, 64 mm diameter complete with BIC couplings. 9kg Dry Powder and CO ₂ portable fire extinguishers.
Control Room	FM-200 Gaseous Suppression System is provided for protection of cable basement below the flooding floor. The system is operated both automatically upon signal from smoke detectors and manually at the gas cylinder bank. The system includes 100% spare cylinders inline.



Location	Fire Protection Equipment at Plant
<p>Control Room, Electrical Substation</p>	<p>An aspirating smoke detection system with an air sampling system that draws air from panels in Control Room, Electrical Sub-Station and other enclosures with high smoke development risk.</p> <p>Smoke Detectors are 'Single Zone Voting' for alarm purpose only and 'Cross Zone Voting' for alarm and automatic activation of connected fire suppression system.</p> <p>Automatic Heat Detectors; 'Single Zone Voting' Heat Detectors are provided for Alarm purpose only.</p> <p>Reinforced rubber lined hose, 30 m long, 63 mm diameter complete with hermaphrodite couplings.</p> <p>9kg Dry Powder and CO₂ extinguishers.</p>
<p>Warehouse</p>	<p>Reinforced rubber lined hose, 30 m long, 64 mm diameter complete with hermaphrodite couplings.</p> <p>9kg Dry Powder and CO₂ extinguishers.</p>
<p>Administration</p>	<p>Reinforced Rubber Lined hose, 30 m long, 64 mm diameter complete with hermaphrodite coupling.</p> <p>9kg Dry Powder and CO₂ portable fire extinguishers.</p>
<p>Export Pipeline</p>	<p>No firefighting equipment is provided along the pipeline. The inspection vehicle will carry 4.5kg dry powder and CO₂ portable fire extinguishers.</p>
<p>Ammonia Plant Ship Loading Facilities</p>	<p>Yara Pilbara's firefighting system uses PPA's existing 8 inch fire water main and ties in an 8 inch line to this main header. The firewater is supplied using 2x 500 m³ firewater tanks located in the PPA area. PPA have guaranteed a supply of firewater for up to 4 hours at a rate of 72 m³/hr in the main firewater header. This can be refilled within 6 hours. This is as per the requirement of Australian Standards AS 2419.</p> <p>The Bulk Liquids Berth constitutes of 3x Fire Hydrants (with provision for 1x more in the future) and 2x Water Curtain Nozzles (Fogging Nozzles). The fire hydrants are installed for emergency response teams to fight any jetty related incidents. PPA currently have an arrangement with DFES who will be called upon to tackle any jetty related fires.</p> <p>In the event of an ammonia vapour release, the water curtain nozzles will be activated to suppress ammonia vapour at the berth. The minimum water jet throw for the nozzles is 31 m horizontally and 10 m vertically, in still air at 8 bar pressure. The water curtain nozzles are rated as follows:</p> <p>2 x 2.5 inch nozzles at 72 m³/hr and 8 bar pressure each (to be run at 45 m³/hr each).</p> <p>The pressure to the fogging nozzles is supplied via a booster pump, located between sections T7 and T8 on the jetty.</p>



Location	Fire Protection Equipment at Plant
TAN Plant - General	
Firewater Storage Tank	<p>Two (2) desalinated water storage tanks (93-FB-001A/B) are used to store fire-fighting water. The tanks also supply desalinated water to all of the users in the process and utility units in the complex.</p> <p>Each tank has a capacity of 1,038 m³ and 600 m³ of that capacity will be dedicated for fire-fighting.</p> <p>As shared tanks, the connection points to the TAN Plant utilities from the tanks are located above the dedicated fire-fighting water level and thus cannot draw water from it.</p> <p>Desalinated water is fed into these tanks from the Ammonia Plant at a maximum of 50 m³/h. The tank is topped up automatically when the water level drops below the allowable limit. The tanks are capable of providing firewater for up to 4 hours, not including the automatic fill from Ammonia Plant.</p>
Firewater Pump	<p>The main firefighting centrifugal pumps (91-GA-002A/B) have a 350 m³/h capacity and are capable of delivering water at 9.8 Bar. The main pump running is electrically driven and the other is a spare diesel pump.</p> <p>A centrifugal jockey pump with a 27 m³/h capacity is installed to maintain a constant pressure in the ring main at 9.8 Bar.</p>
Ring Main	<p>The site uses multiple interconnected ring main systems. All of the ring mains have 12 inch piping with some 8 inch connections. The majority of piping is underground with some above ground piping using the same pipe racks as the process pipework.</p> <p>Block valves are installed at sections of the distribution system to enable isolation for maintenance. Block valves are butterfly valves with position indication if underground.</p>
Hydrants	<p>Fire hydrants installed in accordance with the Australian Standard AS 2419.1 (Fire Hydrant Installations - System design, installation and commissioning).</p> <p>Fire hydrants are located along the ring main and the normal distance between above ground hydrants will be approximately 60 m. Hydrants have full coverage of the site.</p>
Water Mist System	<p>A water mist system is installed in the NOx compressor shelter. The water mist system shall be in accordance with Australian Standard AS 4587 (Water Mist Fire Protection Systems – System Design, Installation and Commissioning).</p>



Location	Fire Protection Equipment at Plant
TAN Pant - General	
Fire hose reels	<p>Fire hose reels are installed in accordance with Australian Standard AS / NZS 1221 (Fire Hose Reels). Hose reels are equipped with a 30 m hose with a diameter of 25 mm. Nozzles have a capacity of 197 L/min at 3.5 bar inlet pressure. Hose reels have a working range between 1.75 and 10.5 bar inlet pressure.</p> <p>Fire hose reels are flat wall mounted single direction type. Fire hose reels are located at areas with fire hazards, such as the chemical store, compressor shelter, TAN bag storage and bulk TAN storage.</p>
Fire Monitors	<p>Fire monitors are provided at strategic locations near and within fire hazardous areas. Fire water monitors are assumed to have a capacity of 1,325 L/min at 7 bar inlet pressure.</p> <p>Monitors are approximately at ground level and the minimum distance between a monitor and protected structure is 15 m. Fire monitors are located at:</p> <ul style="list-style-type: none">• Two (2) in Unit 12 process area;• Three (3) in Unit 32 process area; and• Seven (7) in Bulk TAN storage building.
Dry riser / columns	<p>A dry riser is used at the prilling tower.</p> <p>A dry column or dry ring main is used in the bag storage.</p> <p>The dry riser and column has Siamese fittings for fire inlet and outlet connection points. The inlet allows for connection with a fire truck for supply of fire water. The outlet connections allow the connection of a fire hose reel or fire monitor.</p>
Fire Extinguishers	<p>Fire extinguishers located on the site include portable / wheeled dry chemical type and portable CO₂ extinguishers in accordance with Australian Standard AS 2444 (Portable Fire Extinguishers and Fire Blankets – Selection and Location). Wheeled dry chemical fire extinguishers are located at points with higher fire risks such as oil cooled transformers, oil units of compressors or the chemical store.</p> <p>Portable fire extinguishers act as a first line of defence to cope with small fires.</p>



Location	Fire Protection Equipment at Plant
TAN Plant - Nitrate Production & Storage Conveyor galleries	
Dry Deluge Fire Protection System	<p>Conveyor galleries to/ from ammonium nitrate production or storage buildings have a dry deluge fire protection system.</p> <p>The deluge system consists of Six (6) spray nozzles which are initiated by two (2) smoke and one (1) thermal detector on each side. Fire barriers include protection of flammable construction material of at least 3 metres on both sides of barrier. The conveyor belt stops automatically if the F&G system receives a signal from 2 out of 6 detectors. Deluge is activated manually from the Control Room.</p> <p>A deluge valve is located near the water spray system and will have a pressure switch for indication of water flow operation.</p>



Location	Fire Protection Equipment at Plant	
TAN Plant – Nitric Acid Plant (Unit 12)		
Hydrogen Cylinders store	Detection / Alarms	2x Hydrogen detectors above the cylinders
	Protection / Mitigation	Hose Reels Hydrants Fire monitors
Compressors building	Detection / Alarms	Detectors (NOx, NH ₃ multicriteria & smoke detectors for duct) Analog and digital signals junction boxes Beacons Fire hand switches Fire horns Gas horn
	Protection / Mitigation	Water mist system Hose Reels Hydrants Fire monitors Dry chemical extinguisher (portable)
TAN Plant – (Unit 32)		
TAN plant (coating drum)	Detection / Alarms	Detectors (smoke & thermal) Analog & digital signals junction boxes Beacons Fire hand switches Fire horns
	Protection / Mitigation	Hose reels Dry chemical extinguisher (portable) Deluge system (in the conveyor 72-PC-001)



Location	Fire Protection Equipment at Plant	
TAN plant (coating storage area)	Detection/ Alarms	Beacons Fire horns
	Protection/ Mitigation	Hose Reels Hydrants Fire monitors
Conveyors inside Unit 32	Detection/ Alarms	Fire hand switches
	Protection/ Mitigation	Hose reels Dry chemical extinguisher (portable)
Prilling towers	Detection/ Alarms	Fire hand switches Beacons Analog & digital signals junction boxes CCTV
	Protection/ Mitigation	Dry riser Hose reels (low level) Hydrants (low level) Dry chemical extinguisher (portable) Fire Monitors
Refrigeration compressor	Detection/ Alarms	Four (4) NH ₃ detectors Fire hand switches Beacons
	Protection/ Mitigation	Dry chemical extinguisher (portable) Hydrants Hose reels Fire Monitors
Shift Laboratory	Detection/ Alarms	Detectors (NO _x , NH ₃ , smoke detectors for duct) Fire hand switches Fire horns Beacons Analog and digital signals junction boxes
	Protection/ Mitigation	Dry chemical extinguisher (portable) Trip of air supply system including closing of gas tight damper on detection of explosive/ toxic gas at the air intake



Location		Fire Protection Equipment at Plant
TAN Plant – Substations		
Substation I	Detection/ Alarms	Gas detection (NH ₃ and NO) air intake Fire hand switches Fire horns with beacons Laser Smoke Detectors
	Protection/ Mitigation	Dry chemical & CO ₂ extinguishers (portable) Walls, floor and roof are fire resistant (1hr duration) Cable tunnels and transformer rooms are 2 hours fire resistant
Substation II	Detection/ Alarms	Gas detection (NH ₃ and NO) air intake Fire hand switches Fire horns with beacons Laser Smoke Detectors
	Protection/ Mitigation	Dry chemical & CO ₂ extinguishers (portable) Walls, floor and roof are fire resistant (1hr duration) Cable tunnels and transformer rooms are 2 hours fire resistant
TAN Plant – Ammonium Nitrate Solution and Off-Spec Treatment (Unit 35)		
Off-Spec Treatment Unit	Detection/ Alarms	Fire hand switches Beacons
	Protection/ Mitigation	Hose Reels Hydrants Dry chemical extinguisher (portable)
ANSOL Loading Area	Detection/ Alarms	Fire hand switch
	Protection/ Mitigation	Hydrants Hose reels inside the bag storage
Conveyor	Detection/ Alarms	Fire hand switch
	Protection/ Mitigation	Hydrants Hose reels



Location	Fire Protection Equipment at Plant	
TAN Plant – TAN Bulk Storage (Unit 71)		
TAN Bulk Storage	Detection/ Alarms	Detectors (NOx, N ₂ O, NH ₃ , smoke detectors for duct, VESDA) Fire hand switches Beacons Analog and digital signals junction boxes Solenoid valve junction box
	Protection/ Mitigation	Hose reels Hydrants Fire monitors Spray nozzles (deluge valve) and fire walls at both ends of 72-PC001 Dedicated parking area (outside bulk storage) for front loaders. Parking area is equipped with sprinkler nozzles and fire walls Dry chemical extinguishers (portable & wheeled) Trip of air supply system including closing of gas tight damper on detection of explosive/ toxic gas at the air inlet
TAN Plant – Conveyor Galleries		
Unit 32 to Unit 72	Detection/ Alarms	Conveyor leaving U32 and entering U72: Smoke and thermal heat detectors on each side of the fire walls In case of fire alarm the conveyor belt is stopped automatically if 2 of 6 detection signals are activated. The deluge can be activated manually from the Control Room and locally. Fire hand switches Beacons Analog & digital signals junction boxes Solenoid valve junction box
	Protection/ Mitigation	Spray nozzles (deluge valve) and fire walls at both ends of 72-PC001 Hydrants Fire monitor in U32



Location	Fire Protection Equipment at Plant	
Unit 72 to Unit 73	Detection/ Alarms	<p>Conveyor leaving U72 and entering U73:</p> <p>Detectors (smoke & thermal) on each side of fire walls.</p> <p>In case of fire alarm the conveyor belt is stopped automatically if 2 of 6 detection signals are activated. The deluge can be activated manually from the Control Room and locally. Fire hand switch</p> <p>Analog & digital signals junction boxes</p>
	Protection/ Mitigation	<p>Hose reels</p> <p>Hydrants</p> <p>Fire monitors</p> <p>Spray nozzles (deluge valve) and fire walls in both ends of conveyor 72-PC-002</p> <p>Dry chemical extinguishers (portable & wheeled)</p>
TAN Plant – TAN Bagging Unit (Unit 73)		
TAN Bag Storage	Detection/ Alarms	<p>Detectors (smoke)</p> <p>Fire hand switches</p> <p>Beacons</p> <p>Fire horns</p>
	Protection/ Mitigation	<p>Hose reels</p> <p>Hydrants</p> <p>Dry riser and inner ring main with additional discharged points (portable fire monitors, hoses, etc.) supplied by a fire truck</p> <p>Portable and wheeled dry chemical extinguishers</p> <p>Dedicated parking area (outside bag storage) for front loaders. Parking equipped with sprinkler nozzles and fire walls.</p>
TAN Plant –Bag Storage (Unit 74)		
Empty Bag Storage	Detection/ Alarms	<p>Smoke detectors</p> <p>Fire hand switches</p> <p>Beacons</p> <p>Fire horns</p>
	Protection/ Mitigation	<p>Hose reels</p> <p>Hydrants</p> <p>Dry chemical extinguisher (portable)</p>



Location	Fire Protection Equipment at Plant	
TAN Plant – Emergency Fire Pumps Shelter (Units 91 & 93)		
Emergency Fire Pumps Shelter	Detection/ Alarms	Fire hand switch Fire horn Beacon Junction box
	Protection/ Mitigation	Hose reels Hydrants Sprinkler nozzles using the other pump
TAN Plant – Diesel Storage		
Diesel storage tank and unloading bay	Detection/ Alarms	Nil
	Protection/ Mitigation	Fire extinguisher Hydrants Double walled tank (self bunded) Foam available via the Ammonia Plant Fire Tender
Diesel emergency generator and tank	Detection/ Alarms	Fire Hand Switch
	Protection/ Mitigation	Fire extinguisher Hydrants Hose Reels Double walled tank (self bunded)
TAN Plant – Cooling Tower (Unit 87)		
Cooling Tower	Detection/ Alarms	Fire Hand Switch Beacons Digitals signals junction boxes
	Protection/ Mitigation	Hose Reels Hydrants



Location	Fire Protection Equipment at Plant	
TAN Plant – Utilities		
Offices	Detection/ Alarms	NH ₃ and NO _x detectors in ducting Smoke detectors Fire hand switches Fire horns Beacons Analog & digital signals junction boxes
	Protection/ Mitigation	Hydrants (outside of the building) Dry chemical & CO ₂ extinguishers (portable) Trip of air supply system including closing of gas tight damper on detection of explosive/ toxic gas at the air inlet
Control Room Building	Detection/ Alarms	Detectors (NO _x , NH ₃ , smoke detectors, smoke detectors for duct) Fire hand switches Fire horns Beacons Analog & digital signals junction boxes
	Protection/ Mitigation	Hydrants Dry chemical & CO ₂ extinguishers (portable) Trip of air supply system including closing of gas tight damper on detection of explosive/ toxic gas at the air inlet
Chemical Store	Detection/ Alarms	Smoke detectors Fire hand switches Fire horns Beacons
	Protection/ Mitigation	Hydrant Hose reel Dry chemical extinguishers (portable & wheeled)
Spare Parts Building	Detection/ Alarms	Smoke detectors Fire hand switches Fire horns Beacons
	Protection/ Mitigation	Hose reel (in the chemical store) Dry chemical extinguishers (portable)



Location	Fire Protection Equipment at Plant	
Security Gate	Detection/ Alarms	Detectors (NOx, NH ₃ , smoke detectors, smoke detectors for duct) Fire hand switches Fire horns Beacons
	Protection/ Mitigation	Dry chemical & CO ₂ extinguishers (portable) Trip of air supply system including closing of gas tight damper on detection of explosive/toxic gas at the air inlet
Transporter Office	Detection/ Alarms	Detectors (NOx, NH ₃ , smoke detectors, smoke detectors for duct) Fire hand switches Fire horns Beacons
	Protection/ Mitigation	Trip of air supply system including closing of gas tight damper on detection of explosive/toxic gas at the air inlet Dry chemical extinguishers (portable)
Workshop Area	Detection/ Alarms	Fire hand switches Fire horns Beacons
	Protection/ Mitigation	Dry chemical extinguishers (portable & wheeled)



Location	Fire Protection Equipment at Plant
TAN Remediation Project Office	
Fire Extinguishers	<p>Fire extinguishers located on the site include portable dry chemical type and portable CO₂ extinguishers in accordance with Australian Standard AS 2444 (Portable Fire Extinguishers and Fire Blankets – Selection and Location). Two (2) Fire blankets.</p> <p>Portable fire extinguishers act as a first line of defence to cope with small fires.</p>
Hydrants	<p>Fire hydrants installed in accordance with the Australian Standard AS 2419.1 (Fire Hydrant Installations - System design, installation and commissioning).</p> <p>One Fire hydrant are located next to the Water storage facility.</p>
Firewater Storage Tank	<p>Two (2) clean water storage tanks (Temporary) are used to store fire-fighting water.</p> <p>Two (2) of these tanks has a capacity of 22 m³ dedicated for fire-fighting.</p> <p>These tanks can only be utilised as a last resort ,the nearest Hydrant that is feeding of TAN Site Main ring is 100 metres three (3) fire hose lengths away and should be utilised at all times.</p>
Detection/Alarms	<p>Beacons</p> <p>Fire hand switches</p> <p>Fire horns</p> <p>Gas horn</p>



Location	Fire Protection Equipment at Plant
Bulk Liquid Berth	
Ship loading Facilities	<p>Yara Pilbara’s firefighting system uses PPA’s existing 8 inch fire water main and ties in an 8 inch line to this main header. The firewater is supplied using 2x 500 m³ firewater tanks located in the PPA area. PPA have guaranteed a supply of firewater for up to 4 hours at a rate of 72 m³/hr in the main firewater header. This can be refilled within 6 hours. This is as per the requirement of Australian Standards AS 2419.</p> <p>The Bulk Liquids Berth constitutes of 3x Fire Hydrants (with provision for 1x more in the future) and 2x Water Curtain Nozzles (Fogging Nozzles). The fire hydrants are installed for emergency response teams to fight any jetty related incidents. PPA currently have an arrangement with DFES who will be called upon to tackle any jetty related fires.</p> <p>In the event of an ammonia vapour release, the water curtain nozzles will be activated to suppress ammonia vapour at the berth. The minimum water jet throw for the nozzles is 31 m horizontally and 10 m vertically, in still air at 8 bar pressure. The water curtain nozzles are rated as follows:</p> <p>2x 2.5 inch nozzles at 72 m³/hr and 8 bar pressure each (to be run at 45 m³/hr each).</p> <p>The pressure to the fogging nozzles will be supplied via a 1x 100% jacking pump, located between sections T7 and T8 on the jetty.</p>

Emergency Vehicles & First Aid Facilities	
Ammonia Plant & TAN Plant	
Emergency Vehicles	<p>Ambulance</p> <p>Fire Appliance - Scania P310 Fire Tender with 1500 L capacity water tank.</p>
First Aid Facilities	Emergency Centre

APPENDIX D – Overview of Plant Locations and Operations

Ammonia and TAN Plant Description

The plants are located within the King Bay and Hearson’s Cove Industrial Area on the Burrup Peninsula, in the Pilbara region of the North-West of Western Australia, (approximately 1,300 km north of Perth). The site is situated within a 72 hectare lease area. The location of the plants are shown below.

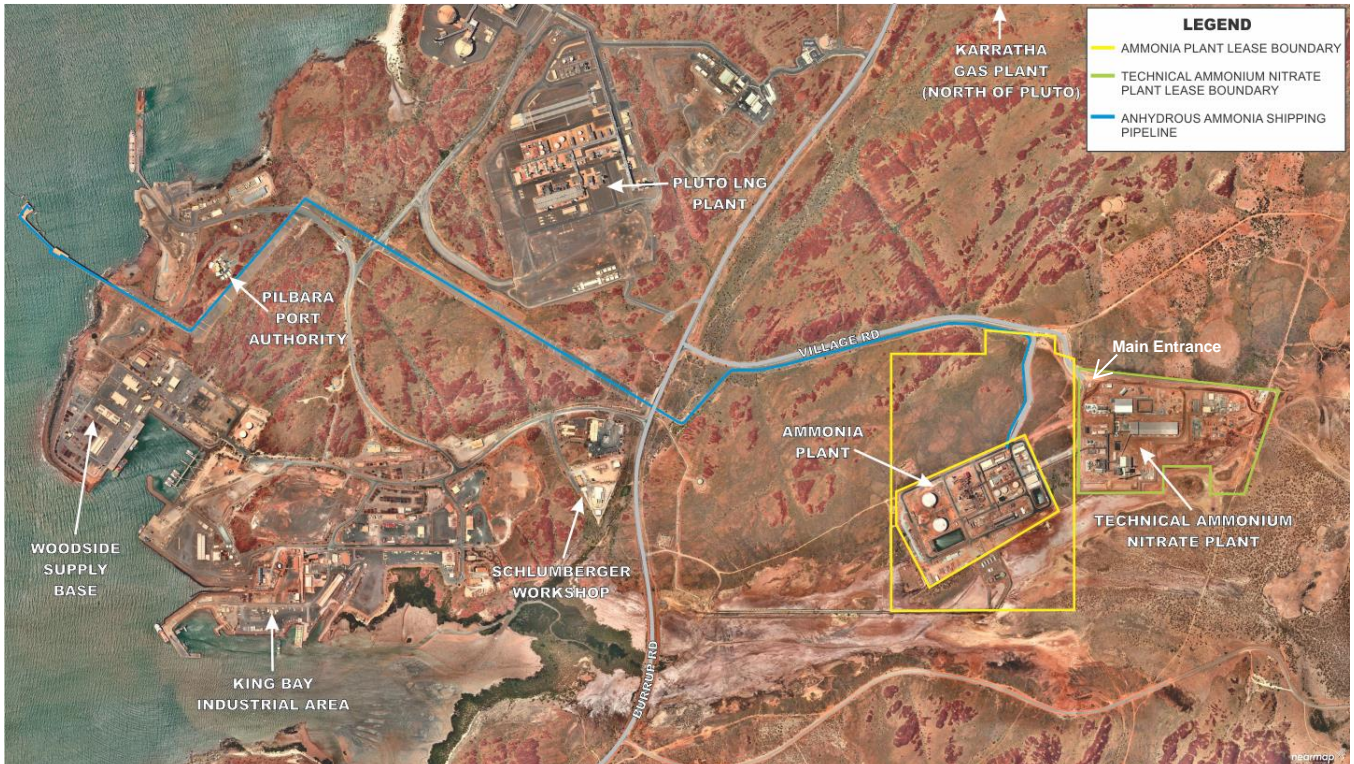
The Ammonia ship loading jetty is located at the DBLB. A 5.2 km long above ground ammonia pipeline transfers refrigerated liquid ammonia from the Ammonia plant to the jetty.

The Yara Pilbara Fertiliser Ltd (Yara Pilbara) Ammonia Plant is located at the Yara Pilbara Peninsula. The ammonia process is based on the KBR Purifier Process™, a low energy natural gas reforming process.

Feedstock for producing the ammonia is natural gas received from Santos Ltd at Varanus Island through a pipeline and Metering station.

The YPN site encompasses three process plants; nitric acid, ammonium nitrate solution and technical ammonium nitrate prills. The nitric acid and ammonium nitrate solution processes are well proven and based on technology licensed from Espindesa, Spain. The technical ammonium nitrate process for making porous prills is based on Yara technology operating in several plants.

Ammonia feedstock and utilities are delivered from YPF to YPN via pipelines.





Ammonia Plant Layout

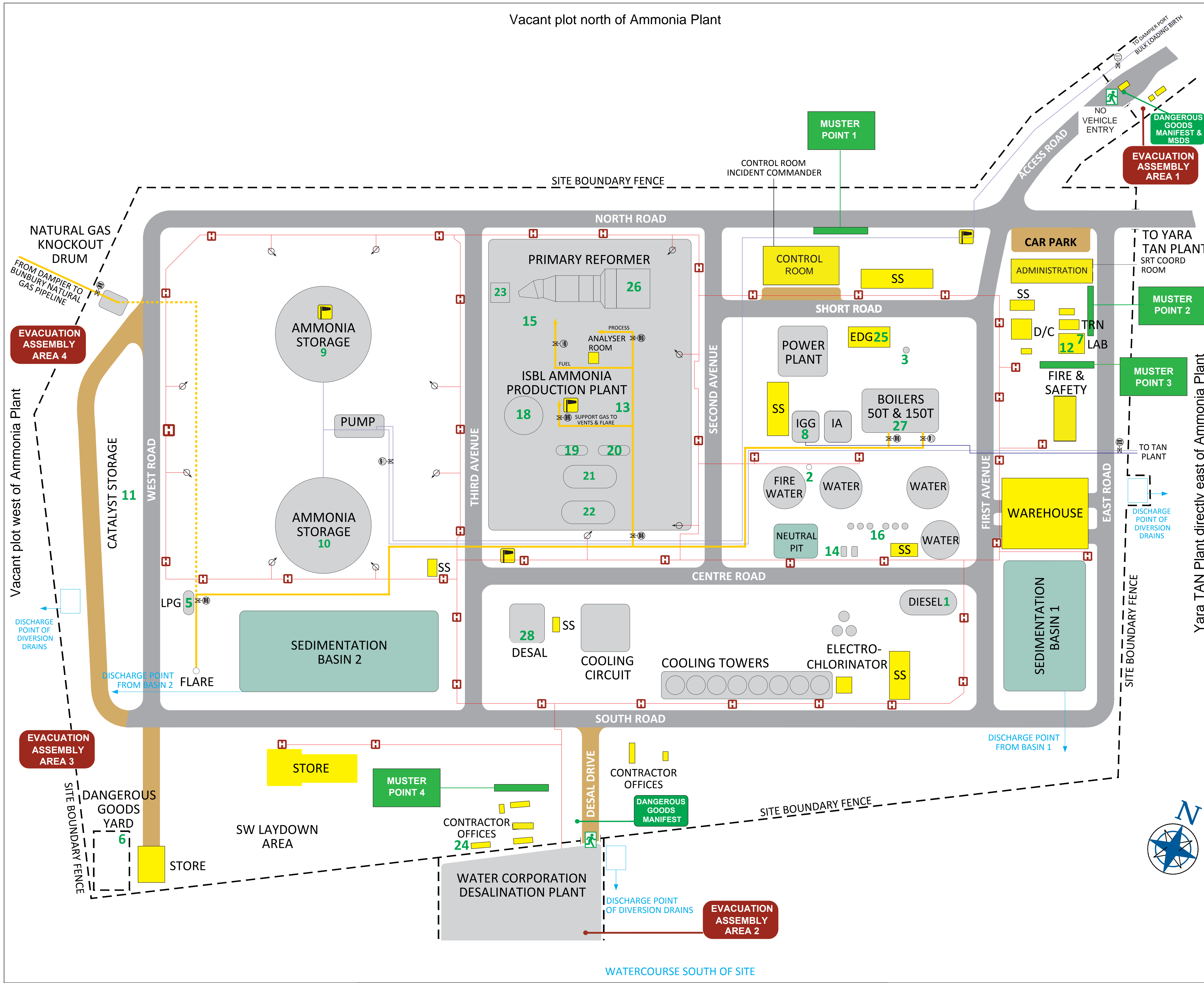
The layout of the Ammonia plant is shown below and comprises of:

- Administration Building, Laboratory, Training Room, Document Control, Warehouse and the Fire & Safety Building are located along the east boundary of plant to ensure easy access from the main gate (located at the North-East corner of the ammonia plant).
- Utility block, which houses Captive Power Plant, DM plant, Package Boilers, Emergency Generator etc. is located between ammonia unit and Warehouse/ Fire & Safety Building.
- Ammonia unit is located between the utility block and the ammonia storage area and is close to the cooling tower area. Primary reformer is located in the north side of the ammonia unit.
- Cooling tower and cooling water package is located on the south of ammonia unit and utility block.
- Ammonia Plant Control Room is located on the north of utility block and is close to the ammonia unit.
- Ammonia storage tanks are located along the plant west boundary. Ammonia storage flare is located in the South-West corner of the storage area.
- 4 x 40 person Refuge Chambers (Muster Points) located on the north side of the CCR, between main Administration building and the Fire & Safety building and in the Contractors Yard.

Please refer to Dangerous Goods Manifest, Appendix K for further information on types and quantities.

Refer to following site map for Muster Points & Emergency Assembly Areas.

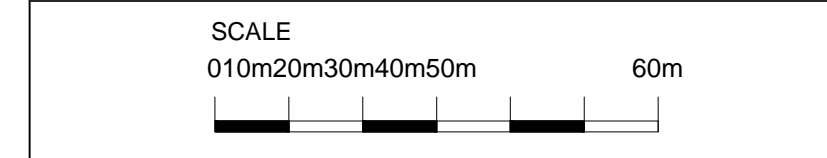
Vacant plot north of Ammonia Plant



DANGEROUS GOODS KEY

Area ID	DG Class	Storage Type
1	C1	Bulk
2	C1	Manufacturing
3	C1	Bulk
4	2.1	Manufacturing
5	2.1	Bulk
6	2.1, 2.2, 2.3, 3, 6.1, 8	PackagedDG
7	2.1, 2.2, 2.3	PackagedDG
8	2.2	Manufacturing
9	2.3 Sub Risk 8	Bulk
10	2.3 Sub Risk 8	Bulk
11	4.2,9	Packaged DG
12	3, 6.1, 8	Packaged DG
13	3, 6.1, 8	Manufacturing
14	8	Bulk
15	D2.1,9	Manufacturing
16	8	Manufacturing
17	Deleted	Deleted
18	OASE(aMDEA) >40%nonDG	Manufacturing
19	2.3 Sub Risk 8	Manufacturing
20	2.3 Sub Risk 8	Manufacturing
21	2.3 Sub Risk 8	Manufacturing
22	2.3 Sub Risk 8, 4.2	Manufacturing
23	2.1, 2.2	PackagedDG
24	2.1, 2.2	PackagedDG
25	C1	Manufacturing
26	2.1	Manufacturing
27	8	Manufacturing
28	3, 8	Manufacturing
Ammonia Pipeline	2.3 Sub Risk 8	Manufacturing
Nitrogen Pipeline	2.2	Manufacturing

- Fire Water Line
- Hydrant
- Monitor 12 NOS
- Natural Gas Isolation Point
- Anhydrous Ammonia Isolation Point
- Underground
- Above Ground
- Ammonia Pipeline
- Natural Gas Pipeline
- Nitrogen Pipeline
- ER Building Location
- Muster Building
- Site Entrance/Exit Evacuation Point
- Wind Sock
- Fence



Dangerous Goods & Combustible Liquid Manifest

Yara Pilbara Fertilisers
2200 MTPD Ammonia Plant
Lot 564 Village Road,
Burrup Peninsula WA



TAN Plant Layout

The layout of the TAN plant is shown below and comprises of:

- Main entrance Security Gate and Emergency Centre, Workshop's, Offices and Transporters Workshop to the north-west site corner;
- AN Truck Loading Area and ANSOL Truck Loading Area to the south of the Transporters Workshop;
- Site offices, TAN Control Room, Fire Water Area (including diesel pump, jockey & fire tank) are located near the eastern boundary;
- TAN Remediation Project Offices located inside fence perimeter at the North-Eastern corner of Transporters Workshop. Temporary Crib rooms are located to the east of the transporter workshop.
- Chemical storage areas; one south of the Site offices, the other on the eastern side of the Technical Ammonium Nitrate Unit;
- Process Manufacturing Areas, including;
 - Unit 12 - Nitric Acid 60% Plant, 760 t/d.
 - Unit 31 - Ammonium Nitrate Solution Plant, 965 t/d.
 - Unit 32 - Technical Ammonium Nitrate Plant, 915 t/d.
 - Unit 12, 31, 32 - Anhydrous Ammonia (liquid) piping.
 - Unit 35 - Ammonium Nitrate Solution Handling and Off-Spec Treatment (20 t/d),
 - Nitrogen Transfer Line
- Associated Process Storage Areas, including;
 - Unit 35 – ANSOL storage
 - Unit 52 – Nitric Acid storage;
 - Unit 72 – TAN Bulk storage
 - Unit 74 – TAN Bag storage;
 - Unit 75 – TAN Bag Storage
 - Unit 46 – Diesel storage tank.

Please refer to Dangerous Goods Manifest, Appendix K for further information on types and quantities.

Refer to following site map for Muster Buildings & Emergency Assembly Areas.

Vacant Plot North of TAN Plant

— Fire Water Line
— Nitrogen Pipeline
— Ammonia Pipeline
H Hydrant
M Muster Building
★ ER Building Location
M Monitor 12 NOS
E Site Entrance/Exit Evacuation Point
— Above Ground
— Underground
W Wind Sock
--- Fence

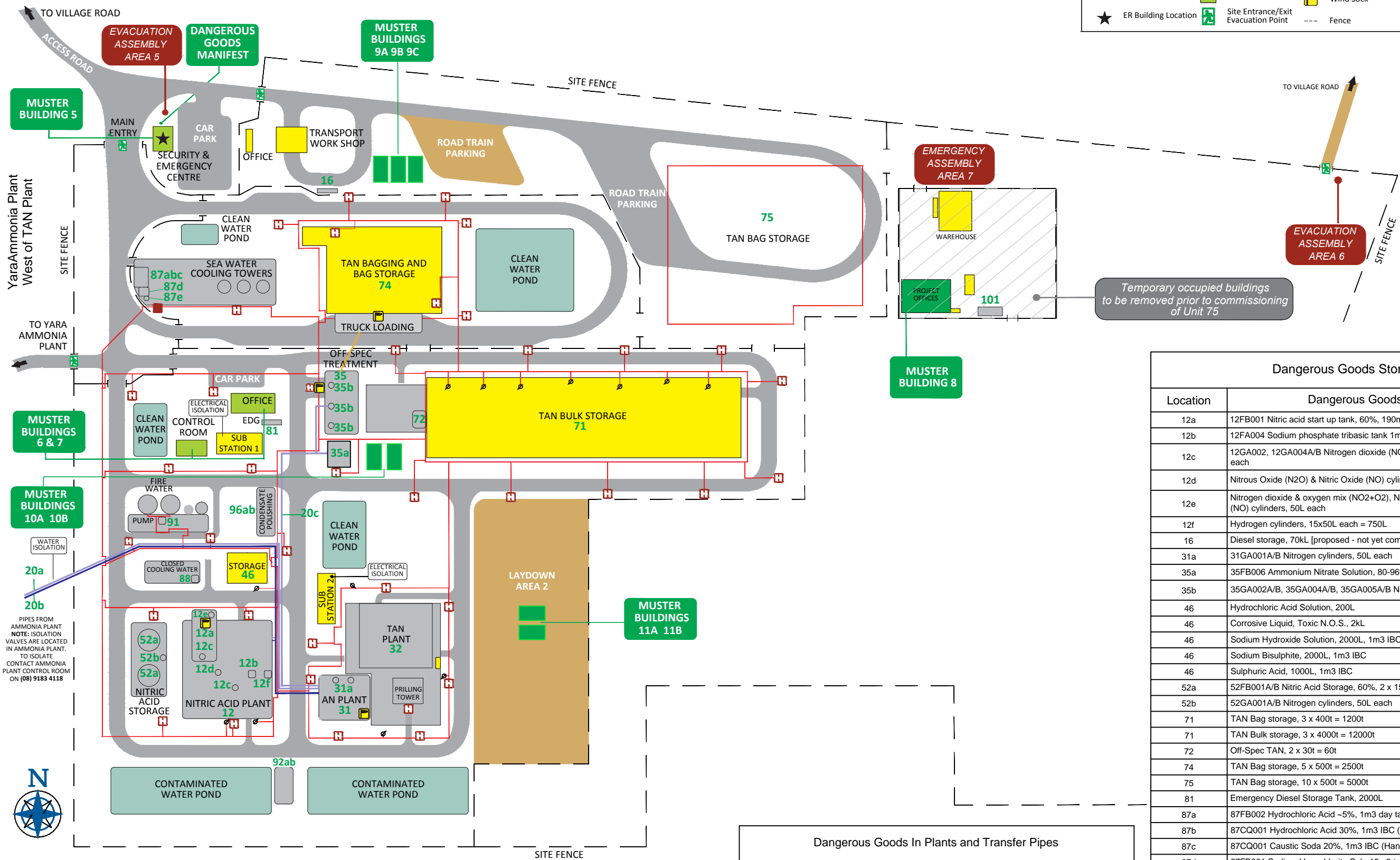


Lot 564 (Lot 3107) Village Road
Karratha WA6714

Dangerous Goods & Combustible Liquid Manifest

SCALE
0 10m 20m 30m 40m 50m 60m

650-508-DWG-YPN-0006
Rev 6
Last Updated: 02.08.2019



Temporary occupied buildings to be removed prior to commissioning of Unit 75

Dangerous Goods Storage

Location	Dangerous Goods Information
12a	12FB001 Nitric acid start up tank, 60%, 190m3
12b	12FA004 Sodium phosphate tribasic tank 1m3 IBC
12c	12GA002, 12GA004A/B Nitrogen dioxide (NO2), Nitric Oxide (O) cylinders 50L each
12d	Nitrous Oxide (N2O) & Nitric Oxide (NO) cylinders, 50L each
12e	Nitrogen dioxide & oxygen mix (NO2+O2), Nitrous Oxide (N2O), Nitric Oxide (NO) cylinders, 50L each
12f	Hydrogen cylinders, 15x50L each = 750L
16	Diesel storage, 70kL [proposed - not yet commissioned]
31a	31GA001A/B Nitrogen cylinders, 50L each
35a	35FB006 Ammonium Nitrate Solution, 80-96%, 500t
35b	35GA002A/B, 35GA004A/B, 35GA005A/B Nitrogen cylinders, 50L each
46	Hydrochloric Acid Solution, 200L
46	Corrosive Liquid, Toxic N.O.S., 2kL
46	Sodium Hydroxide Solution, 2000L, 1m3 IBC
46	Sodium Bisulphite, 2000L, 1m3 IBC
46	Sulphuric Acid, 1000L, 1m3 IBC
52a	52FB001A/B Nitric Acid Storage, 60%, 2 x 1500t
52b	52GA001A/B Nitrogen cylinders, 50L each
71	TAN Bag storage, 3 x 400t = 1200t
71	TAN Bulk storage, 3 x 4000t = 12000t
72	Off-Spec TAN, 2 x 30t = 60t
74	TAN Bag storage, 5 x 500t = 2500t
75	TAN Bag storage, 10 x 500t = 5000t
81	Emergency Diesel Storage Tank, 2000L
87a	87FB002 Hydrochloric Acid ~5%, 1m3 day tank
87b	87CQ001 Hydrochloric Acid 30%, 1m3 IBC (Handling)
87c	87CQ001 Caustic Soda 20%, 1m3 IBC (Handling)
87d	87FB001 Sodium Hypochlorite Sol., 15m3 tank
87e	87CC001 Sodium Metabisulphite, 1m3 IBC
88	88CC001 Caustic Soda 20%, 1m3 IBC (Handling)
91	91FA002 Fire Diesel Storage Tank, 2500L
92a	92CB005 Caustic Soda 20%, 1m3 IBC
92b	96CB005 Sulphuric Acid 98%, 1m3 IBC
96a	96CB001 Caustic Soda 20%, 1m3 IBC
96b	96CB001 Sulphuric Acid 98%, 1m3 IBC
101	Diesel storage, 4500L

Dangerous Goods In Plants and Transfer Pipes

Location	Dangerous Goods Information
12	Nitric Acid 60% Plant, 760 t/d
20a	Ammonia liquid transfer pipeline from Ammonia Plant
20b	Nitrogen transfer pipeline from Ammonia Plant
20c	Ammonia gas pipeline within TAN production facility
31	Ammonium Nitrate (AN) Solution Plant
32	Technical Ammonium Nitrate (TAN) Plant
35	Technical Ammonium Nitrate (TAN) Off-spec Handling

Vacant Plot South of TAN Plant

NOTE: CONTAMINATED & CLEAN WATER PONDS DO NOT DRAIN OFF SITE
PROCESSING AREAS DRAIN TO CONTAMINATED PONDS AND NON-PROCESSING AREAS DRAIN TO CLEAN WATER PONDS
WATERCOURSE SOUTH OF SITE



APPENDIX E – Hazardous Inventories Adjacent to the Plants

Note: There are a number of Major Hazard Facilities, oil / gas supply bases and gas supply pipelines that are in the vicinity of Yara Pilbara's operations on the Burrup Peninsula. However the hazardous inventories of these facilities are outside of the immediate impact areas and should not be impacted by an incident at Yara Pilbara facilities.



APPENDIX F – Plant Population During Normal Operations (Indicative Only)

LOCATION	NO. OF PERSONNEL DAY SHIFT	NO. OF PERSONNEL NIGHT SHIFT	REMARKS
Ammonia Plant			
Administration Building	20	0	Day 0700 – 1530 hrs
Contractors on Site	Between 0 and 30	0	Day 0700 – 1530 hrs
Laboratory & Document Control	5	0	Day 0700 – 1530 hrs Day 0600 – 1800 hrs
Emergency Centre & Security Gatehouse *both TAN & Ammonia Plants	Between 5-10	2 (Gate)	Day 0700 – 1530 hrs Night 1800 – 0600hrs
Workshop / Warehouse	20	0	Day 0700 – 1530 hrs Night 1800 – 0600 hrs
Control Room	12	4	Day 0600 – 1800 hrs Night 1800 – 0600 hrs
ISBL / OSBL	5	5	Day 0600 – 1800 hrs Night 1800 – 0600 hrs
Jetty / Pipeline (Only during ship loading)	3	3	Various shifts
TOTAL EMPLOYEES	100x day shift	14x night shift	

The total number of personnel employed at the Ammonia Plant will range from 70 –100. These personnel will work various shifts and days according to their rosters and positions. The number of personnel on night shift equals the number of personnel on day and night weekend shifts and public holidays.

All operations and production personnel are trained in firefighting and are active members of the ERT. This allows for emergency response coverage 24 hours a day, 7 days a week.



LOCATION	NO. OF PERSONNEL DAY SHIFT	NO. OF PERSONNEL NIGHT SHIFT	REMARKS
TAN Plant			
Offices	12 – 22	0	Day 0700 – 1630hrs
Contractors on Site	0 – 30	Up to 3	Day 0600 – 1800hrs Night 1800 – 0600hrs
Central Control Building	5 – 14	6	Day 0600 – 1800hrs Night 1800 – 0600hrs
Chemical Store	0 - 1	0	Day 0700 – 1630hrs
Spare Parts Building	0 – 1	0	Day 0700 – 1630hrs
Emergency Centre & Security Gate *both TAN & Ammonia Plants	5 - 10	2 (Gate)	Day 0600 – 1800hrs Night 1800 – 0600hrs
Transporters Workshop	1 – 3	0	Day 0700 – 1630 hrs
Transporters Workshop Offices	1 – 2	0	Day 0700 – 1630 hrs
Bulk Storage Building U71	2 – 5	0	Day 0600 – 1800 hrs Night 1800 – 0600hrs
AN Truck Loading and Bagging U73 & Bag Storage U74	2 – 7	0	Day 0700 – 1630 hrs
Shift Laboratory (in U32)	0 – 1	0 - 1	Intermittent during sample (4 per shift)
LIR I / Sub Station I	0 – 1	0	Day 0700 – 1630 hrs
LIR II / Substation II	0 - 1	0	Day 0700 – 1630 hrs
TAN Remediation Project Office	0-25	0	Day 0600 – 1800 hrs
TOTAL EMPLOYEES	28-120	Up to 11	

The total number of personnel employed at the Technical Ammonium Nitrate Production Facility will range from 11 - 111. These personnel will work various shifts and days according to their rosters and positions. The number of personnel on night shift equals the number of personnel on day and night weekend shifts and public holidays. All operations and production personnel are trained in firefighting and are active members of the ERT. This allows for emergency response coverage 24 hours a day, 7 days a week.



Note: For the duration of the construction phase off the TAN Remediation Project there will be an additional

- 300 people per day; and
- 50 people per night.



APPENDIX G – Protective Equipment

Within Fire Tender and Located at the Emergency Centre

- Self-Contained Breathing Apparatus;
- SCBA Long Lines with Scape sets
- Fire Resistant Turn out coats and pants;
- Chemical Splash Suits;
- Fully Encapsulated Chemical Suits;
- Personal Gas Detecting Devices;
- Fire Resistant Hard Hats & Shields; and
- Fire Resistant Boots.

At Plant & Ship loading Facility

- Self-Contained Breathing Apparatus;
- Fully Encapsulated Chemical Suits;
- Hard hats;
- Chemical Splash suits;
- Respirators and Filter Cartridges;
- 5 Minute Escape Units;
- 15 Minute S-Cap Air Units;
- Safety Goggles;
- Safety Visors;
- Elbow Length PVC Gloves;
- PVC Coats and Pants;
- PVC Overalls;
- Hearing Protection; and
- Dust Coveralls.



APPENDIX H – First Aid Equipment

Emergency first aid equipment is listed below:

No.	First Aid Equipment
1	Portable oxygen equipment.
2	Portable oxy-viva – complete.
5	Oxy-Sok Resuscitation Kits.
15	Eye wash stations.
1	Otoscope/ Ophthalmoscope.
4	Glucometer.
2	Thermoscan
4	AED

Other Equipment in First Aid Room and the Ambulance

- Treatment table x 1;
- Medical charts and books;
- Patient slide boards;
- AED
- Stair Chair
- K.E.D
- SCBA
- Splint;
- Linen;
- First aid treatment supplies;
- Scoop Stretcher;
- Maggilamp;
- Defibrillator (Ambulance & FA Room); and
- Mobile Phone (located at Security) for Ambulance.

Within Fire Tender:

- Industrial First Aid Kit; and
- Oxy Viva.

At Ship Loading Facility:

- First Aid Kit; and
- Oxy-Sok Resuscitation Kit.

At TAN Remediation Project Office:

- First Aid Kit



APPENDIX I – Emergency Escape & Evacuation

Emergency, Escape & Evacuation *Note: Refer to Appendix D for Site Maps	
Ammonia Plant	
Windsock Locations	North Storage Tank Vessel 121-MD Pipe rack 268 Cnr. Centre Rd & 3 rd Ave Pipe Bridge Cnr. South Rd. & 1 st Ave
Muster Points	Muster Point 1 – North side of the CCR on North Road. Muster Point 2 – Southeast corner (rear) of Administration Building parallel to East Road. Muster Point 3 – Directly northwest of the Fire & Safety building adjacent to East Road. Muster Point 4 – North of the Contractors Office(s) southeast of Desal Drive
Evacuation Assembly Area (swipe card before leaving via Security Gatehouse and Desalination Gate only)	EAA 1 - Ammonia Security Gatehouse EAA 2 - Desalination Gate EAA 3 - South Western side of Flare EAA 4 - North of Natural Gas Knockout Drum
TAN Plant	
Windsock Locations	Top of the Prilling tower (U32) Top of the Absorption Tower (U12) Top of the Truck Loading Area (U73)
Muster Buildings (swipe card on entry) * Temporary (TAN Remediation Project)	Muster Building 5 Main Security Gatehouse and Emergency Centre Muster Building 6 TAN Control Room Muster Building 7 TAN Administration Building *Muster Building 8 TAN Remediation Project Office, west conference room in main office building *Muster Building 9a/b/c East of Transporter Workshop *Muster Building 10a/b Between Unit 35 and TAN Bulk Store *Muster Building 11a/b Laydown area east of Unit 32
Evacuation Assembly Areas	EAA 5 - Evacuation Assembly Area near the Security and Emergency Centre EAA 6 - Evacuation Assembly Area in the North-East corner of the plant. EAA 7 - North corner (front) of TAN Remediation Project Office
Off site	
Woodside Visitor car park (only open during business hours)	Northern end of Burrup Peninsula Road prior to entrance of Karratha Gas Plant – distance approximately 3.2 kilometres

APPENDIX J – Indicative Population of Surrounding Area



King Bay Industrial Area includes the following industries:

Company	No. Employees	Company	No. Employees
Agility	50 day	Mermaid Marine	50 day
Australian Marine Services	2 day	MI Australia	5 -10 day
Brambles	30 day & adhoc night	Oceanic Offshore	3 day
Cleanaway	15 day	Pilbara Port Authority	25 – 75 day
Coates Hire	10 day & max 2 night	Schlumberger	100 day (max 40-50 on site)
ECM	30 employees	Toll Energy	35 day & max 4.adhoc night
Gearhart United	15 & 4 adhoc night	Western Stevedores	Up to 50 day
Halliburton	30 day	Woodside Pluto LNG	Approx. 100 day
Hughes Industrial Services	32 day & 2 night max. 10 at shift change	Woodside Supply base	50 day
Karratha Gas Plant	Approx. 500 – 800 day Shutdown up to 2000	Unirig	5 day



APPENDIX K – Inventory & Location of Dangerous Goods

Ammonia Plant Dangerous Goods in Excess of Schedule 1 MHF Threshold (NOHSC:1014(2002))

Material	UN Number	Location	Amount
Ammonia	1005	Synthesis & Refrigeration Plant	30 Tonnes
		Storage Tanks 21001/2-MF	80,000 Tonnes
		500mm Export Pipeline and 100mm Recirculation line.	600 Tonnes
		Jetty Line and Ship Loader	29 Tonnes

Dangerous Goods less than Schedule 1 MHF Threshold (NOHSC: 1014(2002)).

Material	UN Number	Location	Amount
Natural Gas	1972	Natural Gas Feed and Conditioning	1.3 Tonnes
		Primary Reformer	2.0 Tonnes
Hydrogen	1049	Secondary reformer and Methanator	1.2 Tonnes

Other Dangerous Goods

Material	UN Number	Location	Amount
Diesel Fuel	0000	Diesel Storage Tank 2301-MF	54 Tonnes
Liquid Nitrogen	1977	2501-MLF1	50 Tonnes
Sulphuric Acid	1830	2204-MF	22 Tonnes
		2205-MFF	
		2001-MUL1F	
Sodium Hydroxide Solution	1824	2201-MUL2F	37 Tonnes
		2203-MF	
		2207-MF	
Hydrazine	3293	106-ML	0.21 Tonnes
Ammonia Solution	2672	107-ML	1 Tonne
Metal Catalyst Dry	2881	Converter 105md	291.2 Tonnes



TAN Plant – Inventory & Location of Dangerous Goods

Notes:

- Loaded vehicles are not parked and stored at the site.
- Dangerous Goods in Tanks, vessels, towers, exchangers, evaporators are based on total capacity of the container.
- Pipework considered is based on the main lines between equipment/ units.
- For conveyors, elevators, screens, bucket elevators, pre-dryers, dryers, drum, hopper, quantity is based on maximum capacity. Residence time 10% considered in 32-GJ-003, 32-CI-010 and 73-FE-001 A/B. A residence time of 5 minutes has been considered for 32-FZ-004.
- Ammonia and NOx quantity are based on the Isolation Sections (IS) considered in the MHF Risk Assessment report, (2-250-329-REP-TRE-8021). The MHF Isolation Sections are identified in section 7 "Dangerous goods in manufacture or process piping" under item "Process ID" as "IS", accordingly.
- Ammonium Nitrate Solution quantity is based on total capacity whereas in MHF Risk Assessment (2-250-329-REP-TRE-8021) the quantity of Ammonia Solution is based on High High Level of liquid.
- Ammonium Nitrate Solution 50-82 % is not Dangerous Goods in accordance with Australian Dangerous Goods Code (ADG Code). For the purposes of this Manifest, it has been considered in both, MHF Risk Assessment (2-250-329-REP-TRE-8021) and this Manifest due to the level of risk (potential explosion).

Legend:

- BSS Loose storage of solids in bulk
- C1 combustible liquids
- UTG Underground Tank
- GTD Tank Situated Normally at Ground Level
- GTS Self-bounded ground Tank
- IBC Intermediate bulk containers (e.g. bulka bags)
- IDA storage of IBCs outside a building
- IDB storage of IBCs within a building
- kg For solids
- L For gas or liquid
- PDA package (drum or cylinder) depot in the open air
- PDB package (drum or cylinder) depot within a building
- PDC storage of package (drum or cylinder) in a fully enclosed room within another building
- PG Packing group

**Summary information about dangerous goods quantities**

Class	Packaging Group	Maximum quantity (L or kg)
2.1	n/a	300 L
2.2	n/a	1,777 L
2.3	n/a	1,269,450 L
3	n/a	n/a
4.1	n/a	n/a
5.1 (prill)	III	20,808,397 kg
5.1 (solution)	n/a	552,120 L
6.1	n/a	n/a
8	II	3,214,000 L
8 SR 5.1	n/a	n/a
C1	n/a	70,000 L



Bulk Dangerous Goods Storages

Storage location	Storage ID	Proper shipping name	UN no.	Class or Division	SR	Packaging Group	Type	Quantity (L or kg)
Unit 46	VPU 4711	Combustible Liquid	n/a	C1	n/a	n/a	GTS	70,000 L
Unit 35	35-FB-006	Ammonium Nitrate Sol. 92%	2426	5.1	n/a	II	GTD	382,000 L
Unit 71	Unit 71	Ammonium Nitrate (prill)	1942	5.1	n/a	III	BSS	12,000,000 kg
Unit 72	Unit 72	Ammonium Nitrate (off-spec)	1942	5.1	n/a	n/a	BSS	60,000 kg
Unit 12	12-FB-001	Nitric Acid 60%	2031	8	n/a	II	GTD	190,000 L
Unit 52	52-FB-001 A	Nitric Acid 60%	2031	8	n/a	II	GTD	1,500,000 L
Unit 52	52-FB-001 B	Nitric Acid 60%	2031	8	n/a	II	GTD	1,500,000 L
Unit 92	92-CB-005	Caustic Soda Sol. 20%	1824	8	n/a	II	IDA	1,000 L
Unit 96	96-CB-001	Caustic Soda Sol 20%	1824	8	n/a	II	IDA	1,000 L
Unit 87	87-FB-001	Sodium Hypochlorite	1791	8	n/a	II	GTD	15,000 L
Unit 87	87-FB-002	Hydrochloric Acid Sol. 5 %	1789	8	n/a	II	GTD	1,000 L
Unit 87	87-CC-002	Sodium Metabisulphite	2693	8	n/a	II	IDA	1,000 L
Unit 92	92-CB-005	Sulphuric acid Sol. 98%	1830	8	n/a	II	IDA	1,000 L
Unit 96	96-CB-001	Sulphuric acid Sol. 98%	1830	8	n/a	II	IDA	1,000 L



Packaged dangerous goods of PG I or Class 2.3

Storage location	Proper shipping name	UN no.	Class or Division	SR	Type	Quantity (L or kg)
Unit 12	Ammonia (cylinders)	1005	2.3	8	PDA	50 L
Total Division 2.3						50 L

Packaged dangerous goods of Division 2.1

Storage location	Proper shipping name	UN no.	Class or Division	SR	Type	Quantity (L or kg)
Unit 12	Hydrogen (cylinders)	1049	2.1	n/a	PDA	300 L
Total Division 2.3						300 L

Packaged dangerous goods of Division 2.2

Storage location	Proper shipping name	UN no.	Class or Division	SR	Type	Quantity (L or kg)
Unit 12	2*N ₂ , N ₂ O, NO, 2*NO ₂ (cylinders)	1977 1070 1660 1067	2.2	n/a	PDA	300 L
Unit 31	N ₂	1977	2.2	n/a	PDA	100 L
Unit 35	N ₂	1977	2.2	n/a	PDA	150 L
Unit 52	N ₂	1977	2.2	n/a	PDA	50 L
Total Division 2.2						600 L

Packaged dangerous goods of Class 2.2 SR 5.1

Storage location	Proper shipping name	UN no.	Class or Division	SR	Type	Quantity (L or kg)
Unit 12	Oxygen (cylinders)	1072	2.2	5.1	PDA	50 L
Total Division 2.2 SR 5.1						50 L



Packaged dangerous goods of PG III

Storage location	Proper shipping name	UN no.	Class or Division	SR	Type	Quantity (L or kg)
Unit 71	Ammonium Nitrate	1942	5.1	-	IDB	1,200,000 kg
Unit 74	Ammonium Nitrate	1942	5.1	-	IDB	2,500,000 kg
Unit 75	Ammonium Nitrate	1942	5.1	-	IDA	5,000,000 kg
Total Division 2.2 SR 5.1						8,700,000 kg

Dangerous goods in manufacture or process piping

Storage location	Process ID	Proper shipping name	UN no.	Class/ Division/ SR	Quantity (L or kg)
U63/ U20/ U12/ U31	Piping (120701, 310192, 200690, 610690)	Nitrogen	1977	2.2	1,177 L
Unit 32	32-FA-004	Ammonium Nitrate Sol. 30%	n/a	n/a	17,000 L
Unit 32	32-FA-005	Ammonium Nitrate Sol. 60%	n/a	n/a	42,200 L
Unit 35	35-FB-002 A	Ammonium Nitrate Sol. 50%	n/a	n/a	60,000 L
Unit 35	35-FB-002 B	Ammonium Nitrate Sol. 50%	n/a	n/a	60,000 L
Unit 35	35-FB-004	Ammonium Nitrate Sol. 50%	n/a	n/a	200,000 L
Unit 35	35-FB-005	Ammonium Nitrate Sol. 50%	n/a	n/a	200,000 L
Total AN Sol <60%					580,377 L
Unit 12	12-IS-4	Ammonia (l)	1005	2.3/ 8	2,020 L
Unit 12	12-IS-5L	Ammonia (l)	1005	2.3/ 8	21,510 L
Unit 12	12-IS-9	Ammonia (l)	1005	2.3/ 8	910 L
Unit 32	32-IS-10L	Ammonia (l)	1005	2.3/ 8	710 L
Unit 32	32-IS-12L	Ammonia (l)	1005	2.3/ 8	880 L



Emergency Management Plan

Storage location	Process ID	Proper shipping name	UN no.	Class/ Division/ SR	Quantity (L or kg)
Unit 32	32-IS-15	Ammonia	1005	2.3/ 8	7,580 L
Total Ammonia					33,610 L
Unit 12	12-IS-5V	Ammonia (g)	1005	2.3/ 8	17,400 L
Unit 31/32	31/32-IS-11V& 12V	Ammonia (l)	1005	2.3/ 8	20,280 L
Unit 31/35	31/35-IS-11V& 12V	Ammonia (l)	1005	2.3/ 8	1,440 L
Unit 32	32-IS-14	Ammonia (g)	1005	2.3/ 8	1,310 L
Total Ammonia					40,430 L
Unit 12	12-IS-6	Nitric Oxide, Nitrogen Dioxide, Di-Nitrogen Tetra-Oxide mixture (13.6% NO ₂)	1660 1067 1070	2.3 / 5.1, 8	197,200 L from ammonia oxidation reactor (12-DC-001) to the process compressor (12-GB-002) including the overhead line from bleaching tower (12-DA-002) (a/g)
Unit 12	12-IS-7	Nitric Oxide, Nitrogen Dioxide, Nitrous Oxide (12.4% NO ₂)	1660 1067 1070	2.3 / 5.1, 8	22,520 L
Unit 12	12-IS-8	Nitric Oxide, Nitrogen Dioxide, Nitrous Oxide (Tail gas 0.07% NO ₂)	1660 1067 1070	2.3 / 5.1, 8	975,640 L from absorption tower (12-DA-001) overhead system and isolation valve 12-XZV-013 to tail gas expander (12-GF-002) (a/g)
Total NO_x					1,195.360 L



Emergency Management Plan

Storage location	Process ID	Proper shipping name	UN no.	Class/ Division/ SR	Quantity (L or kg)
Unit 31	31-DC-001	Ammonium Nitrate Sol. 78%	2426	5.1	57,000 L
Unit 31	Piping (310228)	Ammonium Nitrate Sol. 76%	2426	5.1	1,000 L
Unit 31	31-FA-001	Ammonium Nitrate Sol. 85%	2426	5.1	33,000 L
Unit 31	31-FA-002	Ammonium Nitrate Sol. 96 %	2426	5.1	32,100 L
Unit 31	31-FA-006	Ammonium Nitrate Sol. 78%	2426	5.1	22,500 L
Unit 31	Piping (310230/31, 310234)	Ammonium Nitrate Sol. 85%	2426	5.1	3,740 L
Unit 32	32-FA-001	Ammonium Nitrate Sol. 96 %	2426	5.1	1,600 L
Unit 32	32-FA-057	Ammonium Nitrate Sol. 96%	2426	5.1	13,640 L
Unit 32	Piping (310235/ 310237/38, 320254/ 320242/ 320250, 320244/ 45, 320247/ 48, 320254/ 320251)	Ammonium Nitrate Sol. 78 -96%	2426	5.1	5,540 L
Total AN Sol >76%					170,120 L
Unit 32	32-CI-001 B	Ammonium Nitrate (prill)	1942	5.1	1,041 kg
Unit 32	32-CI-002 A	Ammonium Nitrate (prill)	1942	5.1	1,283 kg
Unit 32	32-CI-002 B	Ammonium Nitrate (prill)	1942	5.1	1,283 kg
Unit 32	32-CI-010	Ammonium Nitrate (prill)	1942	5.1	2,158 kg
Unit 32	32-FZ-004	Ammonium Nitrate (prill)	1942	5.1	2,083 kg
Unit 72	72-PC-001	Ammonium Nitrate (prill)	1942	5.1	1,830 Kg
Unit 72	72-PC-002	Ammonium Nitrate (prill)	1942	5.1	2,943 kg
Unit 72	72-FE-004 A	Ammonium Nitrate	1942	5.1	6,966 kg



Emergency Management Plan

Storage location	Process ID	Proper shipping name	UN no.	Class/ Division/ SR	Quantity (L or kg)
Unit 72	72-FE-004 B	(prill) Ammonium Nitrate (prill)	1942	5.1	6,966 kg
Unit 72	72-PC-004	Ammonium Nitrate (prill)	1942	5.1	9,100 kg
Unit 72	72-GJ-001	Ammonium Nitrate (prill)	1942	5.1	1,203 kg
Unit 72	72-PC-006	Ammonium Nitrate (prill)	1942	5.1	6,008 kg
Unit 73	73-FE-001 A	Ammonium Nitrate (prill)	1942	5.1	1,290 kg
Unit 73	73-FE-001 B	Ammonium Nitrate (prill)	1942	5.1	1,290 kg
Unit 73	73-PC-003	Ammonium Nitrate (prill)	1942	5.1	1,912 kg
Total AN prill					48,397 kg
Unit 12	12-DA-001	Nitric Acid (60%)	2031	8	785,000 L
Unit 12	Piping (120239, 120253, 120240)	Nitric Acid (60%)	2031	8	1,060 L
Unit 12	12-DA-002	Nitric Acid (60%)	2031	8	36,600 L
Unit 12	Piping (120237, 200201, 520200)	Nitric Acid (60%)	2031	8	2,020 L
Unit 12	Piping (120237, 200201, 520200)	Nitric Acid (60%)	2031	8	3,870 L
Total Nitric Acid 60%					829,660 L
Unit 87	87-CQ-001	Hydrochloric Acid 30%	1789	8	1000 L
Unit 87	87-CQ-001	Caustic Soda 20%,	1824	8	1000 L
Unit 88	88-CC-001	Caustic Soda Sol. 20%	1824	8	1,000 L



APPENDIX L – Emergency Response Team Duty Cards

Duty Card One – Incident Controller

Duty Card ONE – Incident Controller

The function of the Incident Controller is to be in control of all incidents that occur. During small incidents the IC usually also performs the operations, planning and logistics functions.

As the incident develops in size or complexity, responsibility for managing these functions shall be performed by the SRT. The Incident Controller will accomplish the strategy developed to combat the incident by meeting the tactical objectives and directs all the incident tactical operations and the implementation of the Pre - Incident Plan

- Assume role of Incident Controller in an emergency situation.
- Switch radio to **Channel 4**.
- Place the Incident Controller vest on for identification purposes.
- Assess the incident in order to classify interim emergency level.
- If required order all personnel on site to evacuate to refuges.
- Initiate and co-ordinate the mobilisation of the ERTL
- Initiate contact with SRT Emergency Services or their alternate.
- Direct the Panel Operator to contact external Emergency Services to provide aid to the affected facility as required (utilise alternate methods if unable to connect to 000).
- Verbally notify the SRT Leader of the incident, providing a detailed brief.
- Complete an Incident Report Form (YARA CMS-F-01) ASAP and provide to the SRTL
- Maintain communications with the ERTL, the SRT and external Emergency Services.
- Regularly update the ERTL on the situation – include, what has been done, what's going to be done, what's changed and any critical issues requiring resolution.
- Account for all personnel on site. (With assistance from the Security Guard using the Gallagher System).
- If there has been an ammonia or chlorine release, determine if any Neighbouring Facilities require notification by referring to the maps in the Control Room and using the Anemometer.
- Delegate the task to notify Neighbouring Facilities to a Panel Operator using Message Manager.

Note: *that if SRT is activated, this function will be conducted by 3rd Party Communications Coordinator.*

- If external Emergency Services are required to come to site organise the Liaisons Officer to meet them at the Gatehouse and bring them to the Control Room if safe to do so.
- Monitor the safety of the ERT and regularly assess the need for support from Emergency Services.
- Command and coordinate the activities of the Control Room Operators.
- Regularly reassess the emergency level.
- Consider the potential for the incident to be protracted and develop a relief in place plan.
- When the emergency is over sound the "All Clear" siren.

Duty Card Two – Panel Operator



Duty Card TWO- Panel Operator

Duty Card Two is the function of all Panel Operators when an emergency is reported to the Control Room.

*Emergency Radio – **Channel 4***

*Emergency Phone – **Extension Fertilisers – 4165 Nitrates – 4007***

*Call sign for radios: **EMERGENCY EMERGENCY EMERGENCY***

-
- Using checklist, note all information provided by the caller:
 - What has happened.
 - What may happen due to incident.
 - Number of people still in immediate area.
 - No # of injuries.
 - What current action is underway to make safe plant .
 - What is known about the emergency – plant condition etc.
 - Contact Shift Superintendent who assumes the role of Incident Controller for all Plant and Pipeline emergencies:
 - Phone Extension Fertilisers – **4165** Nitrates - **4007**
 - Radio channel **4**.
 - For an incident at the jetty, liaise with the Loading Master who will act as the Incident Controller at the Jetty.
 - Relay all information to the Shift Superintendent (Incident Controller).
 - If the Incident Controller is unavailable and the emergency requires immediate evacuation to the refuges, sound the emergency siren.
 - Operate plant as directed by the Shift Superintendent .
 - Follow all instructions given by the Shift Superintendent
 - Maintain a log of events where appropriate.



Duty Card Three – Security Guard

Duty Card THREE - Security Guard

Duty card Three is the function of all Security Guards during an emergency.

*Emergency Radio – **Channel 4***

*Emergency Phone – **Extension Fertilisers – 4165 Nitrates – 4007***

*Call sign for radios: **EMERGENCY EMERGENCY EMERGENCY***

-
- Upon hearing the emergency siren or being notified by the Incident Controller, stop access to the site by vehicles and people.
 - Access the personnel onsite screen using the Gallagher System. This screen accounts for how many people are on site and as personnel reach muster points and swipe it then registers their location.
 - Record and account for personnel at each refuge by radio to confirm numbers. Compare radio numbers with the onsite screen numbers. Notify the Control Room with this number.
 - Ensure site access is maintained for emergency vehicles only.
 - If Emergency Services arrive on site, record the names of and numbers of who enter the site.
 - Inform the Incident Controller or Control Room when Emergency Services arrive.
 - Give Emergency Services Yara Pilbara radios if required (Emergency radios kept in the Security Gatehouse).
 - Maintain a log of events as required.
 - Upon hearing the ALL CLEAR siren, advise all occupants over Channel 5



Duty Card Four – Emergency Response Team Leader (ERTL)

Duty Card FOUR - Emergency Response Team Leader (ERTL)

The function of the ERTL is to mobilise, command and coordinate the Emergency Response Team (ERT) and the ESO. When the ERTL believes that the real or potential scale of the incident will require the deployment of resources greater than those available on-site, he/she must liaise with the Incident Controller who will act to enable and coordinate the additional resources.

*Emergency Radio – **Channel 4***

*Emergency Phone – **Extension Fertilisers – 4165 Nitrates – 4007***

*Call sign for radios: **EMERGENCY EMERGENCY EMERGENCY***

-
- On receiving notification to attend an emergency, make your way to the Emergency Building as quickly as possible and inform the Incident Controller of your arrival.
 - Contact and mobilise your ERT to the Emergency Building.
 - Account for the ERT and radio to Security their names and numbers.
 - Brief the ERT as they arrive and deploy them as required.
 - Ensure that the safety of ERT members is maintained at all times and that the rescue of injured personnel does not expose rescuers to an unacceptable risk.
 - Plan and coordinate the tactical response to the incident with the following priorities:
 - Self and Emergency Response Team preservation;
 - Extract injured personnel and reduce trauma
 - Maintain plant safety;
 - Protect the environment;
 - Protect property; and
 - Restore plant operations.
 - Place all equipment at a safe distance from the incident. Consider re-positioning appliances closer to the scene once control is achieved.
 - For incidents outside battery limits utilise Yara supplied equipment wherever possible.
 - Upon arriving at the emergency scene, assess the emergency and update the Incident Controller with a situation report, including:
 - Situation
 - Mission
 - Execution
 - Command, communication and logistics
 - Preserve the safety of all personnel, contractors and general public at or near the emergency incident site.
 - Provide the Incident Controller with regular updates on the progress of the status of the incident.
 - Liaise with Emergency Services and other authorities in attendance at the site. Arrange a suitable assembly area for vehicles and equipment and access routes for attending agencies.



Duty Card Five – Emergency Response Team

Duty Card FIVE - Emergency Response Team (ERT)

Duty card Five is for all ERT members when they are appointed to the ERT for that shift or are called out to join the ERT in an emergency.

*Emergency Radio – **Channel 4***

*Emergency Phone – **Extension Fertilisers – 4165 Nitrates – 4007***

*Call sign for radios: **EMERGENCY EMERGENCY EMERGENCY***

-
- On receiving notification by the ERTL to attend an emergency, make your way to the Fire and Safety Building ,respective Control Rooms or TAN Security Gate.
 - When you arrive at the Fire and Safety Building ,respective Control Rooms or TAN Security Gate inform the ERTL, who will confirm names and numbers with Security Guards.
 - The ERTL will brief you on the emergency situation.
 - The ERTL will command and coordinate the ERT.
 - Work in conjunction with the ERTL to plan and coordinate the tactical response to the incident with the following priorities:
 - Self and Emergency Response Team preservation;
 - Extract injured personnel;
 - Reduce trauma;
 - Maintain plant safety;
 - Protect the environment;
 - Protect property; and
 - Restore Plant Operations.

**Duty Card Six – Emergency Services Officer****Duty Card SIX – Emergency Services Officer**

Duty Card Six is for all ESO's when they are on shift or are called out to assist in an emergency.

*Emergency Radio – **Channel 4***

*Emergency Phone – **Extension Fertilisers – 4165 Nitrates – 4007***

*Call sign for radios: **EMERGENCY EMERGENCY EMERGENCY***

-
- Upon hearing the emergency alarm wait for the ERTL to provide an exact location and briefing on the emergency situation ..
 - On receiving notification by the ERTL to attend an emergency, make your way to the emergency location as briefed.
 - You report and liaise with the ERTL who will assist and coordinate your response.
 - Remain at the First Aid Room unless responding to requests for assistance from ERTL.
 - Assess the need for treatment of injuries and triaging of casualties.
 - Provides transportation for sick or injured persons from site to Karratha Health Campus Advise the ERTL of the need for further medical assistance both internal and external resources.
 - Communicates with DR or Karratha Health Campus regarding status of Injured Person*



Duty Card Seven – Muster Warden

Duty Card SEVEN – Muster Warden

Duty Card Seven is for all Muster Wardens during the event of a Muster. The function of the Muster Warden is to attend the nearest Muster Point upon hearing the emergency siren and, if the first person there, follow the below procedures.

*Emergency Radio – **Channel 4***

*Emergency Phone – **Extension Fertilisers – 4165 Nitrates – 4007***

*Call sign for radios: **MUSTER WARDEN AT MUSTER POINT (1/2/3 or 4 state your location)***

Shelter in Place Procedure

- Upon hearing the emergency alarm make your way to the nearest Muster Point
- Don the identification vest and delegate another person to don the second vest
- Ensure all occupants swipe the EAC card at the muster point and that they are accounted for on the Muster Marshal Emergency Personnel Checklist.
- Report to Security the status of the muster via the two way radio (channel 5) or via phone (extension 4111)
- If instructed by the Incident Controller, search the designated areas according to the relevant **Red** Warden file (located at TAN Security Gatehouse, TAN Control Room, SRT Room and Ammonia Control Room) to ensure that everyone is within the Muster Building and accounted for.

Anyone refusing or unable to move to the Muster Building must be reported to Security

- Report to security via two way radio (channel 5) or via phone (extension 4111) once search is complete
- Await further instruction from Incident Controller.

Evacuation Procedure

- Distribute bottled water and assist moving any people with a disability
- Follow the instructions from the Incident Controller and guide occupants to the nominated Evacuation Assembly Area.
- Report to security via two way radio (channel 5) or via phone (extension 4111) once occupants have arrived at the nominated Evacuation Assembly Area.
- IF INSTRUCTED** by Incident Controller guide the occupants to the nominated **OFFSITE** Evacuation Assembly Area. Assist moving people with a disability
- Report to security via two way radio (channel 5) or via phone (extension 4111) once occupants have arrived at the nominated Offsite Evacuation Assembly Area.



APPENDIX M – Incident Controller Duty Cards

Plan No	Pre-Incident Plan No.	Quick Reference Duty Card No.
1.	250-500-PLN-YPF-0003.1 Natural Gas Release	250-500-FRM-YPF-0001
2.	250-500-PLN-YPF-0003.2 Process Stream (Flammable Gas) Release	250-500-FRM-YPF-0002
3.	250-500-PLN-YPF-0003.3 Ammonia Release (Export Pipeline, TAN and/or Ammonia Plant)	250-500-FRM-YPF-0003
	Deleted	
5.	250-500-PLN-YPF-0003.5 Ammonia Release (Ship Loading & Jetty)	250-500-FRM-YPF-0005
6.	250-500-PLN-YPF-0003.6 Major Injury or Fatality	250-500-FRM-YPF-0006
7.	250-500-PLN-YPF-0003.7 Non-Process Fire	250-500-FRM-YPF-0007
8.	250-500-PLN-YPF-0003.8 Extreme Weather	250-500-FRM-YPF-0008
9.	250-500-PLN-YPF-0003.9 Bomb or Terrorist Threat	250-500-FRM-YPF-0009
10.	250-500-PLN-YPF-0003.10 Substation, Transformer Bay or Generator Fire	250-500-FRM-YPF-0010
11.	250-500-PLN-YPF-0003.11 Ammonium Nitrate Prills Fire	250-500-FRM-YPF-0011
12.	250-500-PLN-YPF-0003.12 ANSOL Incident	250-500-FRM-YPF-0012
13.	250-500-PLN-YPF-0003.13 Nitric Acid Solution Incident	250-500-FRM-YPF-0013
14.	250-500-PLN-YPF-0003.14 NOx Gas Incident	250-500-FRM-YPF-0014
15.	N/A – Bush Fire Duty Card Only	250-500-FRM-YPF-0015
16.	N/A – Vehicle Interaction or Roll Over Duty Card Only	250-500-FRM-YPF-0016
17.	250-500-PLN-YPF-0003.17 Security Breach: Intruder or Active Shooter	250-500-FRM-YPF-0017
18.	250-500-PLN-YPF-0003.18 Other Environmental Incident Duty Card	250-500-FRM-YPF-0018
	Other	
	Other	
21.	250-500-PLN-YPF-0003.21 Earthquake & Flooding Contingency Planning	250-500-FRM-YPF-0021
22.	250-500-PLN-YPF-0003.22 Catalyst Fire	250-500-FRM-YPF-0022



2018 Annual Compliance Report
EPBC 2008/4546
Technical Ammonium Nitrate Plant

04-06-2020 600-200-ACR-YPN-0007 Rev 1

Attachment 8a: National Heritage Place Access Register (access form and screenshot)



Section 1 – Site Requirements

Condition 8a) and 8d) of Yara Pilbara Nitrates Pty Ltd's (YPN) Environmental Protection & Biodiversity Conservation Act 1999 approval, EPBC2008/4546, requires that:
1. There is no unauthorised access by employees or contractors to the Dampier Archipelago (including Burrup Peninsula) National Heritage Place while those employees or contractors are undertaking work duties; and
2. YPN must record the names of all those required to access areas containing rock art sites inside the National Heritage Place.

Details of person undertaking work duties in areas containing rock art sites inside the National Heritage Place *

Name: Position Title:
A# or Contracting Company:

Section 2 – Agreement and Consent

I understand the details, limitations and obligations of the National Heritage Place Access approval and that failing to fulfil my obligations may result in disciplinary action or criminal prosecution.
I confirm my agreement and consent to the matters in this form is given on a voluntary basis and provide my signature as confirmation of this.

Signature: Date:

Section 3 - Approvals

I, as Manager responsible for Heritage Management, authorise the person above to access the National Heritage Place containing rock art sites to undertake their assigned work duties. This approval remains valid for a period of five years.

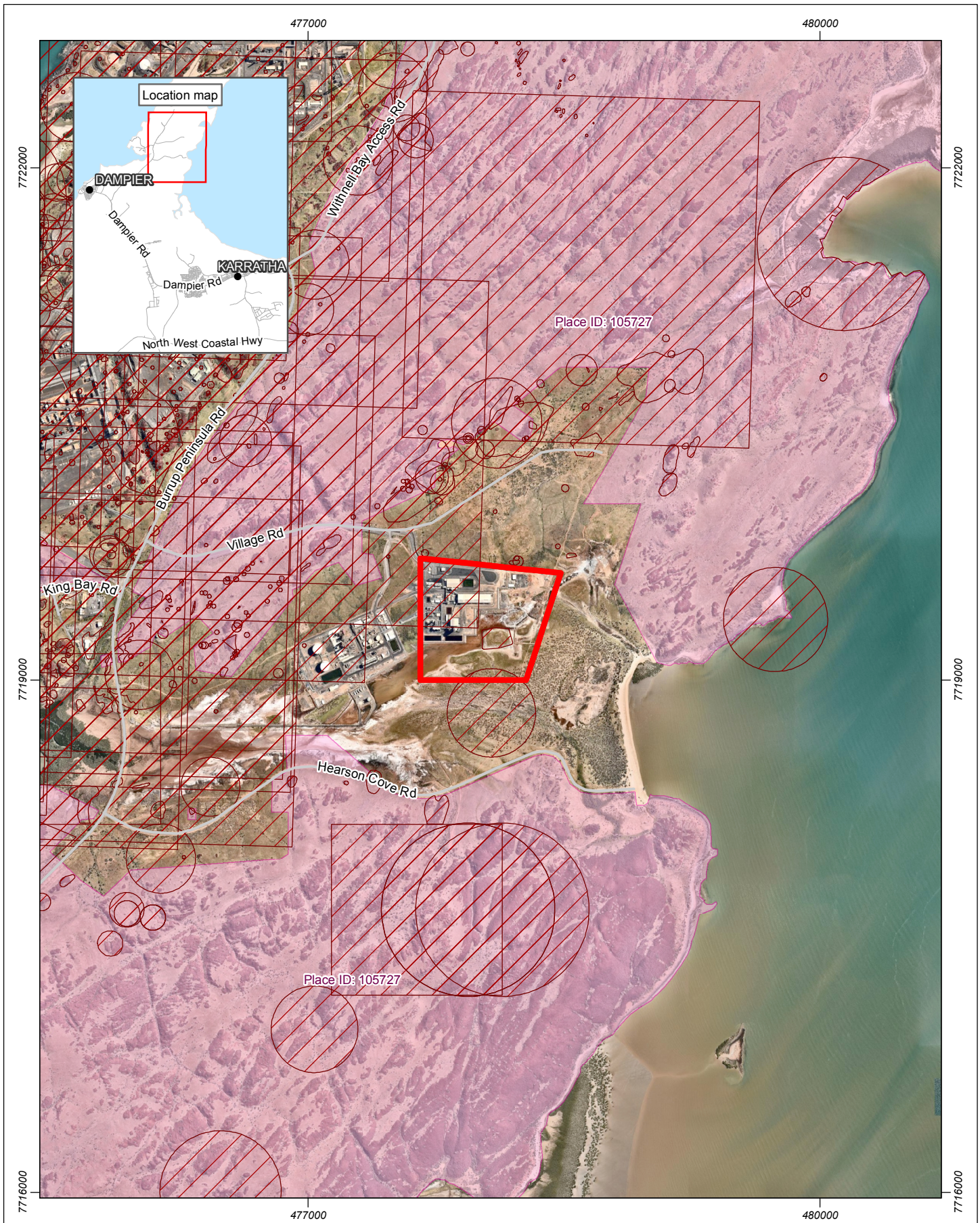
Table with 4 columns: HESQ Manager Name, A#, HESQ Manager Signature, Date

Forward completed form to Document Controller filing and registration in the National Heritage Place Access Register

Document Controller Use Only

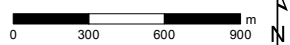
Employee/Contractor details have been entered into the National Heritage Place Access Register Yes []

1 Unauthorised access – defined in EPBC2008/4546 as access by personnel or contractors without written agreement of the manager who is responsible for heritage management.
2 National Heritage Place – defined in EPBC2008/4546 as the Dampier Archipelago (including Burrup Peninsula) National Heritage Place whose location has been defined and values described in the Commonwealth Government's special gazette No.S. 127 dated 3 July 2007. Refer to the pink shaded area on the map over the page.
3 Rock Art sites – defined in EPBC2008/4546 as manmade structures in the National Heritage Place, of a type mentioned in gazette No.S.127 including engravings, etchings, peckings and/or standing stones.






Attachment 1: Location

Scale 1:30,000 at A4



Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 8/06/2017
 Author: JCrute
 Source: Existing cadastre: SLIP, landgate 2016.

Legend

-  Site D boundary
-  National heritage
-  Registered aboriginal heritage site



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 www.strategen.com.au

Form No.	Surname	Given Name	Position Title	a Number (if applicable)	Contracting Company (if not Yara)	Date Authorised
	<i>Bloggs</i>	<i>Joe</i>	<i>Example Person</i>	<i>a931834</i>	<i>Clough Amec</i>	<i>02-Nov-17</i>
001	London	Leanne	Security		ERS	08-Nov-17
002	Holland	Ed	Security		ERS	08-Nov-17
003	Howarth	Brian	HESQ Manager	a922606	Yara	08-Nov-17
004	Rushton	Amy	Trainee Laboratory Technician	a928492	Yara	08-Nov-17
005	March	Corinne	Laboratory Chemist	a924280	Yara	08-Nov-17
006	Gladstone	Jim	H&S Advisor	a923799	Yara	08-Nov-17
007	Barnard	Doug	H&S Advisor	a903703	Yara	08-Nov-17
008	Vasish	Narelle	Business Administration Trainee	a933554	Yara	08-Nov-17
009	Zis	Justin	H&S Superintendent	a933576	Yara	08-Nov-17
010	Ivory	Nicole	Graduate Environmental Officer	a930939	Yara	08-Nov-17
011	Giles	Susan	Environmental Officer	a923267	Yara	08-Nov-17
012	Delbost	Susanna	Environmental Officer	a904476	Yara	08-Nov-17
013	Corker	Neil	Security & ER Superintendent	a925395	Yara	08-Nov-17
014	Bode	Damien	Laboratory Technician		Yara	08-Nov-17
015	Janssen	Ronald	Quality & Laboratory Superintendent	a911741	Yara	08-Nov-17
016	Barbour	Scott	Security		ERS	13-Nov-17
017	Shipp	Bradley	Security		ERS	09-Nov-17
018	Gruber	Andrea	Security		ERS	10-Nov-17
019	Dynan	Jenny	Security		ERS	15-Nov-17
020	Iness	Matthew	Security		ERS	15-Nov-17
021	Bennett	Rick	Security		ERS	20-Nov-17
022	Grujic	Nickola	Security		ERS	20-Nov-17
023	Nguyen	Vanessa	Vacation Student	a934358	Yara	30-Nov-17
024	Carr	Bill	Consultant		WS Fish Consulting	23-Nov-17
025	MacLeod	Ian	Consultant		WS Fish Consulting	23-Nov-17
026	Fish	Warren	Consultant		WS Fish Consulting	23-Nov-17



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Attachment 9B(a): Stack Testing Results 12th May to the 4th of July 2019 (Ektimo Quarterly Stack testing and CEMS data)



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Report Number R007748
Emission Testing Report
June 2019
Yara Pilbara Nitrates
Burrup Peninsula, WA

Document Information

Client Name: Yara Pilbara Fertilisers Pty Ltd
 Report Number: R007748
 Date of Issue: 9 July 2019
 Attention: Nicole Ivory
 Address: Lot 564 Village Road
 Burrup Peninsula WA 6714
 Testing Laboratory: Ektimo Pty Ltd, ABN 86 600 381 413

Report Status

Format	Document Number	Report Date	Prepared By	Reviewed By (1)	Reviewed By (2)
Preliminary Report	-	-	-	-	-
Draft Report	-	-	-	-	-
Final Report	R007748	9/07/2019	NBo	AHa	-
Amend Report	-	-	-	-	-

Template Version: 180619

Amendment Record

Document Number	Initiator	Report Date	Section	Reason
Nil	-	-	-	-

Report Authorisation



Ashley Hart
 Senior Client Manager
 Ektimo Signatory

NATA Accredited Laboratory
 No. 14601

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

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1 EXECUTIVE SUMMARY

Ektimo was engaged by Yara Pilbara Nitrates to perform emission testing. The sampling program was completed on 25 June 2019.

Results from this stack emission monitoring program indicate that Yara Pilbara Nitrates was compliant with requirements of Licence L7997/2002/11 during this monitoring period.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
A1 – Common stack	25 June 2019	Total particulate matter and ammonia

* Flow rate, velocity, temperature and moisture were also determined.

All results are reported on a dry basis at STP.

2 RESULTS SUMMARY

The following licence comparison table shows that all analytes highlighted in green are below the target set by the WA Department of Water and Environmental Regulation (DWER) works approval L7997/2002/11.

DWER No.	Location Description	Pollutant	Units	Target	Detected Values
A1	Common Stack	Particulate matter	mg/m ³	15	<0.9
		Ammonia	mg/m ³	10	0.99

3 RESULTS

3.1 A1 – Common Stack

Date	25/06/2019	Client	Yara Pilbara Nitrates
Report	R007748	Stack ID	Common Stack - Unit 32
Licence No.	L7997/2002/11	Location	Burrup Peninsula
Ektimo Staff	Ashley Hart	State	WA

Sampling Plane Details	
Sampling plane dimensions	1850 mm
Sampling plane area	2.69 m ²
Sampling port size, number & depth	4" Flange (x4), 350 mm
Access & height of ports	Stairs 32 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 11.2 D
Upstream disturbance	Inlet 7.6 D
No. traverses & points sampled	2 16
Sample plane compliance to AS4323.1	Ideal

Stack Parameters		
Moisture content, %v/v	4.3	
Gas molecular weight, g/g mole	28.5 (wet)	29.0 (dry)
Gas density at STP, kg/m ³	1.27 (wet)	1.29 (dry)

Isokinetic Results	Sampling time	Average		Test 1 1050-1155		Test 2 1205-1310	
		Concentration mg/m ³	Mass Rate g/s	Concentration mg/m ³	Mass Rate g/s	Concentration mg/m ³	Mass Rate g/s
Total particulate matter		<1	<0.06	<2	<0.07	<0.9	<0.04
Ammonia		0.99	0.045	0.68	0.031	1.3	0.059
Isokinetic Sampling Parameters							
Sampling time, min				64		64	
Isokinetic rate, %				98		100	
Gas Flow Parameters							
Initial flow measurement time (hhmm)				1045		1200	
Temperature, °C				34		34	
Velocity at sampling plane, m/s				20		20	
Volumetric flow rate, actual, m ³ /min				3200		3200	
Volumetric flow rate (wet STP), m ³ /min				2800		2800	
Volumetric flow rate (dry STP), m ³ /min				2700		2700	
Mass flow rate (wet basis), kg/hour				220000		220000	

4 PLANT OPERATING CONDITIONS

Unless otherwise stated, the plant operating conditions were normal at the time of testing. See Yara Pilbara Fertilisers Pty Ltd's records for complete process conditions.

5 TEST METHODS

All sampling and analysis was performed by Ektimo unless otherwise specified. Specific details of the methods are available upon request.

Parameter	Sampling Method	Analysis Method	Uncertainty*	NATA Accredited	
				Sampling	Analysis
Sample plane criteria	AS 4323.1	NA	NA	✓	NA
Flow rate, temperature and velocity	NA	USEPA 2	8%, 2%, 7%	NA	✓
Moisture	USEPA 4	USEPA 4	8%	✓	✓
Ammonia	USEPA CTM 027	Envirolab Inorg-093	18%	✓	✓ [‡]
Total particulate matter	USEPA 17	USEPA 17	5%	✓	✓

190624

* Uncertainty values cited in this table are calculated at the 95% confidence level (coverage factor = 2)

‡ Analysis performed by Envirolab, NATA accreditation number 2901. Results were reported to Ektimo on 8 July 2019 in report number 220672.

6 QUALITY ASSURANCE/QUALITY CONTROL INFORMATION

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website www.nata.com.au.

Ektimo is accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

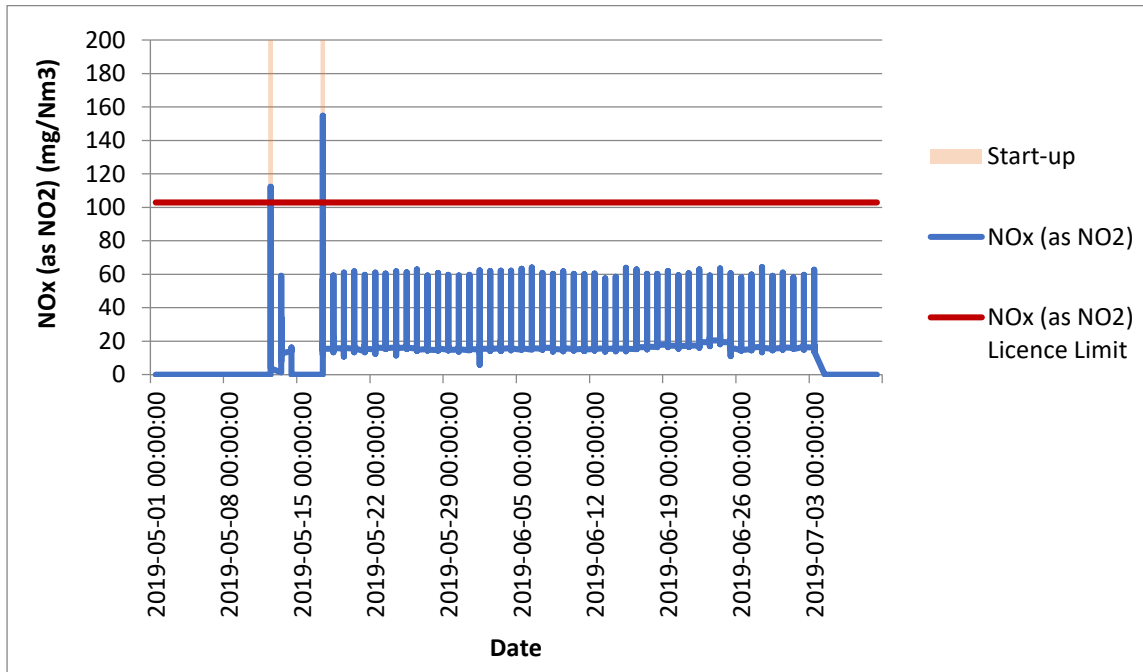
NATA is a member of APLAC (Asia Pacific Laboratory Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through the mutual recognition arrangements with both of these organisations, NATA accreditation is recognised worldwide.

7 DEFINITIONS

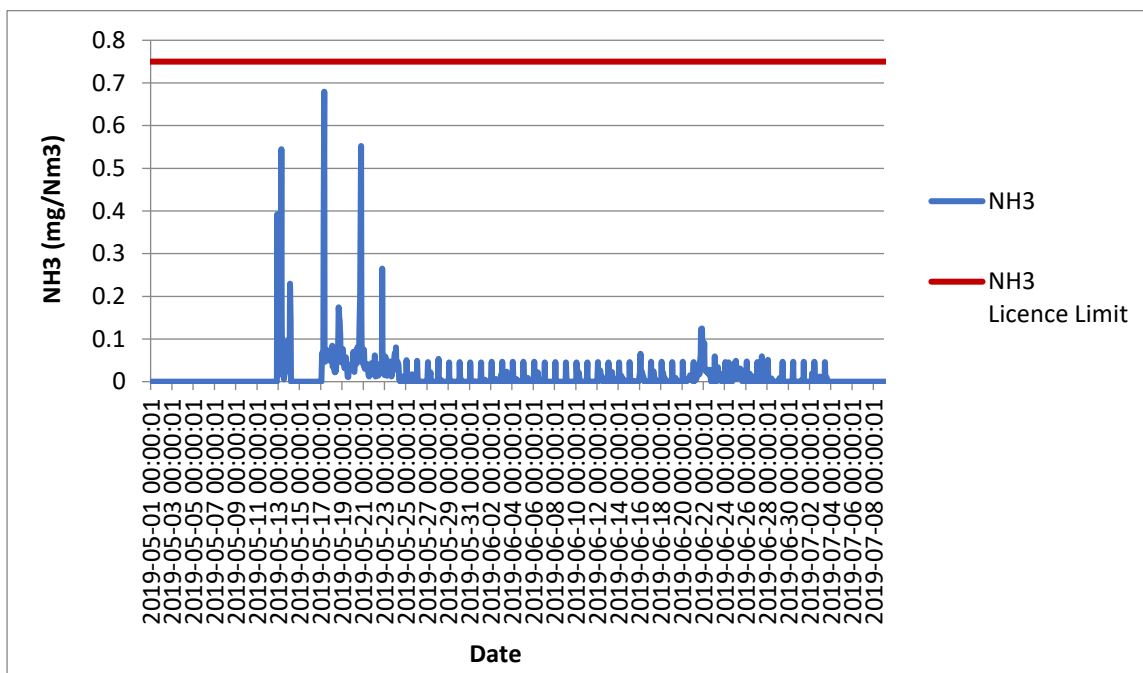
The following symbols and abbreviations may be used in this test report:

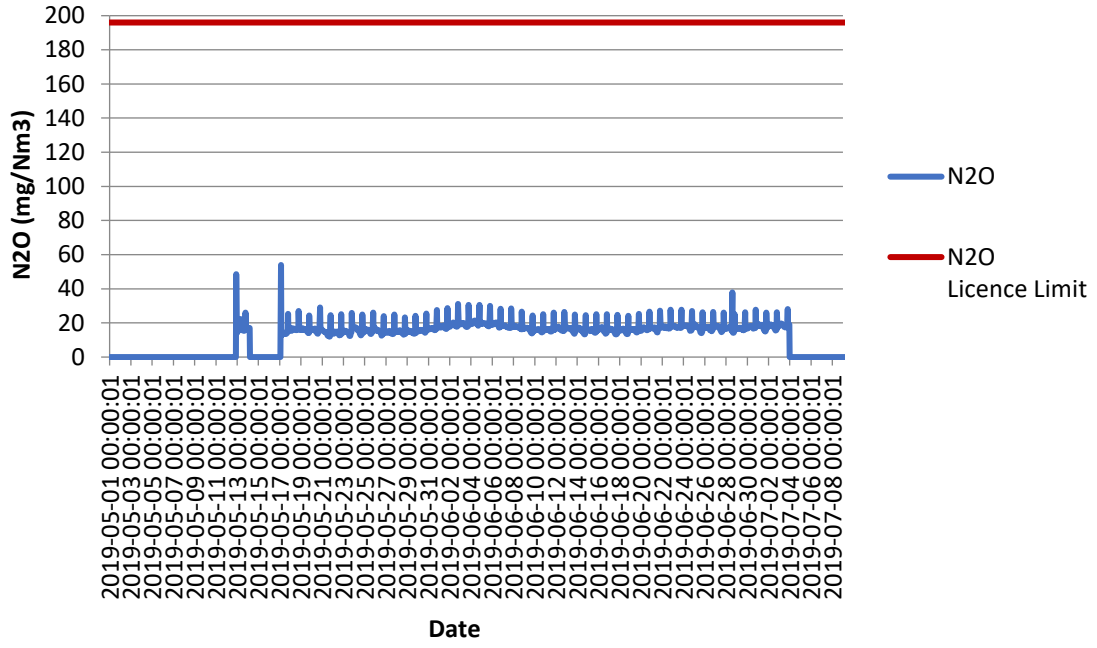
% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
APHA	American public health association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
CEM	Continuous Emission Monitoring
CEMS	Continuous Emission Monitoring System
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
D ₅₀	'Cut size' of a cyclone defined as the particle diameter at which the cyclone achieves a 50% collection efficiency ie. half of the particles are retained by the cyclone and half are not and pass through it to the next stage. The D ₅₀ method simplifies the capture efficiency distribution by assuming that a given cyclone stage captures all of the particles with a diameter equal to or greater than the D ₅₀ of that cyclone and less than the D ₅₀ of the preceding cyclone.
DECC	Department of Environment & Climate Change (NSW)
Disturbance	A flow obstruction or instability in the direction of the flow which may impede accurate flow determination. This includes centrifugal fans, axial fans, partially closed or closed dampers, louvres, bends, connections, junctions, direction changes or changes in pipe diameter.
DWER	Department of Water and Environmental Regulation (WA)
DEHP	Department of Environment and Heritage Protection (QLD)
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra-red
ISC	Intersociety committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
Lower Bound	Defines values reported below detection as equal to zero.
Medium Bound	Defines values reported below detection are equal to half the detection limit.
NA	Not applicable
NATA	National Association of Testing Authorities
NIOSH	National Institute of Occupational Safety and Health
NT	Not tested or results not required
OM	Other approved method
OU	The number of odour units per unit of volume. The numerical value of the odour concentration is equal to the number of dilutions to arrive at the odour threshold (50% panel response).
PM ₁₀	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
PM _{2.5}	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PSA	Particle size analysis
RATA	Relative Accuracy Test Audit
Semi-quantified VOCs	Unknown VOCs (those not matching a standard compound), are identified by matching the mass spectrum of the chromatographic peak to the NIST Standard Reference Database (version 14.0), with a match quality exceeding 70%. An estimated concentration will be determined by matching the integrated area of the peak with the nearest suitable compound in the analytical calibration standard mixture.
STP	Standard temperature and pressure. Gas volumes and concentrations are expressed on a dry basis at 0°C, at discharge oxygen concentration and an absolute pressure of 101.325 kPa, unless otherwise specified.
TM	Test Method
TOC	The sum of all compounds of carbon which contain at least one carbon to carbon bond, plus methane and its derivatives.
USEPA	United States Environmental Protection Agency
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
Vic EPA	Victorian Environment Protection Authority
VOC	Any chemical compound based on carbon with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the particular conditions of use. These compounds may contain oxygen, nitrogen and other elements, but specifically excluded are carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
XRD	X-ray Diffractometry
Upper Bound	Defines values reported below detection are equal to the detection limit.

Nitric Acid Stack- CEMS Data



Note: during start-up, normal operational licence limits do not apply (103 mg/m³). A start-up limit of 1,540 mg/m³ is applicable for the first two (2) hours (maximum) of start-up.





Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-05-12 21:00:01	0.139	0	0	0
2019-05-12 22:00:01	0.976	112.2645912	0.39223868	48.46749013
2019-05-12 23:00:01	1	3.851811488	0.022198949	15.0345193
2019-05-13 00:00:01	1	1.245013045	0.029149796	14.26670049
2019-05-13 01:00:01	1	14.86952075	0.016533261	14.94372873
2019-05-13 02:00:01	1	27.01309248	0.053921543	15.43702267
2019-05-13 03:00:01	1	22.00076291	0.075620414	17.09350689
2019-05-13 04:00:01	1	20.05870899	0.130615849	19.02735991
2019-05-13 05:00:01	1	32.2041872	0.034841748	19.59991368
2019-05-13 06:00:01	1	34.47364439	0.08442114	21.06080109
2019-05-13 07:00:01	1	19.72678011	0.544743787	22.37135183
2019-05-13 08:00:01	1	17.36452339	0.163159837	19.39494923
2019-05-13 09:00:01	1	11.75334455	0.063514855	17.98329663
2019-05-13 10:00:01	1	8.005436341	0.09931723	16.68264288
2019-05-13 11:00:01	1	11.66094442	0.016751966	15.73258418
2019-05-13 12:00:01	1	11.4524727	0.010934182	15.97081437
2019-05-13 13:00:01	1	14.07743817	0.005539358	15.84612304
2019-05-13 14:00:01	1	13.3335416	0.014097526	15.53040086
2019-05-13 15:00:01	1	12.83386703	0.01956977	15.28873593
2019-05-13 16:00:01	1	13.25000769	0.030958327	15.36942879
2019-05-13 17:00:01	1	13.43255291	0.037293293	15.55797007
2019-05-13 18:00:01	1	12.37279474	0.035566199	15.94762762
2019-05-13 19:00:01	1	59.1784961	0.034688221	26.04248159
2019-05-13 20:00:01	1	13.65838383	0.025937403	16.12322545
2019-05-13 21:00:01	1	12.80082542	0.026305171	16.6722949
2019-05-13 22:00:01	1	12.89303639	0.025652908	16.49583771
2019-05-13 23:00:01	1	12.84174482	0.056905551	16.69764146
2019-05-14 00:00:01	1	13.95503297	0.098785948	16.51315905
2019-05-14 01:00:01	1	15.05766947	0.031004318	16.43121891
2019-05-14 02:00:01	1	16.23714417	0.067175746	16.00862178
2019-05-14 03:00:01	1	15.61326981	0.229791168	17.11425939
2019-05-14 04:00:01	1	15.00121199	0.141276435	17.09631529
2019-05-14 05:00:01	0.165	0	0	0
2019-05-14 06:00:01	0	0	0	0
2019-05-14 07:00:01	0	0	0	0
2019-05-14 08:00:01	0	0	0	0
2019-05-14 09:00:01	0	0	0	0
2019-05-14 10:00:01	0	0	0	0
2019-05-14 11:00:01	0	0	0	0
2019-05-14 12:00:01	0	0	0	0
2019-05-14 13:00:01	0	0	0	0

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-05-14 14:00:01	0	0	0	0
2019-05-14 15:00:01	0	0	0	0
2019-05-14 16:00:01	0	0	0	0
2019-05-14 17:00:01	0	0	0	0
2019-05-14 18:00:01	0	0	0	0
2019-05-14 19:00:01	0	0	0	0
2019-05-14 20:00:01	0	0	0	0
2019-05-14 21:00:01	0	0	0	0
2019-05-14 22:00:01	0	0	0	0
2019-05-14 23:00:01	0	0	0	0
2019-05-15 00:00:01	0	0	0	0
2019-05-15 01:00:01	0	0	0	0
2019-05-15 02:00:01	0	0	0	0
2019-05-15 03:00:01	0	0	0	0
2019-05-15 04:00:01	0	0	0	0
2019-05-15 05:00:01	0	0	0	0
2019-05-15 06:00:01	0	0	0	0
2019-05-15 07:00:01	0	0	0	0
2019-05-15 08:00:01	0	0	0	0
2019-05-15 09:00:01	0	0	0	0
2019-05-15 10:00:01	0	0	0	0
2019-05-15 11:00:01	0	0	0	0
2019-05-15 12:00:01	0	0	0	0
2019-05-15 13:00:01	0	0	0	0
2019-05-15 14:00:01	0	0	0	0
2019-05-15 15:00:01	0	0	0	0
2019-05-15 16:00:01	0	0	0	0
2019-05-15 17:00:01	0	0	0	0
2019-05-15 18:00:01	0	0	0	0
2019-05-15 19:00:01	0	0	0	0
2019-05-15 20:00:01	0	0	0	0
2019-05-15 21:00:01	0	0	0	0
2019-05-15 22:00:01	0	0	0	0
2019-05-15 23:00:01	0	0	0	0
2019-05-16 00:00:01	0	0	0	0
2019-05-16 01:00:01	0	0	0	0
2019-05-16 02:00:01	0	0	0	0
2019-05-16 03:00:01	0	0	0	0
2019-05-16 04:00:01	0	0	0	0
2019-05-16 05:00:01	0	0	0	0
2019-05-16 06:00:01	0	0	0	0

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-05-16 07:00:01	0	0	0	0
2019-05-16 08:00:01	0	0	0	0
2019-05-16 09:00:01	0	0	0	0
2019-05-16 10:00:01	0	0	0	0
2019-05-16 11:00:01	0	0	0	0
2019-05-16 12:00:01	0	0	0	0
2019-05-16 13:00:01	0	0	0	0
2019-05-16 14:00:01	0	0	0	0
2019-05-16 15:00:01	0	0	0	0
2019-05-16 16:00:01	0	0	0	0
2019-05-16 17:00:01	0	0	0	0
2019-05-16 18:00:01	0	0	0	0
2019-05-16 19:00:01	0	0	0	0
2019-05-16 20:00:01	0	0	0	0
2019-05-16 21:00:01	0	0	0	0
2019-05-16 22:00:01	0	0	0	0
2019-05-16 23:00:01	0	0	0	0
2019-05-17 00:00:01	0	0	0	0
2019-05-17 01:00:01	0	0	0	0
2019-05-17 02:00:01	0	0	0	0
2019-05-17 03:00:01	0.954	154.7483417	0.060033967	53.93813046
2019-05-17 04:00:01	1	14.79342816	0.068550465	13.14007792
2019-05-17 05:00:01	1	16.3214183	0.054600072	13.01487809
2019-05-17 06:00:01	1	17.83812529	0.04905093	13.29565412
2019-05-17 07:00:01	1	18.71317634	0.37290945	13.9014229
2019-05-17 08:00:01	1	12.0296611	0.679496689	14.36299938
2019-05-17 09:00:01	1	11.81022309	0.050528732	14.13276795
2019-05-17 10:00:01	1	15.01319035	0.046973047	14.13833349
2019-05-17 11:00:01	1	14.93134096	0.06185254	13.87558308
2019-05-17 12:00:01	1	15.33729421	0.056707281	14.07190116
2019-05-17 13:00:01	1	14.76385324	0.064419202	13.66157466
2019-05-17 14:00:01	1	15.35301506	0.074263691	13.43852684
2019-05-17 15:00:01	1	15.4936975	0.063550349	13.67275042
2019-05-17 16:00:01	1	15.22825896	0.053459093	13.88644286
2019-05-17 17:00:01	1	15.60587137	0.05247284	14.36379106
2019-05-17 18:00:01	1	14.1400237	0.061867264	14.71136495
2019-05-17 19:00:01	1	57.40381018	0.065733512	25.33826818
2019-05-17 20:00:01	1	14.91351972	0.050059543	15.93996976
2019-05-17 21:00:01	1	14.67483012	0.04894732	15.80095309
2019-05-17 22:00:01	1	15.44886006	0.050484017	15.50097389
2019-05-17 23:00:01	1	15.42122206	0.054314287	15.895516

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-05-18 00:00:01	1	15.4749328	0.065215459	16.29191865
2019-05-18 01:00:01	1	19.33292763	0.057660992	16.93988322
2019-05-18 02:00:01	1	22.59246714	0.084008344	16.059021
2019-05-18 03:00:01	1	14.58694361	0.035328273	15.31603277
2019-05-18 04:00:01	1	15.52770363	0.036945414	15.78122239
2019-05-18 05:00:01	1	15.82933932	0.037535578	16.25598412
2019-05-18 06:00:01	1	15.95554598	0.041863134	16.77342224
2019-05-18 07:00:01	1	15.34385927	0.024505298	16.61551658
2019-05-18 08:00:01	1	15.71332528	0.022093299	16.17777292
2019-05-18 09:00:01	1	15.81741014	0.039026961	16.24922134
2019-05-18 10:00:01	1	18.10131628	0.023074601	16.58185393
2019-05-18 11:00:01	1	15.19354676	0.03373759	16.46831602
2019-05-18 12:00:01	1	15.44178433	0.048217989	16.25402466
2019-05-18 13:00:01	1	15.28859661	0.053280805	15.92223791
2019-05-18 14:00:01	1	14.30880509	0.046337131	15.73123999
2019-05-18 15:00:01	1	15.07018654	0.079268501	16.02266708
2019-05-18 16:00:01	1	15.90578312	0.113616251	16.12451495
2019-05-18 17:00:01	1	15.90955063	0.173914116	16.39925474
2019-05-18 18:00:01	1	15.19242568	0.149319769	16.6060957
2019-05-18 19:00:01	1	59.31558196	0.145163132	27.06123126
2019-05-18 20:00:01	1	13.3086351	0.108162957	16.84682087
2019-05-18 21:00:01	1	14.2267181	0.053330545	16.1950057
2019-05-18 22:00:01	1	15.83845096	0.047653735	16.24218434
2019-05-18 23:00:01	1	15.85938812	0.04837715	16.02075934
2019-05-19 00:00:01	1	15.66913998	0.045307004	15.97370584
2019-05-19 01:00:01	1	10.91521446	0.043866374	16.15102903
2019-05-19 02:00:01	1	13.97570109	0.076600031	15.96359281
2019-05-19 03:00:01	1	14.31526104	0.045097203	16.47656664
2019-05-19 04:00:01	1	15.54361521	0.042715157	16.81790083
2019-05-19 05:00:01	1	15.19498065	0.039209388	16.32469804
2019-05-19 06:00:01	1	15.44700114	0.031658174	16.10536322
2019-05-19 07:00:01	1	16.22753728	0.03277111	16.48352224
2019-05-19 08:00:01	1	16.1449588	0.058026109	16.16684427
2019-05-19 09:00:01	1	13.95548671	0.056010236	16.38013472
2019-05-19 10:00:01	1	16.03038754	0.036057094	16.18923225
2019-05-19 11:00:01	1	15.54875564	0.035062978	15.87103341
2019-05-19 12:00:01	1	15.40456844	0.024478228	15.53597478
2019-05-19 13:00:01	1	15.341424	0.0113247	15.35794122
2019-05-19 14:00:01	1	15.57839038	0.010629885	14.86142453
2019-05-19 15:00:01	1	15.54647904	0.021535261	14.61570877
2019-05-19 16:00:01	1	15.41813331	0.031133726	14.31903031

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-05-19 17:00:01	1	15.46312823	0.034737683	14.15394518
2019-05-19 18:00:01	1	15.14685666	0.040025929	13.96667389
2019-05-19 19:00:01	1	60.95213251	0.034700581	24.42916886
2019-05-19 20:00:01	1	15.17579264	0.032907798	15.13963539
2019-05-19 21:00:01	1	15.16382	0.034283814	15.76530081
2019-05-19 22:00:01	1	10.97007178	0.037224671	16.12620277
2019-05-19 23:00:01	1	16.15786377	0.035287729	16.36498191
2019-05-20 00:00:01	1	15.54524876	0.035095012	16.36255897
2019-05-20 01:00:01	1	15.39215047	0.030770124	16.28575586
2019-05-20 02:00:01	1	15.1229003	0.069629822	16.52981233
2019-05-20 03:00:01	1	17.32970375	0.02675754	16.3717262
2019-05-20 04:00:01	1	15.05673127	0.02233397	15.82879449
2019-05-20 05:00:01	1	15.317096	0.035920699	15.96857589
2019-05-20 06:00:01	1	15.11571561	0.046175862	16.26741177
2019-05-20 07:00:01	1	15.2934867	0.052816993	16.69487275
2019-05-20 08:00:01	1	15.24509983	0.072757586	16.72060867
2019-05-20 09:00:01	1	16.98226806	0.046431254	15.23227439
2019-05-20 10:00:01	1	17.41458976	0.04302721	14.93626797
2019-05-20 11:00:01	1	16.12364077	0.080958531	15.20913962
2019-05-20 12:00:01	1	16.42257424	0.066912005	14.58866745
2019-05-20 13:00:01	1	16.61600624	0.073189135	13.89881368
2019-05-20 14:00:01	1	16.16173234	0.082463427	13.702355
2019-05-20 15:00:01	1	15.83808386	0.082382385	14.22616723
2019-05-20 16:00:01	1	15.37950352	0.133949607	15.06565738
2019-05-20 17:00:01	1	19.47560996	0.194989037	15.8133863
2019-05-20 18:00:01	1	19.79430117	0.314001742	16.9574802
2019-05-20 19:00:01	1	61.75077452	0.552359592	28.99377256
2019-05-20 20:00:01	1	13.45046214	0.158689897	18.48125099
2019-05-20 21:00:01	1	14.40982034	0.067341232	16.77172934
2019-05-20 22:00:01	1	14.22108233	0.05750239	16.04496211
2019-05-20 23:00:01	1	15.81746976	0.050376682	15.96297395
2019-05-21 00:00:01	1	14.01827818	0.043398389	15.96964482
2019-05-21 01:00:01	1	15.29747254	0.03820241	15.55771655
2019-05-21 02:00:01	1	16.81801629	0.075290992	15.4333133
2019-05-21 03:00:01	1	15.17484846	0.031835295	15.15203115
2019-05-21 04:00:01	1	14.90931279	0.029806164	15.06414252
2019-05-21 05:00:01	1	15.16192167	0.029785685	14.87647554
2019-05-21 06:00:01	1	15.33972864	0.029482422	14.7724592
2019-05-21 07:00:01	1	15.86720552	0.029194055	14.58935627
2019-05-21 08:00:01	1	17.71536091	0.038969211	14.37861356
2019-05-21 09:00:01	1	13.39024865	0.04162221	14.59762481

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-05-21 10:00:01	1	15.30044493	0.028464906	14.36933325
2019-05-21 11:00:01	1	16.37324394	0.033001193	13.71027094
2019-05-21 12:00:01	1	16.75910939	0.01618894	12.64888247
2019-05-21 13:00:01	1	15.19428587	0.011956696	12.39401939
2019-05-21 14:00:01	1	14.73740505	0.016248569	12.31807255
2019-05-21 15:00:01	1	15.45898089	0.028057565	12.31943868
2019-05-21 16:00:01	1	15.61082533	0.031908795	12.07737695
2019-05-21 17:00:01	1	15.45991361	0.032492018	11.9189571
2019-05-21 18:00:01	1	15.27507643	0.034027827	12.13497533
2019-05-21 19:00:01	1	59.67625256	0.043413323	24.5155854
2019-05-21 20:00:01	1	15.52490839	0.027893628	14.47994446
2019-05-21 21:00:01	1	16.0397101	0.025740902	15.00018272
2019-05-21 22:00:01	1	15.14684971	0.023926757	14.36708175
2019-05-21 23:00:01	1	15.43112638	0.018580912	13.93906222
2019-05-22 00:00:01	1	15.01969483	0.020137964	13.99065689
2019-05-22 01:00:01	1	17.4854342	0.020487248	13.78230112
2019-05-22 02:00:01	1	12.4055988	0.061906927	13.70203195
2019-05-22 03:00:01	1	15.927432	0.014131802	14.34940116
2019-05-22 04:00:01	1	15.61573966	0.012202821	15.00953923
2019-05-22 05:00:01	1	15.23595019	0.013180123	14.77579149
2019-05-22 06:00:01	1	15.56166907	0.019011857	14.16697923
2019-05-22 07:00:01	1	16.47645264	0.025311964	14.42484336
2019-05-22 08:00:01	1	15.9542597	0.041377054	14.58137915
2019-05-22 09:00:01	1	15.74571249	0.036041847	14.7580412
2019-05-22 10:00:01	1	15.9702632	0.014669665	14.92710605
2019-05-22 11:00:01	1	15.85556683	0.028875145	14.33436917
2019-05-22 12:00:01	1	16.01437934	0.034961237	13.79949713
2019-05-22 13:00:01	1	15.94366205	0.034762122	13.41534938
2019-05-22 14:00:01	1	16.45030817	0.021826366	13.0452107
2019-05-22 15:00:01	1	16.08714613	0.032104881	12.74414391
2019-05-22 16:00:01	1	15.98903808	0.026721657	12.93641549
2019-05-22 17:00:01	1	16.12635654	0.027595274	13.10010123
2019-05-22 18:00:01	1	15.9448733	0.034026218	13.17692829
2019-05-22 19:00:01	1	61.03757455	0.265052184	25.06609648
2019-05-22 20:00:01	1	14.6390701	0.072116404	15.3022921
2019-05-22 21:00:01	1	15.93900267	0.036761001	15.89107002
2019-05-22 22:00:01	1	15.99268811	0.023836359	15.86553413
2019-05-22 23:00:01	1	16.07760277	0.018348448	15.49658603
2019-05-23 00:00:01	1	16.14206701	0.015852253	15.24865719
2019-05-23 01:00:01	1	16.03714435	0.014965069	14.46311661
2019-05-23 02:00:01	1	15.8904096	0.058791918	15.03506661

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-05-23 03:00:01	1	16.82866466	0.016251119	14.82707631
2019-05-23 04:00:01	1	16.04418754	0.014803027	15.17877692
2019-05-23 05:00:01	1	15.51135285	0.014676292	15.28598465
2019-05-23 06:00:01	1	16.29554997	0.015436834	15.35697904
2019-05-23 07:00:01	1	16.74889512	0.014018771	14.83353534
2019-05-23 08:00:01	1	16.48442978	0.016412182	14.67326569
2019-05-23 09:00:01	1	15.43585027	0.020592427	14.63981719
2019-05-23 10:00:01	1	15.54787974	0.022193014	14.64956867
2019-05-23 11:00:01	1	15.99527016	0.022222951	14.67598898
2019-05-23 12:00:01	1	16.10865572	0.047100781	13.93668047
2019-05-23 13:00:01	1	15.35590619	0.045666897	12.94131643
2019-05-23 14:00:01	1	16.52371081	0.020766593	12.33941994
2019-05-23 15:00:01	1	16.45502697	0.028239276	12.31927396
2019-05-23 16:00:01	1	16.27503216	0.011836167	13.0902601
2019-05-23 17:00:01	1	16.28307124	0.020607403	13.87528608
2019-05-23 18:00:01	1	16.02734596	0.024315855	14.68899275
2019-05-23 19:00:01	1	60.51919394	0.024157633	25.82691611
2019-05-23 20:00:01	1	16.13265707	0.028086341	16.41968406
2019-05-23 21:00:01	1	16.25059599	0.038581985	17.32054926
2019-05-23 22:00:01	1	16.18998945	0.049545296	17.1379888
2019-05-23 23:00:01	1	15.96296521	0.064312747	17.13081828
2019-05-24 00:00:01	1	16.28314574	0.0675152	17.00500253
2019-05-24 01:00:01	1	14.99343442	0.044592255	17.22378223
2019-05-24 02:00:01	1	11.4464491	0.080389178	17.37413576
2019-05-24 03:00:01	1	15.87659822	0.042106975	17.39451507
2019-05-24 04:00:01	1	17.17426011	0.043920109	17.32385864
2019-05-24 05:00:01	1	16.98982266	0.042067607	17.16201176
2019-05-24 06:00:01	1	14.42068358	0.046742242	17.10241943
2019-05-24 07:00:01	1	16.13840873	0.040873279	16.53309652
2019-05-24 08:00:01	1	17.92200025	0.039187281	15.72411863
2019-05-24 09:00:01	1	17.25789955	0.004506457	16.05847562
2019-05-24 10:00:01	1	16.50999612	0.003964851	15.81695927
2019-05-24 11:00:01	1	16.12735911	0.001716088	15.59895657
2019-05-24 12:00:01	1	16.58379301	0	14.66509337
2019-05-24 13:00:01	1	16.22674829	0	13.79511018
2019-05-24 14:00:01	1	16.35538895	0.003325069	13.15846874
2019-05-24 15:00:01	1	16.38938653	0.011126085	12.80186641
2019-05-24 16:00:01	1	16.36319888	0.009499416	12.72594772
2019-05-24 17:00:01	1	16.27471559	0.011861674	13.32417218
2019-05-24 18:00:01	1	15.76605648	0.004645026	14.14997767
2019-05-24 19:00:01	1	61.74102368	0.000323139	24.92438053

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-05-24 20:00:01	1	16.2755866	0.000192532	14.87550174
2019-05-24 21:00:01	1	16.55747777	0.000135123	14.9531915
2019-05-24 22:00:01	1	17.17055232	0.000652461	14.44251278
2019-05-24 23:00:01	1	15.78262271	0.000793464	15.25053018
2019-05-25 00:00:01	1	16.17322004	0.000430751	15.92652435
2019-05-25 01:00:01	1	16.1844372	0.001655061	16.40334403
2019-05-25 02:00:01	1	16.76304627	0.050164074	16.03575244
2019-05-25 03:00:01	1	15.4479931	0.000658191	16.0785849
2019-05-25 04:00:01	1	16.97419803	0.000554079	15.37678424
2019-05-25 05:00:01	1	15.43868406	0.000141603	15.61998759
2019-05-25 06:00:01	1	16.46141113	0.000680429	15.66985862
2019-05-25 07:00:01	1	16.13041301	0.000653837	16.0706303
2019-05-25 08:00:01	1	17.13999419	0.000108103	15.70741888
2019-05-25 09:00:01	1	15.29977235	0	15.11931744
2019-05-25 10:00:01	1	16.15609182	0	14.90790091
2019-05-25 11:00:01	1	16.33474765	7.26996E-05	14.5423283
2019-05-25 12:00:01	1	16.82611176	0.003258351	14.24619067
2019-05-25 13:00:01	1	16.32692614	9.96017E-05	13.70143318
2019-05-25 14:00:01	1	16.47374848	0.017043545	13.53264003
2019-05-25 15:00:01	1	16.54220371	0.005171519	13.69270799
2019-05-25 16:00:01	1	16.43955845	0.005721975	14.3946595
2019-05-25 17:00:01	1	16.39968782	0.003534512	14.87332102
2019-05-25 18:00:01	1	16.02829975	0.004626127	14.87467076
2019-05-25 19:00:01	1	61.23964752	0.000204682	25.96260253
2019-05-25 20:00:01	1	16.38842038	0.00188059	16.27524054
2019-05-25 21:00:01	1	16.07199169	0.00563916	17.2544568
2019-05-25 22:00:01	1	15.85663188	0.010984706	17.19345652
2019-05-25 23:00:01	1	16.23707571	0.008214374	17.07006217
2019-05-26 00:00:01	1	15.5132512	0.004120471	16.76459215
2019-05-26 01:00:01	1	16.1872017	0.001604982	16.09805845
2019-05-26 02:00:01	1	16.07555524	0.04873092	15.76777039
2019-05-26 03:00:01	1	16.72431914	0.000653013	15.44582979
2019-05-26 04:00:01	1	15.90437308	0.000157728	15.27825213
2019-05-26 05:00:01	1	14.17465644	0.000183662	15.83993171
2019-05-26 06:00:01	1	15.04243965	0.000157814	15.99861278
2019-05-26 07:00:01	1	15.76950376	0.000157692	15.70323166
2019-05-26 08:00:01	1	16.17480328	0.000157831	15.0516944
2019-05-26 09:00:01	1	16.2499067	0.000180409	14.9215812
2019-05-26 10:00:01	1	15.39939697	0.000164692	15.39320672
2019-05-26 11:00:01	1	15.4484237	0.000157907	14.74326609
2019-05-26 12:00:01	1	15.58515308	0.000157824	14.18952847

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-05-26 13:00:01	1	15.43827178	0.000137458	13.51840908
2019-05-26 14:00:01	1	15.41869205	0	12.60378055
2019-05-26 15:00:01	1	15.71895109	0	12.80251673
2019-05-26 16:00:01	1	15.3538511	0	13.13696931
2019-05-26 17:00:01	1	15.24721757	0	13.41299305
2019-05-26 18:00:01	1	14.99071406	0	13.79791295
2019-05-26 19:00:01	1	62.89616337	0	24.014508
2019-05-26 20:00:01	1	15.01003456	0	13.91782827
2019-05-26 21:00:01	1	15.38608447	0	14.23898305
2019-05-26 22:00:01	1	15.9935559	0	14.37956479
2019-05-26 23:00:01	1	15.00016363	0	14.71136524
2019-05-27 00:00:01	1	15.33474342	0	15.26368132
2019-05-27 01:00:01	1	15.71283627	0	15.18130242
2019-05-27 02:00:01	1	15.12597967	0.04619281	14.86068052
2019-05-27 03:00:01	1	15.36720146	0	14.53386398
2019-05-27 04:00:01	1	15.28066454	0	14.29156666
2019-05-27 05:00:01	1	16.22176605	0	14.29065552
2019-05-27 06:00:01	1	15.41105804	0.018955356	14.30342527
2019-05-27 07:00:01	1	15.1765794	0.012271787	14.85115959
2019-05-27 08:00:01	1	15.60926532	0.022179866	15.35562812
2019-05-27 09:00:01	1	15.10654693	0	14.73854471
2019-05-27 10:00:01	1	16.0915703	0	14.65872972
2019-05-27 11:00:01	1	15.2374007	0	14.21241056
2019-05-27 12:00:01	1	15.27889013	0	14.33074595
2019-05-27 13:00:01	1	15.19333738	0	14.05811902
2019-05-27 14:00:01	1	15.77437678	0	13.48261185
2019-05-27 15:00:01	1	15.42327825	0	13.473076
2019-05-27 16:00:01	1	15.36857896	0	13.46110928
2019-05-27 17:00:01	1	15.17761546	0	13.6601198
2019-05-27 18:00:01	1	15.61446497	0	14.13310515
2019-05-27 19:00:01	1	59.38234859	0	24.8512246
2019-05-27 20:00:01	1	15.02520089	0	14.73021924
2019-05-27 21:00:01	1	15.45975987	0	15.09457406
2019-05-27 22:00:01	1	14.43342911	0	15.45833814
2019-05-27 23:00:01	1	15.00484713	0	15.44489159
2019-05-28 00:00:01	1	14.64884489	0.000257331	15.29714012
2019-05-28 01:00:01	1	15.02929909	0.006449044	15.31239923
2019-05-28 02:00:01	1	15.34664111	0.053488891	14.87423139
2019-05-28 03:00:01	1	15.24026849	0	15.21264062
2019-05-28 04:00:01	1	15.70735146	0	14.99825474
2019-05-28 05:00:01	1	15.88750581	0.000126909	15.02925265

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-05-28 06:00:01	1	16.00015977	0.002664624	15.25698404
2019-05-28 07:00:01	1	15.44797424	0.004640144	15.66765289
2019-05-28 08:00:01	1	14.58775412	1.32662E-05	15.59802889
2019-05-28 09:00:01	1	16.2541553	0	15.27749801
2019-05-28 10:00:01	1	15.50231011	0	15.205167
2019-05-28 11:00:01	1	15.40151887	0	14.40199696
2019-05-28 12:00:01	1	15.36378494	0	14.12489751
2019-05-28 13:00:01	1	15.05960593	0	14.0462362
2019-05-28 14:00:01	1	15.82444622	0	13.8584805
2019-05-28 15:00:01	1	15.77148767	0	13.53565876
2019-05-28 16:00:01	1	15.64056802	0	13.18095388
2019-05-28 17:00:01	1	15.94962957	0	13.3208622
2019-05-28 18:00:01	1	14.44088647	0	13.73621846
2019-05-28 19:00:01	1	60.91489586	0	23.33289132
2019-05-28 20:00:01	1	15.12663053	0	13.7543208
2019-05-28 21:00:01	1	15.49259177	0	14.4176106
2019-05-28 22:00:01	1	15.20173796	0	14.68174553
2019-05-28 23:00:01	1	15.76927044	0	15.40882858
2019-05-29 00:00:01	1	14.98788035	0	15.93352489
2019-05-29 01:00:01	1	15.01026609	0	15.68137261
2019-05-29 02:00:01	1	14.65895203	0.044798511	15.67869445
2019-05-29 03:00:01	1	14.59883354	0	15.58849772
2019-05-29 04:00:01	1	15.22969146	0	15.26837324
2019-05-29 05:00:01	1	15.24111736	0	14.76314353
2019-05-29 06:00:01	1	17.01615483	2.3103E-05	14.71634928
2019-05-29 07:00:01	1	15.36760405	0.000958132	15.14761344
2019-05-29 08:00:01	1	14.58948971	1.63051E-05	15.30693648
2019-05-29 09:00:01	1	15.87749111	0	15.14723627
2019-05-29 10:00:01	1	15.70446268	0	15.00314832
2019-05-29 11:00:01	1	15.47519054	0	14.18542642
2019-05-29 12:00:01	1	15.08312493	0	14.43781039
2019-05-29 13:00:01	1	15.15682067	0.000104398	14.24954879
2019-05-29 14:00:01	1	15.67823908	0	14.09381659
2019-05-29 15:00:01	1	15.35412353	0	13.63794472
2019-05-29 16:00:01	1	15.04110805	0	13.63475716
2019-05-29 17:00:01	1	15.03460774	0	13.87971041
2019-05-29 18:00:01	1	15.14939241	0	13.95143988
2019-05-29 19:00:01	1	59.70054233	0	24.20492696
2019-05-29 20:00:01	1	15.03443292	0	14.2243377
2019-05-29 21:00:01	1	15.37319948	0	14.44109907
2019-05-29 22:00:01	1	15.39559025	0.000194425	15.24988221

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-05-29 23:00:01	1	14.92978553	0	16.07848877
2019-05-30 00:00:01	1	14.83006303	0	16.09461747
2019-05-30 01:00:01	1	15.0142677	0	15.70041158
2019-05-30 02:00:01	1	15.62539451	0.04574155	15.61916213
2019-05-30 03:00:01	1	15.62589973	0	15.26824438
2019-05-30 04:00:01	1	15.10992932	0	15.17672525
2019-05-30 05:00:01	1	15.16764083	0.005024615	15.56067627
2019-05-30 06:00:01	1	15.13136363	0	15.87314351
2019-05-30 07:00:01	1	15.78868699	0	15.8371998
2019-05-30 08:00:01	1	13.79126214	0	15.81710054
2019-05-30 09:00:01	1	16.35159142	0	15.94735677
2019-05-30 10:00:01	1	16.363688	0	15.6935286
2019-05-30 11:00:01	1	15.00324444	0	15.50257012
2019-05-30 12:00:01	1	15.27503436	0	15.50204318
2019-05-30 13:00:01	1	15.58111552	0	15.28195168
2019-05-30 14:00:01	1	15.40863152	0	15.15336095
2019-05-30 15:00:01	1	15.20389997	0	14.59358986
2019-05-30 16:00:01	1	15.59225796	0	14.17975073
2019-05-30 17:00:01	1	15.0620482	0	14.45645868
2019-05-30 18:00:01	1	15.27423989	0	14.84207729
2019-05-30 19:00:01	1	59.2886349	0	25.56175184
2019-05-30 20:00:01	1	13.91315863	0	16.29813575
2019-05-30 21:00:01	1	14.85796444	0	16.61858206
2019-05-30 22:00:01	1	16.94704401	0	16.82155016
2019-05-30 23:00:01	1	15.31301852	0	16.43464426
2019-05-31 00:00:01	1	14.53831792	0	16.50842283
2019-05-31 01:00:01	1	15.57506169	0	16.10911377
2019-05-31 02:00:01	1	15.38521321	0.045032737	16.41099805
2019-05-31 03:00:01	1	17.77755117	0	16.40982312
2019-05-31 04:00:01	1	14.90943285	0	16.62773608
2019-05-31 05:00:01	1	15.46130494	0	16.55901921
2019-05-31 06:00:01	1	15.25385098	0	16.59892052
2019-05-31 07:00:01	1	15.51760333	0	16.80629665
2019-05-31 08:00:01	1	15.77273714	0	16.53673651
2019-05-31 09:00:01	1	14.843831	0	16.71428991
2019-05-31 10:00:01	1	14.68966827	0	17.02468097
2019-05-31 11:00:01	1	15.68651823	0.000989394	16.19051018
2019-05-31 12:00:01	1	15.30087627	0.000303347	16.16459828
2019-05-31 13:00:01	1	15.88414739	0	15.90924642
2019-05-31 14:00:01	1	15.6705405	0	15.77861669
2019-05-31 15:00:01	1	15.00386258	0	16.11350279

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-05-31 16:00:01	1	15.1538768	0	16.19870437
2019-05-31 17:00:01	1	15.31131628	0	16.20400711
2019-05-31 18:00:01	1	15.40991952	0	16.40475376
2019-05-31 19:00:01	1	59.75840845	0	27.47806103
2019-05-31 20:00:01	1	15.57481244	0	17.37357267
2019-05-31 21:00:01	1	15.96395256	0	17.90100075
2019-05-31 22:00:01	1	14.98399696	0	18.51538283
2019-05-31 23:00:01	1	15.33746992	4.384E-05	18.36326884
2019-06-01 00:00:01	1	15.09466018	0.000208331	18.35667675
2019-06-01 01:00:01	1	15.29150963	0.000158058	18.37142721
2019-06-01 02:00:01	1	15.9577088	0.044867395	17.29525382
2019-06-01 03:00:01	1	12.65203668	0	17.51900965
2019-06-01 04:00:01	1	6.012739429	0	17.53469451
2019-06-01 05:00:01	1	13.38982187	0	17.93745194
2019-06-01 06:00:01	1	15.19609091	0	17.8847446
2019-06-01 07:00:01	1	16.24434857	0	17.51169745
2019-06-01 08:00:01	1	15.80237111	0	17.55965121
2019-06-01 09:00:01	1	14.86607155	6.29534E-06	17.94189278
2019-06-01 10:00:01	1	14.9223237	0.003442866	18.51378781
2019-06-01 11:00:01	1	15.85280822	0.0044746	17.85055417
2019-06-01 12:00:01	1	15.82942553	0.000153748	17.35800011
2019-06-01 13:00:01	1	13.54317986	0	17.40209747
2019-06-01 14:00:01	1	15.79955769	0	16.92873964
2019-06-01 15:00:01	1	17.64379854	0	16.52132972
2019-06-01 16:00:01	1	12.87381129	0	16.71744644
2019-06-01 17:00:01	1	15.83750299	0	16.58354419
2019-06-01 18:00:01	1	17.8850818	0	16.93149594
2019-06-01 19:00:01	1	62.31997377	0	28.59123571
2019-06-01 20:00:01	1	15.4781393	0	18.52456773
2019-06-01 21:00:01	1	15.28834279	0	17.98379836
2019-06-01 22:00:01	1	16.05843554	0	17.6605778
2019-06-01 23:00:01	1	15.4922243	0	17.81599314
2019-06-02 00:00:01	1	15.45101716	0	17.81770109
2019-06-02 01:00:01	1	15.52998677	0	17.85645904
2019-06-02 02:00:01	1	15.65645737	0.046401278	18.31529481
2019-06-02 03:00:01	1	15.74825457	0	18.57193825
2019-06-02 04:00:01	1	15.51044486	0	19.01666516
2019-06-02 05:00:01	1	15.57247683	0	19.48375396
2019-06-02 06:00:01	1	15.55711295	0	19.64606065
2019-06-02 07:00:01	1	15.73641683	0	20.04208445
2019-06-02 08:00:01	1	15.71329813	0	20.15055687

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-02 09:00:01	1	15.83092008	0	20.0398547
2019-06-02 10:00:01	1	15.60986042	0.000758645	19.59205159
2019-06-02 11:00:01	1	15.96372764	0.006136825	18.89531449
2019-06-02 12:00:01	1	15.94174403	0.006342689	18.45210393
2019-06-02 13:00:01	1	15.59537006	0.000179865	18.29494424
2019-06-02 14:00:01	1	14.22943253	0	17.94275291
2019-06-02 15:00:01	1	17.18770458	0	18.0030601
2019-06-02 16:00:01	1	15.70232535	0	17.99993509
2019-06-02 17:00:01	1	15.92915677	0	17.80826267
2019-06-02 18:00:01	1	15.47568955	0	18.50550162
2019-06-02 19:00:01	1	62.00665692	0	31.07372711
2019-06-02 20:00:01	1	15.9424595	0	20.09291488
2019-06-02 21:00:01	1	15.58109174	0	19.69764808
2019-06-02 22:00:01	1	15.61958531	0	19.42683704
2019-06-02 23:00:01	1	15.39077483	0	19.11687236
2019-06-03 00:00:01	1	15.80024837	0.017189609	19.05916451
2019-06-03 01:00:01	1	15.41361148	0.00016098	19.26536051
2019-06-03 02:00:01	1	15.63731634	0.046606823	19.28564367
2019-06-03 03:00:01	1	15.69922229	0	19.50538757
2019-06-03 04:00:01	1	15.97362664	0	19.60150982
2019-06-03 05:00:01	1	15.5310329	0	19.86767619
2019-06-03 06:00:01	1	15.53138412	0	19.75571698
2019-06-03 07:00:01	1	15.57587476	0	19.88795855
2019-06-03 08:00:01	1	15.87042243	0	19.81764508
2019-06-03 09:00:01	1	15.8317571	0	19.52704758
2019-06-03 10:00:01	1	15.88539205	0.000485989	19.02435428
2019-06-03 11:00:01	1	20.66114995	0.017538796	18.34437537
2019-06-03 12:00:01	1	14.61309582	0.023700351	18.0019997
2019-06-03 13:00:01	1	14.21891566	0.004922957	17.73264532
2019-06-03 14:00:01	1	17.36186701	0	17.68721682
2019-06-03 15:00:01	1	16.07635083	0	17.53523681
2019-06-03 16:00:01	1	14.0962694	0	17.77038716
2019-06-03 17:00:01	1	16.64526759	0	18.07368455
2019-06-03 18:00:01	1	14.7971368	0	19.20552439
2019-06-03 19:00:01	1	62.18053998	0	30.60288818
2019-06-03 20:00:01	1	17.45295017	0	20.32789226
2019-06-03 21:00:01	1	15.25524994	0.010966156	20.93302147
2019-06-03 22:00:01	1	15.3473615	0	20.25960011
2019-06-03 23:00:01	1	15.44806993	0	19.50573234
2019-06-04 00:00:01	1	15.89393385	0.006598312	19.29613775
2019-06-04 01:00:01	1	15.59755646	0	19.34447834

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-04 02:00:01	1	15.60138601	0.046977886	19.32613899
2019-06-04 03:00:01	1	15.64213947	0.002143619	19.71777243
2019-06-04 04:00:01	1	15.85964216	0	19.96583262
2019-06-04 05:00:01	1	15.51706279	0	20.14764961
2019-06-04 06:00:01	1	15.47428958	0	20.23925229
2019-06-04 07:00:01	1	15.52846529	0	20.60386852
2019-06-04 08:00:01	1	15.72183393	0	21.36557113
2019-06-04 09:00:01	1	16.13068301	0	21.36714261
2019-06-04 10:00:01	1	15.93940393	0.00648842	20.65796302
2019-06-04 11:00:01	1	15.27775815	0.000117612	20.24963895
2019-06-04 12:00:01	1	15.68271675	0.00376888	19.6910539
2019-06-04 13:00:01	1	14.47534664	0	19.2889056
2019-06-04 14:00:01	1	17.23520843	0	19.29084546
2019-06-04 15:00:01	1	15.53711864	0	19.3521655
2019-06-04 16:00:01	1	16.35234487	0	18.35449022
2019-06-04 17:00:01	1	15.61920815	0	18.79594613
2019-06-04 18:00:01	1	15.86784081	0	19.23921374
2019-06-04 19:00:01	1	62.12830333	0	30.56707931
2019-06-04 20:00:01	1	15.96676378	0	20.01011482
2019-06-04 21:00:01	1	15.33468163	0	19.72833993
2019-06-04 22:00:01	1	16.03694788	0	19.44536325
2019-06-04 23:00:01	1	15.7156565	0	19.40687507
2019-06-05 00:00:01	1	15.00558776	0	20.24122882
2019-06-05 01:00:01	1	15.90376996	0	19.62677066
2019-06-05 02:00:01	1	15.68999336	0.046496452	19.65718588
2019-06-05 03:00:01	1	15.80090437	0	19.62664387
2019-06-05 04:00:01	1	15.54258003	0	19.40003553
2019-06-05 05:00:01	1	15.63026893	0	19.70491608
2019-06-05 06:00:01	1	15.82993016	0	19.73734914
2019-06-05 07:00:01	1	15.79089347	0	19.84209162
2019-06-05 08:00:01	1	15.74399371	0	19.64736015
2019-06-05 09:00:01	1	15.66571338	9.89422E-07	19.47174255
2019-06-05 10:00:01	1	15.79853983	0.008884126	19.47120632
2019-06-05 11:00:01	1	15.75317977	0.00582093	19.10831228
2019-06-05 12:00:01	1	15.98976291	0.008088943	18.83003847
2019-06-05 13:00:01	1	15.66854332	0	18.62912488
2019-06-05 14:00:01	1	15.93113441	0	18.26182826
2019-06-05 15:00:01	1	15.6399734	0	18.1321306
2019-06-05 16:00:01	1	15.64297401	0	17.95288546
2019-06-05 17:00:01	1	16.20283522	0	18.30408444
2019-06-05 18:00:01	1	15.71051519	0	18.74129092

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-05 19:00:01	1	63.38815647	0	29.94310858
2019-06-05 20:00:01	1	14.87167907	0	19.71380703
2019-06-05 21:00:01	1	15.32758551	0	20.58265658
2019-06-05 22:00:01	1	15.39267182	0	19.66460629
2019-06-05 23:00:01	1	15.89261214	0	19.16400596
2019-06-06 00:00:01	1	14.97775087	0	19.41829557
2019-06-06 01:00:01	1	15.90137399	0	18.993457
2019-06-06 02:00:01	1	15.77648676	0.046263025	19.18217619
2019-06-06 03:00:01	1	15.67392988	0	19.23092487
2019-06-06 04:00:01	1	15.91430999	1.74661E-05	19.47549726
2019-06-06 05:00:01	1	15.57187559	0.000160703	19.92998992
2019-06-06 06:00:01	1	15.45586079	0.000180101	19.81618951
2019-06-06 07:00:01	1	15.51257699	0.00020885	20.053029
2019-06-06 08:00:01	1	15.68372315	0.001555342	20.14653485
2019-06-06 09:00:01	1	15.73174537	0.002828256	20.2893821
2019-06-06 10:00:01	1	15.90689261	0.022197151	20.12655005
2019-06-06 11:00:01	1	15.76421246	0.008361627	19.67879387
2019-06-06 12:00:01	1	15.96530131	0.009008351	19.48082984
2019-06-06 13:00:01	1	15.68394786	0.000103395	19.25234994
2019-06-06 14:00:01	1	15.79150818	0	18.30149349
2019-06-06 15:00:01	1	16.30490986	0	17.15549933
2019-06-06 16:00:01	1	15.85622783	0	17.27769904
2019-06-06 17:00:01	1	16.04070824	0	17.47731043
2019-06-06 18:00:01	1	16.13200009	0	17.94058259
2019-06-06 19:00:01	1	64.00640826	0	28.37488449
2019-06-06 20:00:01	1	15.83733275	0	17.71372062
2019-06-06 21:00:01	1	15.30534592	0	18.33569964
2019-06-06 22:00:01	1	15.42536342	0	18.5342149
2019-06-06 23:00:01	1	15.91359972	0	18.42977071
2019-06-07 00:00:01	1	15.56840434	0	18.20672543
2019-06-07 01:00:01	1	15.42354417	0	18.13385322
2019-06-07 02:00:01	1	15.49660686	0.045347831	18.22286777
2019-06-07 03:00:01	1	15.61012124	0	18.31996826
2019-06-07 04:00:01	1	14.95568864	0	18.31986421
2019-06-07 05:00:01	1	14.97180909	0	18.47014858
2019-06-07 06:00:01	1	15.27177104	0	18.06140809
2019-06-07 07:00:01	1	16.36048751	0	17.91490886
2019-06-07 08:00:01	1	16.0880063	0	17.88565167
2019-06-07 09:00:01	1	16.71434846	0	17.68362652
2019-06-07 10:00:01	1	15.36024953	0	17.39414973
2019-06-07 11:00:01	1	15.4111279	0	17.44071922

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-07 12:00:01	1	15.55263084	0	17.45294071
2019-06-07 13:00:01	1	15.72034054	0	17.18175515
2019-06-07 14:00:01	1	15.30412862	0	17.18480068
2019-06-07 15:00:01	1	15.76457611	0	17.08533752
2019-06-07 16:00:01	1	15.47337799	0	16.97440367
2019-06-07 17:00:01	1	15.67806414	0	17.1307223
2019-06-07 18:00:01	1	15.71943973	0	17.36768103
2019-06-07 19:00:01	1	60.80798887	0	28.52920845
2019-06-07 20:00:01	1	15.56085134	0	17.77476301
2019-06-07 21:00:01	1	14.90086358	0	17.94038339
2019-06-07 22:00:01	1	15.15556934	0	18.06014039
2019-06-07 23:00:01	1	15.99626486	0	17.88519512
2019-06-08 00:00:01	1	16.04318235	0	17.61248406
2019-06-08 01:00:01	1	14.90649926	0	17.84934073
2019-06-08 02:00:01	1	15.02226491	0.045967434	18.32719994
2019-06-08 03:00:01	1	15.8690853	0	18.17246913
2019-06-08 04:00:01	1	16.22922649	0	17.54840849
2019-06-08 05:00:01	1	14.93153193	0	17.76869265
2019-06-08 06:00:01	1	15.27341064	0	17.77225496
2019-06-08 07:00:01	1	15.76104904	0	17.63468503
2019-06-08 08:00:01	1	15.58032926	0	17.70225566
2019-06-08 09:00:01	1	15.57914024	0	17.97161511
2019-06-08 10:00:01	1	15.70119346	0	17.77696277
2019-06-08 11:00:01	1	15.69014226	0	17.41364509
2019-06-08 12:00:01	1	15.41830455	0	17.33281527
2019-06-08 13:00:01	1	13.84555793	0	17.22758271
2019-06-08 14:00:01	1	15.31658095	0	16.93140857
2019-06-08 15:00:01	1	15.5784245	0	16.62447284
2019-06-08 16:00:01	1	15.09000622	0	16.92000751
2019-06-08 17:00:01	1	14.85851971	0	16.29799703
2019-06-08 18:00:01	1	16.48040566	0	16.28031132
2019-06-08 19:00:01	1	60.33813812	0	26.5504587
2019-06-08 20:00:01	1	15.50106585	0	16.22694151
2019-06-08 21:00:01	1	15.46047081	0	16.58510093
2019-06-08 22:00:01	1	15.98596053	0	16.54734017
2019-06-08 23:00:01	1	15.33920885	0	16.56164919
2019-06-09 00:00:01	1	15.03485811	0	16.67219955
2019-06-09 01:00:01	1	15.35935743	0	17.18090017
2019-06-09 02:00:01	1	15.11968829	0.045107465	17.26964317
2019-06-09 03:00:01	1	15.25064814	0	17.11301228
2019-06-09 04:00:01	1	16.04338247	0	16.88615218

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-09 05:00:01	1	15.24425676	0	17.03648369
2019-06-09 06:00:01	1	14.97139684	0	17.2705806
2019-06-09 07:00:01	1	15.74161269	0	17.06847295
2019-06-09 08:00:01	1	15.80825418	0	16.93507472
2019-06-09 09:00:01	1	15.18391162	0	16.85445944
2019-06-09 10:00:01	1	15.17728513	0	16.684999
2019-06-09 11:00:01	1	15.03661234	0	16.48283235
2019-06-09 12:00:01	1	15.28731887	0	16.19260174
2019-06-09 13:00:01	1	15.35053318	0	15.82304173
2019-06-09 14:00:01	1	15.54132979	0	15.14023564
2019-06-09 15:00:01	1	15.66443851	0	14.62465446
2019-06-09 16:00:01	1	15.56447617	0	14.12050068
2019-06-09 17:00:01	1	15.38827324	0	13.96886487
2019-06-09 18:00:01	1	15.08591884	0	13.91792285
2019-06-09 19:00:01	1	61.76335347	0	24.37380275
2019-06-09 20:00:01	1	13.96278276	0	14.694015
2019-06-09 21:00:01	1	14.4392239	0	15.13310228
2019-06-09 22:00:01	1	16.09610922	0	15.32873608
2019-06-09 23:00:01	1	15.86707153	0	15.67202051
2019-06-10 00:00:01	1	15.30848665	0	15.90674067
2019-06-10 01:00:01	1	16.08616949	0	15.76323774
2019-06-10 02:00:01	1	15.41318986	0.045393494	15.80974531
2019-06-10 03:00:01	1	15.77660743	0.003708742	15.73628348
2019-06-10 04:00:01	1	14.91957592	0.020508081	16.02023854
2019-06-10 05:00:01	1	15.55254081	0.017938342	16.23353072
2019-06-10 06:00:01	1	15.26359701	0.012157651	16.24620921
2019-06-10 07:00:01	1	15.57693182	0.022145113	16.21889577
2019-06-10 08:00:01	1	15.40633581	0.008519827	16.50145803
2019-06-10 09:00:01	1	14.96255429	0.000631214	16.32285334
2019-06-10 10:00:01	1	15.57420405	0	15.96679791
2019-06-10 11:00:01	1	15.73951796	0	15.49521509
2019-06-10 12:00:01	1	15.55585883	0	15.54626543
2019-06-10 13:00:01	1	14.39045699	0	15.59574352
2019-06-10 14:00:01	1	14.61105809	0	15.09677928
2019-06-10 15:00:01	1	15.84400808	0	14.58900092
2019-06-10 16:00:01	1	16.53050215	0	14.51022375
2019-06-10 17:00:01	1	15.24008572	0	14.64047699
2019-06-10 18:00:01	1	15.24634426	0	14.77200537
2019-06-10 19:00:01	1	60.31324549	0	25.17248581
2019-06-10 20:00:01	1	15.11272965	0	15.71858855
2019-06-10 21:00:01	1	15.87050522	0	15.79880238

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-10 22:00:01	1	15.30766585	0	15.92797013
2019-06-10 23:00:01	1	15.14956012	0	16.04798788
2019-06-11 00:00:01	1	15.49480512	0	15.8957503
2019-06-11 01:00:01	1	15.11930553	0	16.25139104
2019-06-11 02:00:01	1	15.91426342	0.045502307	15.99281843
2019-06-11 03:00:01	1	15.00155463	0	16.09816191
2019-06-11 04:00:01	1	15.1584668	0	16.11499203
2019-06-11 05:00:01	1	15.75495113	0	16.05804309
2019-06-11 06:00:01	1	14.94040473	0	16.55483793
2019-06-11 07:00:01	1	15.64226743	0	16.39262104
2019-06-11 08:00:01	1	15.18773756	0	16.53880549
2019-06-11 09:00:01	1	15.45414773	0	16.01334969
2019-06-11 10:00:01	1	15.92298404	0	15.44859894
2019-06-11 11:00:01	1	16.47150473	0	15.08179646
2019-06-11 12:00:01	1	14.08448348	0	14.94768931
2019-06-11 13:00:01	1	15.88656924	0	14.9158964
2019-06-11 14:00:01	1	15.22903776	0	14.95905294
2019-06-11 15:00:01	1	16.88673558	0	16.15839576
2019-06-11 16:00:01	1	14.15534788	0	16.98139389
2019-06-11 17:00:01	1	15.39076418	0	15.90673944
2019-06-11 18:00:01	1	15.09998176	0	15.74760656
2019-06-11 19:00:01	1	60.05952388	0	26.01042407
2019-06-11 20:00:01	1	15.86917412	0	15.96364209
2019-06-11 21:00:01	1	15.07251288	0	16.28170244
2019-06-11 22:00:01	1	15.66243764	0	16.1654076
2019-06-11 23:00:01	1	15.20638513	0	16.36800447
2019-06-12 00:00:01	1	15.21578308	8.17161E-05	16.84712967
2019-06-12 01:00:01	1	15.90805407	0.000132983	17.07058573
2019-06-12 02:00:01	1	15.64190703	0.045746865	17.15854782
2019-06-12 03:00:01	1	15.18711204	0.001443283	17.50005445
2019-06-12 04:00:01	1	15.56336044	0.006909679	17.41870938
2019-06-12 05:00:01	1	15.42531006	0.017568186	17.71318761
2019-06-12 06:00:01	1	15.5569163	0.01079597	17.8533862
2019-06-12 07:00:01	1	15.44428499	0.026464842	17.45188097
2019-06-12 08:00:01	1	15.40531461	0.019527155	16.97879954
2019-06-12 09:00:01	1	15.52806603	0.004020625	16.46099371
2019-06-12 10:00:01	1	15.64903383	0.007229026	16.3416586
2019-06-12 11:00:01	1	14.92686036	0.012903779	16.36023865
2019-06-12 12:00:01	1	15.11664897	0.002014321	15.62164082
2019-06-12 13:00:01	1	14.29000937	0	15.45855097
2019-06-12 14:00:01	1	15.19960435	0	15.48319451

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-12 15:00:01	1	15.5163029	0	15.32419527
2019-06-12 16:00:01	1	15.03534399	0	15.87063183
2019-06-12 17:00:01	1	17.60720919	0	15.61345545
2019-06-12 18:00:01	1	16.24308194	0	15.38976853
2019-06-12 19:00:01	1	60.49938568	0	26.34613855
2019-06-12 20:00:01	1	15.21753689	0	16.58287727
2019-06-12 21:00:01	1	15.91483597	0	17.20642627
2019-06-12 22:00:01	1	15.27575715	0	17.58375264
2019-06-12 23:00:01	1	15.48081604	0	17.59427168
2019-06-13 00:00:01	1	15.6148792	0	17.67828124
2019-06-13 01:00:01	1	15.65863694	0	17.36198861
2019-06-13 02:00:01	1	15.3765162	0.045212497	17.04329049
2019-06-13 03:00:01	1	15.28846049	0	16.59206138
2019-06-13 04:00:01	1	15.43982368	0	16.73279071
2019-06-13 05:00:01	1	15.5271934	0.001385324	16.7460723
2019-06-13 06:00:01	1	15.35622437	0.002361917	16.76095698
2019-06-13 07:00:01	1	15.71764987	0.002165042	16.6954159
2019-06-13 08:00:01	1	15.37413379	0.009202233	16.77206365
2019-06-13 09:00:01	1	15.53612457	0.021537875	16.69907563
2019-06-13 10:00:01	1	16.06683485	0.022680715	16.80103822
2019-06-13 11:00:01	1	15.08720539	0.001976148	16.17280359
2019-06-13 12:00:01	1	15.49566088	0	15.52536267
2019-06-13 13:00:01	1	16.01593323	0.009411494	15.37546858
2019-06-13 14:00:01	1	13.74220472	0	14.9754419
2019-06-13 15:00:01	1	15.31188631	0	14.72077825
2019-06-13 16:00:01	1	17.30484226	0	14.17510136
2019-06-13 17:00:01	1	16.1829525	0	13.73143252
2019-06-13 18:00:01	1	14.67370125	0	13.76163651
2019-06-13 19:00:01	1	57.60260938	0	24.88475839
2019-06-13 20:00:01	1	16.47125431	0	15.12151902
2019-06-13 21:00:01	1	15.48210555	0	16.06368973
2019-06-13 22:00:01	1	15.11561323	0	16.20203023
2019-06-13 23:00:01	1	15.37256625	0	16.34475061
2019-06-14 00:00:01	1	15.69764194	0	16.2193779
2019-06-14 01:00:01	1	15.94255711	0	16.12074566
2019-06-14 02:00:01	1	15.36934135	0.045425751	16.29303291
2019-06-14 03:00:01	1	15.22169295	0	17.04623097
2019-06-14 04:00:01	1	15.42897182	6.3162E-05	17.30528357
2019-06-14 05:00:01	1	15.8562861	0.000385708	16.54880168
2019-06-14 06:00:01	1	15.58029804	0.009477388	16.1128641
2019-06-14 07:00:01	1	15.11190872	0.013865586	16.42121001

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-14 08:00:01	1	15.51874255	0.011488301	16.7485149
2019-06-14 09:00:01	1	16.86322175	0.006434455	16.02943668
2019-06-14 10:00:01	1	16.69658671	0.001439029	15.42462078
2019-06-14 11:00:01	1	15.64853136	0.002184685	15.11267575
2019-06-14 12:00:01	1	15.06276915	0.001935145	14.83895593
2019-06-14 13:00:01	1	15.52551295	0.004351851	14.55065644
2019-06-14 14:00:01	1	15.65804141	0.000602359	14.20929956
2019-06-14 15:00:01	1	15.728108	0	13.72803995
2019-06-14 16:00:01	1	14.96549341	0	13.36475369
2019-06-14 17:00:01	1	14.95163567	0	13.55145047
2019-06-14 18:00:01	1	14.04908022	0	13.52728744
2019-06-14 19:00:01	1	58.53716629	0	24.49947732
2019-06-14 20:00:01	1	15.36840274	0	15.32419044
2019-06-14 21:00:01	1	15.24562909	0	15.45925326
2019-06-14 22:00:01	1	16.94994902	0	15.98971835
2019-06-14 23:00:01	1	15.75434761	0	16.05073616
2019-06-15 00:00:01	1	15.57367773	0	15.76796619
2019-06-15 01:00:01	1	15.36360737	0	16.02657141
2019-06-15 02:00:01	1	15.35560334	0.04563806	16.14967916
2019-06-15 03:00:01	1	15.48388075	0.001790928	15.99503834
2019-06-15 04:00:01	1	15.27991489	0.000206057	15.57786656
2019-06-15 05:00:01	1	15.54519821	0.000231317	15.14157872
2019-06-15 06:00:01	1	15.50342968	0.001060294	15.85423123
2019-06-15 07:00:01	1	15.61327394	0.001436886	16.23332777
2019-06-15 08:00:01	1	15.51722213	0.00130627	16.48616828
2019-06-15 09:00:01	1	15.52966784	0.00088195	16.19624853
2019-06-15 10:00:01	1	15.71559444	0.000913243	16.0457221
2019-06-15 11:00:01	1	15.66037016	0.001266935	15.7777816
2019-06-15 12:00:01	1	15.53014001	0	15.30918505
2019-06-15 13:00:01	1	13.93618383	0	15.07911194
2019-06-15 14:00:01	1	15.64179424	0	14.61210008
2019-06-15 15:00:01	1	14.92288862	0	14.42163368
2019-06-15 16:00:01	1	15.84654834	0	14.19595754
2019-06-15 17:00:01	1	14.78026265	0	14.31377025
2019-06-15 18:00:01	1	14.894151	0	14.53497764
2019-06-15 19:00:01	1	63.82816778	0	25.19500331
2019-06-15 20:00:01	1	15.25432745	0	15.15534834
2019-06-15 21:00:01	1	15.37237653	0	15.35689755
2019-06-15 22:00:01	1	15.56047646	0.000489688	15.78815154
2019-06-15 23:00:01	1	15.49847253	0.004208827	15.7883087
2019-06-16 00:00:01	1	15.39306942	0.015334481	16.03980166

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-16 01:00:01	1	15.46392443	0.020395763	16.19011338
2019-06-16 02:00:01	1	15.60103276	0.065342862	16.25344794
2019-06-16 03:00:01	1	15.5277944	0.018787506	16.23324337
2019-06-16 04:00:01	1	15.43264311	0.019337827	16.53300634
2019-06-16 05:00:01	1	15.4364439	0.024326507	16.58537888
2019-06-16 06:00:01	1	15.43122946	0.021322406	17.03171402
2019-06-16 07:00:01	1	15.85435679	0.013526329	17.52373802
2019-06-16 08:00:01	1	16.487762	0.00771821	16.50674586
2019-06-16 09:00:01	1	16.45126669	0.010872747	16.24567555
2019-06-16 10:00:01	1	16.91385418	0.003775239	15.93347345
2019-06-16 11:00:01	1	16.6684658	0.000311649	15.71185361
2019-06-16 12:00:01	1	16.75487483	0	15.24634538
2019-06-16 13:00:01	1	16.56751855	0	14.99068888
2019-06-16 14:00:01	1	15.46326357	0	14.52932285
2019-06-16 15:00:01	1	17.21022812	0	14.05359303
2019-06-16 16:00:01	1	15.21217269	0	13.72095251
2019-06-16 17:00:01	1	16.56066825	0	13.92442635
2019-06-16 18:00:01	1	16.96522638	0	14.13816653
2019-06-16 19:00:01	1	63.01864094	0	25.0450451
2019-06-16 20:00:01	1	16.45468733	0	15.11651374
2019-06-16 21:00:01	1	16.42601474	0	16.07503072
2019-06-16 22:00:01	1	16.64748191	0	15.9997196
2019-06-16 23:00:01	1	16.48777145	0	15.96487499
2019-06-17 00:00:01	1	16.47998258	0	16.11112107
2019-06-17 01:00:01	1	16.7537503	0	16.44647904
2019-06-17 02:00:01	1	16.61901446	0.046782057	16.56357387
2019-06-17 03:00:01	1	16.30218946	0	16.76634158
2019-06-17 04:00:01	1	16.3081017	0	16.39168909
2019-06-17 05:00:01	1	16.54088415	0.000911451	15.85676042
2019-06-17 06:00:01	1	16.43837955	0.007634394	15.99918498
2019-06-17 07:00:01	1	16.43741891	0.022692116	16.35777229
2019-06-17 08:00:01	1	16.61180387	0.023991332	16.32140115
2019-06-17 09:00:01	1	16.73893149	0.015685946	16.00454539
2019-06-17 10:00:01	1	17.30086645	0.006367558	15.47876013
2019-06-17 11:00:01	1	16.62573341	0.005993806	15.01242204
2019-06-17 12:00:01	1	15.05469417	0.003322534	14.56565632
2019-06-17 13:00:01	1	16.71406231	0.000164524	13.96283034
2019-06-17 14:00:01	1	16.68120007	0.000159426	13.44794238
2019-06-17 15:00:01	1	16.51574963	0.000159409	13.33967593
2019-06-17 16:00:01	1	16.68379825	0.000159983	13.33754769
2019-06-17 17:00:01	1	16.34762015	0.000160288	13.47645818

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-17 18:00:01	1	15.29340587	0.000185411	13.66667328
2019-06-17 19:00:01	1	60.25532063	0.000191674	24.70903045
2019-06-17 20:00:01	1	17.3843839	0.000160937	14.97460787
2019-06-17 21:00:01	1	16.44655105	0.000237417	15.12848566
2019-06-17 22:00:01	1	16.45734735	0.000160778	15.74995583
2019-06-17 23:00:01	1	16.62069648	0.000160415	16.15570644
2019-06-18 00:00:01	1	16.65940951	0.000160711	16.62263612
2019-06-18 01:00:01	1	16.40421839	0.000160799	16.50153523
2019-06-18 02:00:01	1	16.55370619	0.04650637	16.10290791
2019-06-18 03:00:01	1	16.63146785	0	15.57327211
2019-06-18 04:00:01	1	16.67965939	0.001073902	15.80576196
2019-06-18 05:00:01	1	16.79154224	0.021772367	16.15475338
2019-06-18 06:00:01	1	17.72851065	0.013696985	16.35818342
2019-06-18 07:00:01	1	17.81147338	0.011699126	16.51098642
2019-06-18 08:00:01	1	18.24380168	0.001369845	16.67316692
2019-06-18 09:00:01	1	17.94981221	2.55384E-05	16.38770928
2019-06-18 10:00:01	1	18.19663824	0.006908452	16.21762786
2019-06-18 11:00:01	1	18.01355183	0.004685975	15.733194
2019-06-18 12:00:01	1	18.06076168	0.000160297	15.11007396
2019-06-18 13:00:01	1	18.25571902	0.000160094	14.66334357
2019-06-18 14:00:01	1	17.95167241	0.000159983	14.13256212
2019-06-18 15:00:01	1	18.12651356	0.000160193	13.76506028
2019-06-18 16:00:01	1	17.98394262	0.000159955	13.42469453
2019-06-18 17:00:01	1	18.04054661	0.000160018	13.44749917
2019-06-18 18:00:01	1	17.61354393	0.000188952	13.53123563
2019-06-18 19:00:01	1	60.29801672	0.000186844	24.21955535
2019-06-18 20:00:01	1	17.23446681	0.000159814	14.96828783
2019-06-18 21:00:01	1	18.51000521	0.000159363	15.87604891
2019-06-18 22:00:01	1	17.87102982	0.000159419	15.94743118
2019-06-18 23:00:01	1	17.73903578	0.000159613	16.07080102
2019-06-19 00:00:01	1	18.06355863	0.000159662	16.03689084
2019-06-19 01:00:01	1	17.86497283	0.000159975	16.14578459
2019-06-19 02:00:01	1	17.83370531	0.045691703	16.06590867
2019-06-19 03:00:01	1	17.83657933	0	16.02948052
2019-06-19 04:00:01	1	17.76216732	0	15.99715944
2019-06-19 05:00:01	1	17.6837587	0	16.1666651
2019-06-19 06:00:01	1	17.63550902	2.45606E-05	16.22584149
2019-06-19 07:00:01	1	17.91256052	0.000265512	16.26253259
2019-06-19 08:00:01	1	17.89764108	0.000168693	16.12107098
2019-06-19 09:00:01	1	16.47532958	0.008764776	16.07992712
2019-06-19 10:00:01	1	18.81055402	0.000795421	16.49904103

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-19 11:00:01	1	18.72501181	0.004990715	15.8818419
2019-06-19 12:00:01	1	19.01521085	0.000160574	14.90145611
2019-06-19 13:00:01	1	18.2513973	0.000160263	14.53497073
2019-06-19 14:00:01	1	17.96707783	0.000160154	14.50051259
2019-06-19 15:00:01	1	18.15367442	0.000159665	14.47369967
2019-06-19 16:00:01	1	18.08011302	0.000159341	14.85659736
2019-06-19 17:00:01	1	17.28370926	0.000167709	15.08802732
2019-06-19 18:00:01	1	16.89424926	0.000139294	15.35950509
2019-06-19 19:00:01	1	62.01220868	0.000337208	25.3649434
2019-06-19 20:00:01	1	19.19357179	0.000182373	15.7290461
2019-06-19 21:00:01	1	17.53197386	6.26361E-05	15.6841072
2019-06-19 22:00:01	1	17.17774276	0.000146606	15.50765951
2019-06-19 23:00:01	1	17.33002885	0.000485101	15.33826047
2019-06-20 00:00:01	1	17.29828803	0.000474791	15.33262616
2019-06-20 01:00:01	1	17.36220609	0.000849878	15.48921528
2019-06-20 02:00:01	1	17.59214253	0.046727092	15.79229812
2019-06-20 03:00:01	1	16.45738611	0.001679552	16.22682167
2019-06-20 04:00:01	1	16.63230126	0.002542485	16.76536034
2019-06-20 05:00:01	1	16.89974637	0.002190692	17.42215415
2019-06-20 06:00:01	1	17.39923039	0.002523535	17.5102609
2019-06-20 07:00:01	1	17.13982634	0.001299201	17.35412187
2019-06-20 08:00:01	1	16.86006423	0.000267747	16.99909192
2019-06-20 09:00:01	1	15.43695891	0.000469155	16.93586002
2019-06-20 10:00:01	1	18.1216037	0.000206626	16.6723109
2019-06-20 11:00:01	1	17.12211041	0.006225313	16.55422698
2019-06-20 12:00:01	1	19.1258744	0.00665417	15.89333159
2019-06-20 13:00:01	1	17.09245943	0.003084912	15.73518359
2019-06-20 14:00:01	1	17.84536458	0.003673856	15.7302038
2019-06-20 15:00:01	1	16.89961682	0.00545259	16.04882523
2019-06-20 16:00:01	1	16.58631032	0.005389665	16.31924011
2019-06-20 17:00:01	1	16.01648727	0.008864529	16.52724411
2019-06-20 18:00:01	1	18.68681073	0.015459679	16.20871254
2019-06-20 19:00:01	1	59.55066309	0.010969855	26.67995364
2019-06-20 20:00:01	1	17.31747121	0.008112471	17.06483425
2019-06-20 21:00:01	1	16.97851392	0.007266279	17.61126436
2019-06-20 22:00:01	1	17.61670868	0.005856416	17.31700124
2019-06-20 23:00:01	1	17.21349807	0.002740839	17.35858571
2019-06-21 00:00:01	1	17.17277507	0.003487473	17.21167228
2019-06-21 01:00:01	1	17.19104963	0.009806918	17.28182443
2019-06-21 02:00:01	1	17.08574063	0.046044871	17.16280397
2019-06-21 03:00:01	1	17.30189091	5.01327E-05	16.75122059

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-21 04:00:01	1	16.65165808	0.00298115	17.1000157
2019-06-21 05:00:01	1	17.44065231	0.003566614	17.28440049
2019-06-21 06:00:01	1	17.22693782	0.004819407	17.39180932
2019-06-21 07:00:01	1	17.46663723	0.003497601	17.23143876
2019-06-21 08:00:01	1	17.37623734	0.004374239	16.99264098
2019-06-21 09:00:01	1	16.69399118	0.014601562	15.91235857
2019-06-21 10:00:01	1	17.71706259	0.012579058	16.09827452
2019-06-21 11:00:01	1	17.72957457	0.018633241	15.41651942
2019-06-21 12:00:01	1	17.17212637	0.014938942	14.65052151
2019-06-21 13:00:01	1	16.81254666	0.019115053	14.34019731
2019-06-21 14:00:01	1	16.73786235	0.021823828	15.59000226
2019-06-21 15:00:01	1	18.12731529	0.017582702	16.40688359
2019-06-21 16:00:01	1	17.24340762	0.021085485	16.7339441
2019-06-21 17:00:01	1	17.35009698	0.04818902	17.01491261
2019-06-21 18:00:01	1	17.27957707	0.062804671	16.94149816
2019-06-21 19:00:01	1	60.73003246	0.123429095	27.16657654
2019-06-21 20:00:01	1	17.20968257	0.114077582	17.69075445
2019-06-21 21:00:01	1	16.78225513	0.124274426	17.85811372
2019-06-21 22:00:01	1	17.3303845	0.092764637	17.78269247
2019-06-21 23:00:01	1	17.48956932	0.06582997	17.84286215
2019-06-22 00:00:01	1	17.31536854	0.046866995	17.58190997
2019-06-22 01:00:01	1	17.0594355	0.039488182	17.50243656
2019-06-22 02:00:01	1	17.00627639	0.090667618	17.86828468
2019-06-22 03:00:01	1	17.62192579	0.031510148	17.59572112
2019-06-22 04:00:01	1	17.21563011	0.028456627	17.12142517
2019-06-22 05:00:01	1	16.81353576	0.026686519	17.49095985
2019-06-22 06:00:01	1	17.12313289	0.02376328	17.9175098
2019-06-22 07:00:01	1	18.23998038	0.025405284	17.82397293
2019-06-22 08:00:01	1	16.57822633	0.028102938	17.7777433
2019-06-22 09:00:01	1	17.85635674	0.027569103	17.51523523
2019-06-22 10:00:01	1	17.87457662	0.021183625	16.9027633
2019-06-22 11:00:01	1	17.49715191	0.021754763	16.95928025
2019-06-22 12:00:01	1	16.07854072	0.018366811	17.09692579
2019-06-22 13:00:01	1	17.3063287	0.016472351	17.08637237
2019-06-22 14:00:01	1	18.16551831	0.025642382	16.77812736
2019-06-22 15:00:01	1	16.95455571	0.027935553	16.84456564
2019-06-22 16:00:01	1	17.25846975	0.017981553	16.68452761
2019-06-22 17:00:01	1	16.95864439	0.002162796	16.9154898
2019-06-22 18:00:01	1	19.63262774	0.000363811	17.26557034
2019-06-22 19:00:01	1	62.95668852	0.000273089	27.81735761
2019-06-22 20:00:01	1	19.4198543	1.43031E-05	17.90918115

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-22 21:00:01	1	19.62371714	0.000151905	18.13573075
2019-06-22 22:00:01	1	19.5595452	0.000115903	18.30161804
2019-06-22 23:00:01	1	19.39064011	0.001104798	18.39805099
2019-06-23 00:00:01	1	19.54730099	0.01077748	18.2968723
2019-06-23 01:00:01	1	19.73985625	0.019332029	18.14736939
2019-06-23 02:00:01	1	19.67624843	0.059158768	18.09145035
2019-06-23 03:00:01	1	19.67267458	0.006325255	17.87650879
2019-06-23 04:00:01	1	19.62081485	0.003787842	17.76557987
2019-06-23 05:00:01	1	18.92714993	0.001907937	17.9110886
2019-06-23 06:00:01	1	18.80509251	0.001144876	17.97815027
2019-06-23 07:00:01	1	18.42730979	0.002668898	17.8806099
2019-06-23 08:00:01	1	19.01679959	0.02802532	17.29611149
2019-06-23 09:00:01	1	18.79270756	0.033548841	17.56440741
2019-06-23 10:00:01	1	18.67096457	0.020897003	17.55673415
2019-06-23 11:00:01	1	18.58517723	0.01756874	17.15876775
2019-06-23 12:00:01	1	18.87818826	0.01791238	17.31377351
2019-06-23 13:00:01	1	16.93399494	0.019463872	17.26688487
2019-06-23 14:00:01	1	20.54720514	0.009690358	17.32948494
2019-06-23 15:00:01	1	20.68571231	0.002421235	17.26174852
2019-06-23 16:00:01	1	20.42822125	0.001987955	17.18404622
2019-06-23 17:00:01	1	20.59213375	0.002663491	17.01318771
2019-06-23 18:00:01	1	20.32447451	0.004811951	16.99784402
2019-06-23 19:00:01	1	59.23602082	0.003366951	27.65618664
2019-06-23 20:00:01	1	20.50179033	0.000249374	17.8504611
2019-06-23 21:00:01	1	20.17052604	0.000304347	18.09317878
2019-06-23 22:00:01	1	22.16655799	0.000353746	18.05982551
2019-06-23 23:00:01	1	20.46221206	0.000288583	18.14465353
2019-06-24 00:00:01	1	20.44771518	0.000108673	18.26615344
2019-06-24 01:00:01	1	20.47805916	8.46662E-05	18.25127077
2019-06-24 02:00:01	1	20.69896171	0.046198879	18.2966376
2019-06-24 03:00:01	1	20.39229645	8.66981E-05	18.33470622
2019-06-24 04:00:01	1	20.23262081	8.81422E-05	18.45761036
2019-06-24 05:00:01	1	24.49284437	0.000394217	18.40190502
2019-06-24 06:00:01	1	20.28373765	0.000374938	18.26862928
2019-06-24 07:00:01	1	20.36147391	0.005319947	18.50353364
2019-06-24 08:00:01	1	21.12719308	0.01015596	18.20776837
2019-06-24 09:00:01	1	19.22615317	0.045481368	18.04255355
2019-06-24 10:00:01	1	19.54676659	0.039535239	18.05861818
2019-06-24 11:00:01	1	18.20587672	0.034564184	17.91296813
2019-06-24 12:00:01	1	20.40765519	0.03583603	17.46842297
2019-06-24 13:00:01	1	19.25178325	0.033610072	17.09322136

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-24 14:00:01	1	19.6261019	0.021110879	16.18279316
2019-06-24 15:00:01	1	19.86820102	0.000412088	15.41247635
2019-06-24 16:00:01	1	19.52374441	0.001261794	15.56113592
2019-06-24 17:00:01	1	20.37199069	0.000443047	15.55568721
2019-06-24 18:00:01	1	19.21305972	0.003396249	15.53914455
2019-06-24 19:00:01	1	63.52833559	0.009666598	27.00899345
2019-06-24 20:00:01	1	19.8144187	0.007866364	16.88988442
2019-06-24 21:00:01	1	20.27770502	0.014428356	17.23417323
2019-06-24 22:00:01	1	19.87597975	0.043271016	17.62403297
2019-06-24 23:00:01	1	19.44331017	0.026801377	18.07754266
2019-06-25 00:00:01	1	19.3072321	0.018730786	18.92576419
2019-06-25 01:00:01	1	19.67682523	0.014361419	19.22632136
2019-06-25 02:00:01	1	20.47336438	0.048711336	18.84699358
2019-06-25 03:00:01	1	18.12743197	0.005900966	18.492559
2019-06-25 04:00:01	1	14.93441316	0.019816449	17.62731544
2019-06-25 05:00:01	1	19.49037599	0.017837427	18.05233248
2019-06-25 06:00:01	1	20.02826714	0.024568091	17.82560612
2019-06-25 07:00:01	1	20.05449068	0.025171249	17.35074083
2019-06-25 08:00:01	1	18.9728154	0.013555675	17.77698262
2019-06-25 09:00:01	1	20.89835558	0.030090406	17.54203364
2019-06-25 10:00:01	1	19.52820056	0.022063105	17.52903454
2019-06-25 11:00:01	1	20.23232223	0.031233445	17.08268781
2019-06-25 12:00:01	1	18.87123885	0.027523674	16.29475714
2019-06-25 13:00:01	1	19.75221121	0.027769867	15.53583647
2019-06-25 14:00:01	1	20.5477474	0.013541956	14.6062518
2019-06-25 15:00:01	1	19.47296736	0.008597866	14.25112504
2019-06-25 16:00:01	1	19.53943886	0.000552043	14.04218926
2019-06-25 17:00:01	1	20.25916626	0.000119345	14.09266044
2019-06-25 18:00:01	1	19.41984436	0.00527723	14.99412611
2019-06-25 19:00:01	1	60.70083032	0.008292546	26.19052428
2019-06-25 20:00:01	1	17.55484247	0.005796448	16.69174141
2019-06-25 21:00:01	1	14.13030207	0.003139007	16.89550728
2019-06-25 22:00:01	1	11.05090078	0.001020267	17.21339654
2019-06-25 23:00:01	1	16.01742657	0.002921317	17.43411756
2019-06-26 00:00:01	1	14.8003584	0.004690943	17.67197338
2019-06-26 01:00:01	1	15.37349171	0.001296721	17.25417323
2019-06-26 02:00:01	1	14.61112088	0.047503566	17.1681504
2019-06-26 03:00:01	1	15.75982149	0.000228003	17.20654248
2019-06-26 04:00:01	1	15.1291334	5.92796E-05	17.38165824
2019-06-26 05:00:01	1	14.6610211	0.000144401	17.41007632
2019-06-26 06:00:01	1	15.06760493	0.00015949	17.09008296

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-26 07:00:01	1	14.52658228	0.000135955	17.57897004
2019-06-26 08:00:01	1	15.99888736	3.59902E-05	17.17180639
2019-06-26 09:00:01	1	14.62454699	0.018785213	17.45739231
2019-06-26 10:00:01	1	14.66315425	0.013412223	17.16318286
2019-06-26 11:00:01	1	15.71718299	0.009911032	16.27963515
2019-06-26 12:00:01	1	14.82041962	0.010907864	15.65159765
2019-06-26 13:00:01	1	14.864501	0.013538734	15.78380714
2019-06-26 14:00:01	1	14.93200898	0.009955299	15.91021701
2019-06-26 15:00:01	1	15.78488798	0.006250681	15.19874471
2019-06-26 16:00:01	1	15.13388278	0.000159398	15.10057942
2019-06-26 17:00:01	1	14.7838638	0.000158854	15.6854921
2019-06-26 18:00:01	1	14.37958389	0.000188424	16.14314724
2019-06-26 19:00:01	1	58.17957046	0.000189087	26.42160352
2019-06-26 20:00:01	1	14.76873119	0.006810512	17.42579397
2019-06-26 21:00:01	1	14.89020605	0.002006934	17.72353652
2019-06-26 22:00:01	1	15.22059783	0	17.72069784
2019-06-26 23:00:01	1	14.71385687	0	17.93824885
2019-06-27 00:00:01	1	15.31910138	0	18.01677306
2019-06-27 01:00:01	1	14.68531968	0	18.28465452
2019-06-27 02:00:01	1	15.07697465	0.046015985	18.27954806
2019-06-27 03:00:01	1	15.18129718	0	17.83104049
2019-06-27 04:00:01	1	14.6024028	0	17.95178733
2019-06-27 05:00:01	1	15.03207976	0	18.06430568
2019-06-27 06:00:01	1	16.06993027	0	18.26770134
2019-06-27 07:00:01	1	18.37955427	0	18.21947739
2019-06-27 08:00:01	1	19.20586113	0	17.56029708
2019-06-27 09:00:01	1	18.74304677	0.015566146	17.12757147
2019-06-27 10:00:01	1	18.00418349	0.029227248	16.80448923
2019-06-27 11:00:01	1	18.92275981	0.031335129	16.01697075
2019-06-27 12:00:01	1	18.79586349	0.059642857	15.50175535
2019-06-27 13:00:01	1	18.27239733	0.050528764	15.01333786
2019-06-27 14:00:01	1	18.72790486	0.043381907	14.70339414
2019-06-27 15:00:01	1	18.93203509	0.009065282	14.99075681
2019-06-27 16:00:01	1	18.74045561	0.006548805	15.41572616
2019-06-27 17:00:01	1	18.7156557	0.000900035	15.89966954
2019-06-27 18:00:01	1	17.40285381	0.000606272	16.05650239
2019-06-27 19:00:01	1	59.91937733	0	26.00186321
2019-06-27 20:00:01	1	17.59129065	0	16.33544132
2019-06-27 21:00:01	1	16.8296454	0	16.83030377
2019-06-27 22:00:01	1	15.68286299	0	16.88512748
2019-06-27 23:00:01	1	16.26174447	0	16.80052914

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-28 00:00:01	1	16.7158687	0	16.71446778
2019-06-28 01:00:01	1	15.86439271	0	16.73042853
2019-06-28 02:00:01	1	16.37624898	0.050832067	16.60750923
2019-06-28 03:00:01	1	16.35876303	0	16.78442821
2019-06-28 04:00:01	1	16.42640818	0	16.91248606
2019-06-28 05:00:01	1	16.35572685	0	17.18473477
2019-06-28 06:00:01	1	16.22483667	0	17.28031936
2019-06-28 07:00:01	1	16.17007285	0	17.48554478
2019-06-28 08:00:01	1	16.40905407	0	17.68527733
2019-06-28 09:00:01	1	16.58002869	0.000131158	17.64437864
2019-06-28 10:00:01	1	16.62972431	0.007959	17.31201874
2019-06-28 11:00:01	1	15.29386666	0.0028565	16.96235033
2019-06-28 12:00:01	1	13.47328184	0.001165458	16.60037747
2019-06-28 13:00:01	1	25.36350863	9.9083E-06	15.41513591
2019-06-28 14:00:01	1	64.20043963	4.32543E-05	37.80360474
2019-06-28 15:00:01	1	15.62438366	0.000449748	14.632777
2019-06-28 16:00:01	1	15.91858882	0.000361512	14.1693125
2019-06-28 17:00:01	1	16.45764143	0.000178363	14.2011887
2019-06-28 18:00:01	1	15.42389259	0	14.6615865
2019-06-28 19:00:01	1	58.60801403	0	25.19768579
2019-06-28 20:00:01	1	15.57131815	0	15.83166536
2019-06-28 21:00:01	1	16.54868888	0	16.2164868
2019-06-28 22:00:01	1	15.72198695	0	16.4100176
2019-06-28 23:00:01	1	15.99995863	0	16.56202711
2019-06-29 00:00:01	1	15.50726217	5.26035E-07	16.89669635
2019-06-29 01:00:01	1	15.92739832	0.000517213	17.15336195
2019-06-29 02:00:01	1	16.03570033	0.000142266	16.63249977
2019-06-29 03:00:01	1	15.89108187	8.28633E-05	16.41827764
2019-06-29 04:00:01	1	15.68545576	0.008515084	16.54996948
2019-06-29 05:00:01	1	16.23883356	0.000952952	16.67042807
2019-06-29 06:00:01	1	15.79812953	0.003578368	17.00865601
2019-06-29 07:00:01	1	15.52402144	0.002893008	17.18322465
2019-06-29 08:00:01	1	16.73280366	0.002913325	16.88770416
2019-06-29 09:00:01	1	15.53483755	0.001940302	16.82971089
2019-06-29 10:00:01	1	15.26708743	0.000501334	16.9615278
2019-06-29 11:00:01	1	16.88075198	0.04631419	16.46971884
2019-06-29 12:00:01	1	14.56737218	0	16.13419525
2019-06-29 13:00:01	1	14.93843691	1.36983E-06	16.17781099
2019-06-29 14:00:01	1	16.36197338	0	16.06234943
2019-06-29 15:00:01	1	18.22989596	0	15.7719039
2019-06-29 16:00:01	1	15.64904189	0	15.67961083

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-06-29 17:00:01	1	15.73476984	0	15.89464944
2019-06-29 18:00:01	1	16.11873826	1.2105E-06	16.1184771
2019-06-29 19:00:01	1	59.15718481	4.09408E-07	26.21689351
2019-06-29 20:00:01	1	15.73478211	0	16.40933477
2019-06-29 21:00:01	1	15.79462453	0	16.61480069
2019-06-29 22:00:01	1	15.87358545	0	16.66804584
2019-06-29 23:00:01	1	15.64798034	0	16.61223974
2019-06-30 00:00:01	1	15.85347481	0	16.68227263
2019-06-30 01:00:01	1	16.26881709	0	16.82553501
2019-06-30 02:00:01	1	15.57666521	0	17.38423236
2019-06-30 03:00:01	1	15.65582827	0	17.58070643
2019-06-30 04:00:01	1	16.39722142	7.98943E-05	17.35039078
2019-06-30 05:00:01	1	15.12589758	0	18.03851612
2019-06-30 06:00:01	1	16.21923865	6.4011E-05	18.20511775
2019-06-30 07:00:01	1	17.01066763	0.000209117	17.95037015
2019-06-30 08:00:01	1	16.66594908	0.001287363	17.88751021
2019-06-30 09:00:01	1	15.63452567	0.000471862	17.92298025
2019-06-30 10:00:01	1	15.62843171	0.000152355	18.21890828
2019-06-30 11:00:01	1	15.90990424	0.04628593	17.73605585
2019-06-30 12:00:01	1	15.64071047	0	17.20812917
2019-06-30 13:00:01	1	15.00568979	0	16.63785583
2019-06-30 14:00:01	1	17.57356635	0	18.34215584
2019-06-30 15:00:01	1	16.58978809	0	17.60692728
2019-06-30 16:00:01	1	16.79445007	0	16.96510101
2019-06-30 17:00:01	1	16.15141623	0	16.89261606
2019-06-30 18:00:01	1	16.13046807	0	16.96753668
2019-06-30 19:00:01	1	61.07539288	0	27.69541271
2019-06-30 20:00:01	1	15.83153975	0	18.10763477
2019-06-30 21:00:01	1	16.01735699	0	18.66854587
2019-06-30 22:00:01	1	16.2052813	0	18.87850337
2019-06-30 23:00:01	1	16.31400221	0	18.84318132
2019-07-01 00:00:01	1	16.07751424	0	19.20918361
2019-07-01 01:00:01	1	16.18581156	0	19.4801759
2019-07-01 02:00:01	1	16.14660133	0	18.90265396
2019-07-01 03:00:01	1	16.57062988	0	18.16834759
2019-07-01 04:00:01	1	16.08182359	0	18.18132786
2019-07-01 05:00:01	1	16.27710082	0.001983347	18.20499986
2019-07-01 06:00:01	1	16.5001856	0.003015842	18.09015831
2019-07-01 07:00:01	1	15.92334294	0	18.18611788
2019-07-01 08:00:01	1	16.27985731	0.003656525	18.56642538
2019-07-01 09:00:01	1	16.19420289	0.005272401	18.91029816

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-07-01 10:00:01	1	16.07059581	2.11311E-06	18.49932962
2019-07-01 11:00:01	1	15.61986374	0.046260565	18.35559981
2019-07-01 12:00:01	1	15.89569506	0	17.39954496
2019-07-01 13:00:01	1	16.42874688	0	16.31037738
2019-07-01 14:00:01	1	15.83848086	0	15.71327192
2019-07-01 15:00:01	1	15.98918544	0	15.46125126
2019-07-01 16:00:01	1	16.30068123	0	15.0036791
2019-07-01 17:00:01	1	16.47548522	0	14.95981194
2019-07-01 18:00:01	1	16.10121695	0	15.46292562
2019-07-01 19:00:01	1	58.24601277	0	26.14005292
2019-07-01 20:00:01	1	16.33777354	0	16.82866074
2019-07-01 21:00:01	1	17.09564287	0	17.43348026
2019-07-01 22:00:01	1	15.7890521	0	18.50075657
2019-07-01 23:00:01	1	15.22852348	0	18.76728575
2019-07-02 00:00:01	1	16.69761424	0	18.41968335
2019-07-02 01:00:01	1	16.28827452	0	18.06753354
2019-07-02 02:00:01	1	15.83993602	0	18.15686392
2019-07-02 03:00:01	1	15.99449838	0	18.46269693
2019-07-02 04:00:01	1	15.9464633	0	18.13814455
2019-07-02 05:00:01	1	15.97781665	0	19.13458981
2019-07-02 06:00:01	1	16.14689856	0.019391097	18.95690944
2019-07-02 07:00:01	1	16.49237375	0	18.11334202
2019-07-02 08:00:01	1	15.74110271	0.00078952	18.4380617
2019-07-02 09:00:01	1	16.01563124	0.000434078	18.65907656
2019-07-02 10:00:01	1	15.60844903	0.000160848	18.23087239
2019-07-02 11:00:01	1	15.80962772	0.046685841	18.33057743
2019-07-02 12:00:01	1	15.25696844	0	17.37931563
2019-07-02 13:00:01	1	16.67705269	0	17.16247815
2019-07-02 14:00:01	1	18.75914466	0	16.4729786
2019-07-02 15:00:01	1	16.15740252	0	16.02048934
2019-07-02 16:00:01	1	16.998767	0	15.60376549
2019-07-02 17:00:01	1	16.26803994	0	15.73060589
2019-07-02 18:00:01	1	14.95412528	0	15.95538728
2019-07-02 19:00:01	1	59.74138506	0	26.23303289
2019-07-02 20:00:01	1	16.93352691	0	17.20176355
2019-07-02 21:00:01	1	17.41262488	0	17.78528453
2019-07-02 22:00:01	1	17.39917987	0.000810943	17.97725088
2019-07-02 23:00:01	1	16.41952412	0.012015956	18.20238822
2019-07-03 00:00:01	1	16.20800708	0.004264218	18.89735524
2019-07-03 01:00:01	1	16.5617105	0.000122913	19.0625164
2019-07-03 02:00:01	1	16.32152781	0	18.67847142

Title	Ammonia to burner (yes / no)	NOx (as NO2) Corrected Value	NH3 Corrected Value	N2O Corrected Value
Unit		mg/Nm3	mg/Nm3	mg/Nm3
2019-07-03 03:00:01	1	16.22380041	0	19.03876344
2019-07-03 04:00:01	1	16.50983484	0	19.47768677
2019-07-03 05:00:01	1	17.8662658	0	19.63225689
2019-07-03 06:00:01	1	17.18172143	0.007851264	18.82996532
2019-07-03 07:00:01	1	15.34437848	0.007390131	18.71180836
2019-07-03 08:00:01	1	16.41956462	0.001780647	19.10343277
2019-07-03 09:00:01	1	16.36160529	0.003048955	18.69954451
2019-07-03 10:00:01	1	16.35128073	0.000780342	18.49644603
2019-07-03 11:00:01	1	16.38856332	0.045884308	17.86701129
2019-07-03 12:00:01	1	14.73727711	0.00016246	17.55430111
2019-07-03 13:00:01	1	18.15861184	0.000160485	17.44081029
2019-07-03 14:00:01	1	15.82934957	0.00016045	17.38224611
2019-07-03 15:00:01	1	15.91259001	0.008778636	17.50062725
2019-07-03 16:00:01	1	16.27242034	0	17.46538009
2019-07-03 17:00:01	1	16.53872345	0	17.50965819
2019-07-03 18:00:01	1	14.22384421	0	17.68529017
2019-07-03 19:00:01	1	62.83447578	0	28.11673136
2019-07-03 20:00:01	1	13.96746873	0	18.52793252
2019-07-03 21:00:01	1	14.08974068	0	18.81853933
2019-07-03 22:00:01	1	14.40734977	0	19.06482661
2019-07-03 23:00:01	1	13.97141797	0	19.08832311
2019-07-04 00:00:01	0.227	0	0	0

<..\..\..\Environmental Monitoring\DCS monitoring\Daily DCS\DCS YPN Nitric Acid Stack 2019.xlsx>



2018 Annual Compliance Report
EPBC 2008/4546
Technical Ammonium Nitrate Plant

04-06-2020 600-200-ACR-YPN-0007 Rev 1

Attachment 10A(a): Letter YPN to Department regarding Rock Art Monitoring, dated 2 July 2018



Knowledge grows

2 July 2018

Our Reference: 650-200-LET-DOE-0002

Your Reference: EPBC 2008/4546

Monica Collins
Chief Compliance Officer
Office of Compliance
Department of the Environment and Energy
GPO Box 787
Canberra ACT 2601

Dear Ms Collins

Proposed Technical Ammonium Nitrate Production Facility (EPBC 2008/4546)

I write in relation to the Consolidated Approval Notice for the above referral, issued by your Department and dated 12 September 2017, and to recent discussions with yourself and colleagues.

As discussed, Condition 10A of the Consolidated Approval Notice, *On-going Rock Art Monitoring*, requires that, from 2018, rock art monitoring must be undertaken annually between 15 July and 15 September of each year, for the life of the approval. Condition 10A also requires that the monitoring be undertaken by a suitably qualified person (Heritage), and using a methodology approved by the Minister in writing, or through a program administered by the Western Australian Government Department of Water and Environmental Regulation (DWER).

As DWER has confirmed that they will not be conducting a monitoring program in 2018, Yara Pilbara Nitrates' proposes the following actions to meet the requirements of Condition 10A in 2018:

- Yara seeks approval to replicate the monitoring program that was approved in 2017 (see attached DOEE letter dated 21 December 2017)
- All aspects of the monitoring methodology will remain the same, with Warren Fish and Dr Ian MacLeod again managing the monitoring, with the heritage custodians of the Burrup rock art, Murujuga Aboriginal Corporation, actively involved (see attached Yara Pilbara Nitrates letter dated 3 November 2017, ref 650-208-LET-YPN-0001)
- With respect to the requirement of Condition 10A to engage at least once annually with the Murujuga Aboriginal Corporation in the planning and reporting associated with the on-going annual rock art monitoring, Yara Pilbara Nitrates has held multiple face-to-face meetings with Murujuga Aboriginal Corporation, as well as correspondence and telephone discussions to ensure their support for this proposal

Yara Pilbara Nitrates Pty Ltd

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Perth WA 6000
Australia
Telephone: +61 8 9327 8100
Facsimile: +61 8 9327 8199



Knowledge grows

Should this proposal meet with approval, the next step would be to identify with Murujuga Aboriginal Corporation an optimal time within the required dates for the monitoring, and begin logistical planning immediately to ensure compliance.

For your information, our intent is to conduct additional monitoring in partnership with Murujuga Aboriginal Corporation, according to methodology developed by Fish and Macleod and shared with Murujuga Aboriginal Corporation. This methodology has been submitted for consideration to the Director General of DWER by Murujuga Aboriginal Corporation's CEO during a recent meeting on country. Data gathered via this monitoring may well inform future approaches to protection of the Burrup rock art.

Yours Sincerely

A handwritten signature in dark ink, appearing to read 'L. Blackburn', with a long horizontal flourish extending to the right.

Luke BLACKBOURN

Manager Government and External Relations

Yara Pilbara Nitrates

Attachments

1. DOEE letter, 21 Dec 2017
 2. YPN letter, 3 Nov 2017
- cc. Peter Jeffries, Acting CEO Murujuga Aboriginal Corporation



Ref: 2008/4546

Mr Brian Howarth
HESQ Manager
Yara Pilbara Nitrates Pty Ltd
Locked Bag 5009
Karratha WA 6714

EPBC 2008/4546 – Proposed Technical Ammonium Nitrate Production Facility – Approval of Methodology

Dear Mr Howarth

Thank you for your letter dated 3 November 2017 to the Department, requesting approval of Yara Pilbara Nitrates interim rock art monitoring methodology under condition 10A(d) of EPBC Act approval 2008/4546.

I note that the Western Australian Government recently published the draft Burrup Rock Art Strategy which will provide a long-term framework to protect Aboriginal rock art on the Burrup Peninsula. In this context I understand that Yara Pilbara Nitrates Pty Ltd is seeking the approval of its methodology as an interim method to be used for 2017 monitoring, pending the development of a new method by the Western Australian Government and the independent Burrup Rock Art Monitoring Management Committee.

I also understand that Yara Pilbara Nitrates Pty Ltd has sought to address the recommendations of the Data Analysis Australia report to the extent feasible and that those recommendations will also be considered by the independent Burrup Rock Art Monitoring Management Committee in the development of the Burrup Rock Art Strategy.

On this basis, as delegate of the Minister I approve the proposed rock art monitoring methodology for 2017. I am also satisfied that Mr Warren Fish and Dr Ian Macleod, have suitable qualifications and experience to undertake the rock art monitoring under condition 10A.

Should you require any further information please contact Officer Dwaine McMaugh, A/g Director, Environmental Audit Section, on 02 6274 1641 or by email: EPBCmonitoring@environment.gov.au.

Yours sincerely

Monica Collins
Chief Compliance Officer
Office of Compliance

21 December 2017



Knowledge grows

3 November 2017

Our Reference: 650-208-LET-YPN-0001

Your Reference: EPBC 2008/4546

Monica Collins
Chief Compliance Officer
Office of Compliance
Department of the Environment and Energy
GPO Box 787
Canberra ACT 2601

Dear Ms Collins

Proposed Technical Ammonium Nitrate Production Facility (EPBC 2008/4546)

I write in relation to the Consolidated Approval Notice for the above referral, issued by your Department and dated 12 September 2017.

Condition 10A of the Consolidated Approval Notice, *On-going Rock Art Monitoring*, requires the first on-going rock art monitoring event to be completed by no later than 31 December 2017, and I wish to update you with respect to Yara Pilbara Nitrates actions to date to meet this condition, and seek approval of our proposed methodology and monitors.

As you are aware, previous rock art monitoring on the Burrup Peninsula was undertaken by CSIRO as part of the Western Australian Government's Burrup Rock Art Monitoring Program which expired in June 2016. Since that time, the WA Government has failed to replace the program and so we are in the position of needing to conduct our own rock art monitoring as per the Consolidated Approval Notice. Yara recognises the importance of obtaining data in 2017 so as to avoid a year-long gap in the monitoring data. Our efforts aim to make the data we gather as useful as possible in contributing to the understanding of the rock art and any potential impacts thereon.

A key aspect of our initial efforts has been to engage and include members of Murujuga Aboriginal Corporation (MAC) in our rock art monitoring activities. We note that as freehold title holders for the Murujuga National Park, as cultural custodians for the rock art and as Indigenous Rangers working on country, MAC are key stakeholders regarding Burrup rock art, yet they continue to state that they are being sidelined and treated paternalistically with respect to the Burrup rock art, as they attested at the Senate Inquiry earlier this year.

We have met the CEO, Chairperson, Circle of Elders and the Manager of the Murujuga Land and Sea Unit. They have agreed to assist in the rock art monitoring program for 2017, and our experts will work with the Rangers to ensure knowledge and skills transfer take place. Murujuga are supportive of this work and look forward to working with Yara.

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Knowledge grows

The proposed methodology is attached, and we trust it will meet with the approval of the Minister. As you will see, we have taken the previous CSIRO methodology, and made some changes to reflect clear recommendations of the Data Analysis Australia report *Review of CSIRO Report on Burrup Peninsula Rock Art Monitoring* found on the web at

<https://www.der.wa.gov.au/images/documents/our-work/consultation/Burrup-Rock-Art/DAA-independent-review-report---May-2017.pdf>

We noted your Department's endorsement of the role of CSIRO in previous rock art monitoring in the Department's response to comments in Dr Ken Mulvaney's submission to the Senate Inquiry. We trust that the Department therefore has a familiarity and understanding of the methodology presented.

Condition 10A c) requires the rock art monitoring to "...be undertaken by a suitably qualified person (Heritage)", with the definition later provided:

Suitably qualified person (Heritage) is a person with at least a bachelors degree with Honours in archaeology or five (5) years experience in Indigenous heritage or archaeology recognised by a relevant body such as the Australian Association of Consulting Archaeologists.

Our program will be led by Warren Fish, who is a Masters Degree qualified archaeologist and an ex-Registrar of Aboriginal Sites with the WA Government, with well over a decade of experience in Indigenous heritage. Warren will be supported by Dr Ian MacLeod, who is a highly respected international academic and scientist, specialising in heritage conservation. Dr MacLeod has been instrumental in the various rock art conservation and monitoring campaigns conducted on the Burrup. CVs are attached for both. As previously mentioned, the heritage custodians of the Burrup rock art, Murujuga Aboriginal Corporation, will be actively involved in the monitoring. These participants ensure we meet this Condition of the Consolidated Approval Notice.

We trust that this interim program meets with approval of the Minister, and would like to state our keenness to support updated methodology and monitoring in subsequent years. We are more than happy to provide further information, and look forward to working with the Department to ensure monitoring takes place in a timely manner. Should you need any further information before putting the proposed monitoring program to the Minister, please do not hesitate to contact us. In addition, if you feel that Departmental staff may benefit from a visit to the Burrup to better understand Yara's activities and the context in which we operate, we would be only too happy to host them.

Yours Sincerely,

A handwritten signature in blue ink, appearing to read "Brian Howarth", is written over a horizontal line.

Brian HOWARTH

HESQ Manager

Yara Pilbara Nitrates

Attachments

1. CV Fish
2. CV MacLeod
3. Proposed Technical Ammonium Nitrate Production Facility Rock Art Monitoring Methodology

cc. Craig Bonney, CEO MAC

CV

Warren Stuart FISH

PERSONAL DETAILS

Name: Warren Stuart FISH

Address: 31 Goollelal Drive
Kingsley 6026
Perth, Western Australia

Telephone: +61 (0)8 9409 7041 (home)
+61 (0) 409 448 860 (mobile)

Email: wsfish@bigpond.com

Warren has over 20 years of leadership experience and is highly skilled at developing and implementing strategic objectives.

He has international experience in corporate governance, Health Safety and Environment leadership, enterprise risk management, government relations, corporate affairs, Indigenous affairs, and people logistics.

Warren has held senior leadership positions in the Western Australian State Government; worked in the United States, southern Africa and Australia; and held key management roles in successful major projects.

IN BRIEF

20 years working in:

- Executive management
- Corporate Affairs
- Heritage and native title
- Sustainability
- Health, safety and environment (HSE) and sustainable development
- Corporate compliance and approvals
- Enterprise risk management

Experience:

- Project Director: Stakeholder Relations and Approvals, encompassing all HSE components. \$8 billion greenfields JV with multi-cultural partners and complicated commercial arrangements. Construction of a mine, railway and port and marketing of product and project into China and Korea.
- Executive Director: Health, Safety, Environment and Corporate Logistics at CITIC Pacific Mining, an \$15 billion greenfield magnetite project in north-west Western Australia. Greenfields construction of a mine, processing plant, infrastructure corridor, power station and port. My role extended to Executive Director of the company.
- Key management and leadership roles:
 - Aurizon
 - CITIC Pacific Mining
 - North West Shelf Venture

- Woodside Pluto LNG projects
- Registrar of Aboriginal Sites, WA State Government
- Work locations in the United States, southern Africa and Australia

Qualifications:

- MA (2001): respected in the international academic community, with numerous papers published in peer-reviewed journals, and have reviewed wide-ranging papers for academic publications.

Board representation:

- Previous membership of 14 Boards, including CITIC Pacific Mining Management Pty Ltd.

EMPLOYMENT HISTORY

September 2016 - Present:

WS Fish Consulting Principal

Consulting to industry on:

- Stakeholder Management and Corporate Affairs
- Government relations
- Heritage and native title
- Sustainability
- Health and Safety
- Environment

Skills include, although not limited to the following:

- Utilising strong government relationships (both State and Federal) to connect business leaders to political leaders in order to influence policy direction.
- Providing strategic advice to senior management and board on sustainability, stakeholder relations and community engagement.
- Delivery of regulatory approvals.

August 2014 – September 2016:

Aurizon Project Director: Stakeholder Relations, HSE and Approvals

The West Pilbara Infrastructure Project (WPIP) is a Joint Venture with Baosteel, POSCO, and AMCI to construct and operate an iron ore mine, 280km railway and port in the west Pilbara, Australia. Initial capacity is 40mtpa scalable to 250mtpa. Reporting to the Executive Vice President Strategy and Business Development I held formal accountability for below but was also heavily involved in Corporate Affairs issues across the business. This included providing advice to the then CEO on State and Federal political matters.

Portfolio included accountability for:

- Stakeholder Management and Corporate Affairs
- Sustainability
- Health and Safety
- Environment
- Heritage and native title

Responsibilities included:

- Successful delivery of regulatory approvals
- Lead negotiations for a State Agreement with the WA Government, including driving its passage through Parliament.
- Lead negotiations on a State Development Agreement for the Port, allowing sufficient control for Aurizon to take advantage of significant opportunities.
- Lead negotiations on Native Title Agreements.
- Ensure that commercial relationships were appropriately established and maintained.
- Develop and maintain strong joint venture, supplier and stakeholder relationships.
- Lead the implementation of the Heads of Agreement in terms of the management of major stakeholder relationships.

Key achievements

- Negotiated changes to approved Government port layout and design. Led to \$600m construction savings.
- Negotiated change to Government position on State Agreement term from 16 yrs +10+10 to 50 yrs +10+10. This increased project viability and led to significantly more favourable financing terms.
- Negotiated changes to Government policy relating to financial mechanisms usually required in State Agreements (use of trust structures as proponents)

May 2010 - June 2014:

CITIC Pacific Mining Management Pty Ltd Executive Director: Health, Safety, Environment and Corporate Affairs

CITIC Pacific Mining (CPM) is an Australian company wholly owned by the CITIC Group, one of China's largest SOE's. CPM constructed China's largest resource project in Australia in the form of a magnetite mine in the Pilbara. The Project is a \$15bn resource and infrastructure project consisting of a mine, concentrator, 450MW gas-fired power station, 30km infrastructure corridor, tailings facility, 60GL desalination plant and port. Peak construction workforce was 4500.

Portfolio included accountability for:

- Health and Safety
- Corporate Affairs
- Sustainability
- Corporate Logistics
- Environment
- Heritage & Native Title
- Pastoral Management (Mardie Station)

Reporting to the Executive Chairman, this position carried accountability for CITIC Pacific Mining's license to operate.

Responsibilities included, although not limited to the following;

- Staff compliment – approximately 120 (300 including contractors) people and \$90m annual budget.
- Board level decision-making and planning advice on company strategic direction.
- Health and Safety portfolio for construction, commissioning and operations. Peak workforce of over 4500.
- Cultural change programs in Health and Safety leading to a significant reduction in injuries.

Key achievements

- Introduced the first publication of a comprehensive Sustainability Report in the CITIC Group's history. Sustained and sophisticated internal stakeholder management at senior executive and board level required to gain approval for this to be undertaken in a traditionally conservative Chinese SOE. The report was well-received and the template was used for other business units in Hong Kong and mainland China. This led to wide-ranging internal discussion on the potential effects of climate change on various parts of the business.
- Stakeholder relations campaign with Federal politicians around the Carbon Pollution Reduction Scheme (CPRS) and Clean Energy Futures (CEF). Design of carbon

policy for CITIC Pacific Mining, particularly around 450MW power station and the construction of a solar farm to contribute to offset. We were able to win significant Federal funding to support the construction of the solar farm, leading to dramatic reduction of accommodation village costs.

- Significant issues were being encountered with the Safety portfolio, with poor performance and high injury rates. After a fatality occurred, I was asked by then-CEO to lead the undertaking of a cultural change project in the Safety portfolio. Detailed and sophisticated stakeholder work with Australian Board, Hong Kong Board and CITIC Board in Beijing. Program design and implementation across site with 4500 construction workers. Led to decrease in Recordable Injury Frequency Rate from 14 down to 3 within six months.
- Company Logistics were not being efficiently managed. Then then-CEO requested I undertake a change management project to rectify. I led renegotiations of contracts with QANTAS and other air and bus charter providers, as well as accommodation village service providers (3 different providers and 3 villages). Security contracts were redesigned. Outcome was a more disciplined approach to corporate logistics and significant cost savings. CEO then requested that the same study be undertaken on other portfolios, including site maintenance, which was also posted under my aegis.
- Mardie Station had been purchased by the company to shore up tenure and secure land access. The station had been running at a loss and the then then-CEO turned to me to rectify. I undertook a full review of operations which led to leaner operating models and the setup of a feedlot. This included capital spend on infrastructure, which was a difficult sell when instruction was to cut costs. The Board agreed with my logic and proposal, capital costs were incurred and Mardie Station has run at a healthy profit every year since.
- Site faced a significant fibrous materials issue and State Mining Engineer's advice to Mines and Petroleum Minister was to temporarily shut down the site. I led negotiations for Project to remain active while safety regime was being re-designed.
- Maintained strong relationships with Federal and State Government despite contentious issues, including significant cross-cultural and political miscommunication.

March 2008 – April 2010:

CITIC Pacific Mining Management Pty Ltd Director, Corporate Affairs, Environment and Heritage

Reporting to the CEO, this position was created to direct the Environment and Heritage portfolio and increase focus on approvals, compliance, sustainable and responsible development, and the management of community and stakeholder expectations in these spheres including;

- High level negotiations and interaction with various Commonwealth and State Government Departments.
- Environment, Heritage and Land Access processes and approvals, within accelerated timeframes, and Tenement Management.
- Indigenous relationships, consultations, approvals, surveys and negotiations with Traditional Custodians.
- Negotiator to CPM Legal Counsel during negotiations with three different Native Title Claimant Groups and on-going administration of Native Title portfolio.
- Responsibility for Indigenous Business and Employment strategy

Key achievements

- Approvals were the major risk to the project and were holding up construction at a

cost of US\$7m/day. I led the turnaround to a position where approvals were 6-8 months ahead of construction. This involved complex negotiations with Government and led to parallel approval processes being put in place. This had not been done before by Government.

- Significant fibrous materials (asbestos) issue on site with Dept of Mines and Petroleum Safety Branch advice to temporarily close site and halt construction. I successfully negotiated an outcome at Director General level that allowed construction to continue whilst new protocols were being designed and implemented.
- Re-negotiated approval conditions that were expensive and onerous to comply with. This led to significant cost savings.

Dec 2006 - March 2008:

Woodside Energy Limited Corporate Affairs, Heritage Manager

This position was created in the face of increased scrutiny in land access negotiations and entailed managing all Woodside heritage matters, including:

- Staff compliment – 5 reports
- High level negotiations with various Commonwealth and State Government Departments on National Heritage Listing.
- Drafting of Conservation Agreements between Woodside and the Commonwealth, and the NWSV and the Commonwealth.
- Heritage work exceeding international best practice on the Pluto Project.
- Managing corporate social responsibility.

Key achievements

- Led work negotiating National Heritage Listing of the Burrup peninsula with Pluto and North West Shelf areas excised.
- Negotiated Traditional Owner participation in heritage projects despite high-profile opposition from conservation groups and activists.

Nov 2004 - Dec 2006:

Woodside Energy Limited Manager Corporate Affairs, Karratha

Woodside Energy is Australia's largest oil and gas producer. Their primary facility is the Northwest Shelf Gas Plant, outside Karratha in Western Australia and is the largest resource project in Australia.

This position entailed managing a team to ensure delivery on the following issues:

- Staff compliment – 9 reports
- Corporate affairs advice
- Government and community relations
- Media and issues management
- Emergency response
- Government approvals
- Native Title and heritage
- Sustainability portfolio

Key achievements

- Member of the senior leadership team of 6 responsible for delivery of LNG cargoes as well as domestic gas to WA.
- Expansion of gas plant with no community issues raised.

May 2004 - Nov 2004:

**Department of Industry and Resources, Perth
Heritage Manager**

This position was created in order to provide advice to the Department, industry proponents and external stakeholders regarding heritage, Native Title and land access issues. Most of this work was undertaken on major projects and areas of my involvement included the Burrup Peninsula, Ord Stage II, ALCOA and Gorgon amongst others. This senior management position provided high-level advice to the Minister for State Development.

July 2002 - May 2004:

**Department of Indigenous Affairs, Perth
Assistant Director, Heritage and Culture Branch
Registrar of Aboriginal Sites**

The role as Assistant Director managed the Heritage and Culture Branch and the compliance arm of heritage legislation and attendant approvals system. A network of regional offices reported to this position. Strategic and operational policy was designed and implemented.

The Registrar is responsible for Aboriginal sites in Western Australia. High-level discussions and negotiations were undertaken with other State Agencies (usually at Director-level and upwards), industry representatives and Aboriginal organizations to facilitate responsible development. The Registrar provides the Minister for Indigenous Affairs with advice on development approvals.

February 2001 - July 2002: Curtin University of Western Australia
Consultant/Sessional Academic

March 1998 - Feb 2001: KwaZulu-Natal Museum Service
Media and Liaison Officer

1997 (3 months): University of Colorado
Denver Museum of Natural History
Canyon Archaeological Centre
Selected to participate USA government sponsored program of work.

April 1994 - March 1998: Northern Province Heritage Service
Archaeologist

QUALIFICATIONS

CURTIN UNIVERSITY OF TECHNOLOGY

Perth, Western Australia

Postgraduate courses completed at Curtin Business School:

- Marketing Theory 568
- Marketing Research 562
- Internet Marketing 567
- Applied Cases in Electronic Marketing 560
- Research Methodology 655

UNIVERSITY OF THE WITWATERSRAND

Johannesburg, South Africa

M.A.

2001 Masters Degree by research in archaeology

Thesis: "Early Venda History and the Mutokolwe Ruins near Tshiendeulu"

UNIVERSITY OF CAPE TOWN

Cape Town, South Africa

B.A. HONOURS

1991 - Graduated with Honours in maritime archaeology

Thesis: "Historic Shipwrecks; Issues in Management in a South African Context"

UNIVERSITY OF CAPE TOWN

Cape Town, South Africa

B.A.

1990 - Graduated with Bachelor of Arts, majoring in Archaeology

REFERENCES

References can be provided on request.

Curriculum Vitae for Ian Macleod

Place & Date of Birth: Ballarat, Victoria, Australia, 16 October 1948

Nationality: Australian

Business Address: Heritage Conservation Solutions
2/258 Labouchere Road, Como, Western Australia 6152
Telephone: 61-419952706
e-mail: iandonaldmacleod@gmail.com

Research Address: Western Australian Maritime Museum
Peter Hughes Drive, Victoria Quay
Fremantle, Western Australia 6160
Telephone: 61-8 94318302 (messages)
e-mail: ian.macleod@museum.wa.gov.au

Education:

2007: Doctor of Science, University of Melbourne: Thesis title *Chemistry and Conservation of Shipwrecks and Rock Art*, March 2007.

1974: Doctor of Philosophy, University of Melbourne: The thesis "*Polarography in anhydrous hydrogen fluoride*" reported on the electrochemistry of the transition and p-block metal-fluorides dissolved in liquid anhydrous-hydrogen-fluoride. Supervisor was the late professor Tom O'Donnell.

1970: Bachelor of Science (Hons) - (H2A), University of Melbourne. The thesis "*Potentiometry in Anhydrous Hydrogen Fluoride*" reported a study of the electrochemical properties of tin fluorides dissolved in liquid anhydrous-hydrogen-fluoride.

1961 – 1966: Ballarat High School, Victoria

Awards and Fellowships

Fellow of the Society of Antiquaries of Scotland (FSA Scot, 1974)

Fellow of the Royal Australian Chemical Institute (FRACI 1986)

Chartered Chemist (C.Chem. 1986)

Fellow of the International Institute for the Conservation of Artistic and Historic Works (FIIC, 1987)

Fellow of the Australian Academy of Technological Sciences & Engineering (FTSE, 2000)

Fellow of the Royal Society of Chemistry (FRSC, 2013)

International Council of Museums Committee for Conservation Triennial Medal (2017)

Heritage Council of Western Australia Medal, Professional Category (2017)

Bathurst Macquarie Heritage Medal finalist (2017)

Life Professional Member of the Australian Institute for the Conservation of Cultural Materials (2015)

Life member of the Australasian Corrosion Association (2014)

Corrosion Medal, the Australasian Corrosion Association for service and public engagement (2004)

Centenary Medal for services to Metallurgy and Technological Sciences, Australian Government (2003)

Alton Batty Medal for applied chemistry, Royal Australian Chemical Institute (1999)

Employment History in Conservation Management

May 2016 - present: Principal *Heritage Conservation Solutions*, an independent corrosion and deterioration assessment consultancy group operating in the museum and community sectors. Specialities include problem solving in corrosion degradation and management of buildings and sites.

May 2011- May 2016

Executive Director, Fremantle Museums and Collections

The primary responsibility of this position was the integrated management and service delivery of museum programs in Fremantle, including engagement with many community groups in the region. The role coordinated the departments of Materials Conservation, Maritime Archaeology and Maritime History and front of house staff. During this period applied research included microbial corrosion, the conservation of historic shipwrecks and the application of *in-situ* treatment methodologies to site management strategies. The assessment of buildings for passive conservation management for large collections has been shown to be cost effective and sustainable. A new approach for the determination of intervention priorities for major collections has been developed.

June 2006 – May 2011 Executive Director, Collection Management and Conservation

The position involved the management, development and integration of the museum collections and conservation programs with the relocation of objects and staff within the metropolitan area. During this interval I effected the safe relocation of collections from five metropolitan storage sites to the central facility that I set up in suburban Welshpool. This rationalisation involved closing two museum sites and three storage locations. I project managed the valuation of the 12½ million objects in the WA Museum collections which were valued at \$638 million. During this period my research focus was on corrosion phenomena on the Australian WWI submarine AE2 in the Sea of Marmara in Turkey and Japanese shipwrecks from WWII in Chuuk Lagoon in Micronesia.

July 2003 to June 2006

Director, Museum Relocation Project & Museum Services

I was responsible for the relocation of 85 staff, honorary associates, volunteers and 4½ million collection items from the WA Museum site in Perth site to the new Collections and Research Centre in Welshpool. The relocation was necessitated due to a unique combination of hazards from latent asbestos risk and major dangerous goods fire hazards associated with more than 130,000 litres of ethanol stored on site in the main museum building. The project consisted of the conversion of a 9,000 m² building into an integrated suite of laboratories and collection boxes which had a high-quality temperature and relative humidity controlled storage facility with dust removal to 1µm. This was a massive preventive conservation project covering the bulk of the WA Museum collections. As project manager I coordinated engineers, architects, space planners, curators, collection managers, staff, and the development of communication strategies for key players. The project involved regular briefings with the Minister and Director General of the Department for Culture and the Arts as well as the chair of the Board of Trustees. The project was completed on time and within the \$11 million budget.

1978 – 2003

Various positions within the WA Museum Materials Conservation and general administration.

Research Background:

Applied Chemistry

During my PhD and post-doctoral fellowships I developed a range of techniques for solving complex problems which involved careful experimentation, fine motor coordination skills and ability to engage a wide variety of audiences with the nature of the applied research.

Cultural Materials Conservation

I have pursued an understanding of the mechanisms of decay of cultural materials with detailed analysis of the layers of degraded materials on objects recovered from terrestrial and marine environments. Part of this work has involved surface analysis of tool-marks; wear patterns and fabrication techniques, as well as provenance studies on the materials used in the manufacturing processes. I have achieved an international reputation for my *in-situ* corrosion studies on historic shipwrecks, with particular emphasis on iron shipwrecks. Through successful modelling of the electrochemical processes involved in corrosion of shipwreck materials I have developed models that predict the decay rate of the vessels. I pioneered the use of sacrificial anodes on iron artefacts as a method of *in-situ* conservation. Major achievements have incorporated sites such as the SS *Xantho* (1872) steam engine in Western Australia, the best bower anchor and a carronade from the HMS *Sirius* (1790) on Norfolk Island, a the composite wooden-iron wreck of the *Zanoni* (1867) in South Australia and cannon from the *Swan* (1653) in Scotland and both HMVS *Cerberus* (1926) and the *City of Launceston* (1865) in Victoria. A method of assessing the age of corroded cast iron cannon has been established using chloride diffusion data.

Successful identification of contemporary forgeries in silver coins recovered from the wreck of the Dutch *Batavia* (1629) and the American *Rapid* (1812) provided insights into corruption in the Spanish Netherlands in 1562 and in Mexico during 1796. Surface analysis of corroded silver coins on the Portuguese shipwreck of the *San Pedro de Alcantara* (1786) provided an energy map of the turbulent wreck site. Industrial practices of the 19th century have revealed the way in which ships' fastenings contributed to the ultimate loss of the vessels through decay mechanisms associated with premature structural failure due to inclusions. Analysis of the encrusting marine organisms has shown that bacteria convert phosphorus impurities in iron into a growth stimulant.

I developed the method for determining the dimensions of scantlings on historic iron shipwrecks from the combination of residual metal thickness and the long-term corrosion rate. I determined the impact of stresses during manufacture and shipwrecking processes on the corrosion rate of non-ferrous metals. The effect of chloride ion concentration on the corrosion rates of iron alloys has been characterised. Detailed analysis of corrosion data from 70-year old wrecks in Chuuk Lagoon in the Federated States of Micronesia has enabled prediction of when they will collapse. Collaborative work with marine biologists has established the first evidence of biodynamic interaction of marine organisms with wrecked ships and aircraft and how marine organisms affect the deterioration of wrecks.

Through applied micrometeorology it was demonstrated that the active decay of historic prisoner-painted surfaces was due to hard render on the exterior of the World Heritage listed former convict-built Fremantle Prison. This study prompted the Heritage Council of WA to order removal of the 100 year old render which has now stabilised the site. Chloride mapping at St Georges Anglican cathedral in Perth demonstrated that salt movement was the primary cause of degradation of brick and stonework. Wide scale application of papier-mâché poultices enabled the bulk of the salts to be removed and to retain the original materials, which was the first time the process had been carried out on an industrial scale in Australia.

My work on the Australian WWI submarine HMAS AE2 in the Sea of Marmara, Turkey has resulted in the application of ten tonnes of zinc sacrificial anodes to conserve this historic vessel on the seabed at a depth of 73 metres. Data collected from in-situ corrosion measurements has shown the pH profiles found adjacent to the submarine and at a distance of 25 metres are replicated in microenvironments inside the complex submarine. I have developed a method to determine when in-situ conservation of marine iron objects has reached effective completion without the need for excavation activities.

I have developed the method for migrating formalin-preserved natural science specimens from 70% ethanol to 65% aqueous glycerol which has been applied to the WA Museum's iconic Megamouth III, a

5.2 metre The treatment program was conducted inside a public gallery at the WA Maritime Museum and has resulted in a stabilised shark that has lost a lot of its shrinkage caused by 13 years of alcohol induced desiccation. The method is now being used by the Natural History Museum in London on a large great white shark.

Working with the Benedictine community at New Norcia, Australia's only monastic township, I developed a significance and conservation ranking which enables calculation of which objects are the most important to treat. This work has been successfully extended to the management of iron shipwrecks in Port Phillip Bay and Bass Strait. I also developed a method of removing tarnish from metallic threads in a 17th century cope by using neutral buffered solutions of dithionite and immersion of the textiles.

Conservation of Aboriginal Rock Art

Thirty-five years ago, my introduction to Aboriginal rock art in the Wheatbelt of Western Australia began. The task was to assess the impact of previous interventions involving installation of drip lines and graffiti removal to control degradation of sites. Through connections at Murdoch University I established the methodology of applying the principles of micrometeorology to model the decay rates of engraved and painted surfaces. This work led to a series of successful grant applications to fund basic research into the physical microenvironment of the sites to see how the chemical and microbiological activity interact to control the rates of physical and biological degradation. Micro-environmental modelling correctly replicated the temperature profiles of rock art sites in the West Kimberley and Murchison regions of Western Australia. This work enables estimation of the annual climate of the sites without the need for repeated visitation.

The complexities of the decay patterns on the Kimberley Wandjina paintings were shown to be due to acid dissolution of the intensely white pigment huntite, $Mg_3Ca(CO_3)_4$ into pseudomorphic whewellite $CaC_2O_4 \cdot H_2O$, which preserved the form of the totemic images. Acidic solutions from rainfall events in the absence of oxalate ions dissolve the images. Microenvironment and mineralogy studies at *Walga Rock* has revealed a series of complex dissolution and re-precipitation reactions whereby water born ions derived from aged avian guano results in the preservation of calcitic and kaolinitic pigments on the images. Research in the Burrup peninsula established the direct relationship between acidity of the rocks and the number of bacteria, yeasts and moulds growing on their surface and the impact of nitrates on the overall microbiological activity. I introduced using pH measurements to assess the local environment and now have extended the work to include E_h data collected directly from the rock surfaces. I have established the connection between industrial emissions and apparent acceleration of the decay rate of petroglyphs.

I was the deputy ex-officio WA Museum member on the Aboriginal Cultural Materials Committee of the Department of Aboriginal Affairs for eight years. This committee met monthly and advised the Minister on the impact of proposed mining and development applications on Aboriginal sites with recommendations on which sites should be preserved and which can be destroyed.

Professional Activities

I have been a member of the Royal Australian Chemical Institute since 1970 and was the Media Liaison Officer for the WA Branch in 1984 and a Fellow since 1986. I have been a member of the Australasian Corrosion Association (ACA) for 40 years and was on the Editorial Board of their journal *Corrosion and Materials* for five years and am the present Editor. The ACA recognised my contribution to corrosion science through the invitation to present the *P.F. Thomson Memorial Lecture* at the ACA Bicentennial Conference in Perth in 1988, in Adelaide for 2002 and in Perth 2011 for the 18th International Corrosion Congress of which I was the chair. I was awarded their *Corrosion Medal* in 2004 for services to the Association and to public education. In 2005 I was a plenary lecturer at the

Golden Jubilee conference of the ACA and opened the Trade Fair. I have given numerous seminars for the association over the last 38 years. I was elected to Life Membership of the ACA in 2014. I was Federal Treasurer of the Australian Institute for the Conservation of Cultural Material (AICCM) from 1980- 89 and Western Australian Branch President in 1979, 1988-1992 and again in 2006 and was a member of the Professional Accreditation Committee for ten years. I am a Professional Conservator life member of the AICCM.

I was a member of the Conservation and Collections Management Working Party of the Heritage Collections Council of the Commonwealth of Australia for five years. In September 1999 I was elected to the Directory Board of the Conservation Committee of the International Council of Museums and completed my second term in 2005, having brought about fundamental changes in the by-laws that facilitated universal access to the election processes for the Directory Board of ICOM-CC. November 2000 saw my election as a Fellow of the Australian Academy of Technological Sciences and Engineering and I was invited by the IIC to be a member of the editorial board of new international journal *Reviews in Conservation*.

I give regular media interviews and lectures to service organisations and community groups and run public workshops in Preventive and Metals Conservation for Edith Cowan University's *Certificate in Museum Studies*. From 1998-2004 a series of keynote addresses were presented at the Murdoch University Science Summer School for year 10 & 11 high school students. I was appointed to the Editorial board of *Conservation and Management of Archaeological Sites*. In 2007 I was a guest lecturer for the Murdoch University STAR program and gave a RioTinto sponsored talk on *Conservation Chemistry Science* to year 10-11 high school students in Northam, Tom Price, Carnarvon and Bunbury and reached more than 1200 students in one week. In 2009 the Murdoch University Science Summer School appointed me as plenary lecturer for their science communication program for year 10 and 11 students. On average I delivered 45 public talks a year at community groups or at conferences and workshops during my five-year term as Executive Director of the Fremantle Museums. In 2017 I was awarded the medal for Professional Practice by the WA Heritage Council and the ICOM-Committee for Conservation Silver medal for services to materials conservation.

Research Grants

The Lotteries Commission grant was given to the Swan Bells Foundation of which I am the chair. I was a principal investigator under Peter Veth for the ARC Historic Shipwrecks Preservation Project. The Synchrotron analysis of the de Vlamingh was a joint project with the National Gallery of Victoria (David Thurrowgood). The present study on the Hartog plate is a joint venture between the Rijksmuseum (Amsterdam), the Queen Victoria Museum in Launceston and the Western Australian Museum.

For all other grants, I was the applicant and awardee.

Year	Source	Value	Title
2017	Synchrotron	\$35,000	<i>XFM Study of the Hartog Plate</i>
2015	Lotteries Commission (WA)	\$300,000	ANZAC 100 th Anniversary memorial bell
2013	Synchrotron	\$35,000	<i>XFM Study of the de Vlamingh Plate</i>
2011	ARC Linkage	\$180,000 cash \$521,000 in kind	<i>Australian Historic Shipwreck Preservation Project: Clarence (1850)</i>
1994	British Council	\$2,600	<i>In-situ corrosion studies on a Cromwellian warship in Scotland</i>
1994	AIATSIS	\$10,856	<i>Microclimate modelling of rock art sites in the Kimberley Region of WA.</i>
1991	WA Heritage Council	\$24,000	<i>Microclimate studies and site management strategies II</i>
1990	AIATSIS	\$10,000	<i>Microclimate studies - effects of animal excreta on rock art.</i>
1990	National Estate Program	\$72,000	<i>Microclimate studies and development of site management programmes for conservation of rock art in West Kimberley Region of Western Australia.</i>
1988	ARC	\$18,000	<i>Conservation of wood-iron composite materials and pewter.</i>
1987	AIATSIS	\$11,150	<i>Conservation of rock art at McKay Caves</i>
1987	AIATSIS	\$6,750	<i>Conservation of rock art at Walga Rock</i>
1985	ARC	\$35,500	<i>Conservation and degradation of pewter and wood-iron composite materials recovered from historic shipwrecks'</i>

Career Highlights

- 2017** Awarded Professional Contribution medal by the WA Heritage Council. Work on the conservation of the fire ravaged Yarloop Railway Workshop museum. Work with *Nutopia Films* on bacterial corrosion of iron shipwrecks in Chuuk Lagoon, Federated States of Micronesia. Recording pH and E_h of Burrup rock art. Microenvironment analysis at an early bronze age mound at the Japanese Centre for Anatolian Archaeology at Kaman, Turkey. Awarded ICOM-CC Triennial medal at the XVIII Conference, Copenhagen.
- 2016** Developed and co-presented a 5-day metals in textile conservation workshop for the Queen Sirikit Textile Museum in Bangkok and quantified the impact of high temperatures and humidity on biodeterioration of textiles. I co-presented an AICCM Textile Working Group workshop in Sydney on treatment of composite metal and textile objects. Coordinated fund-raising for \$485,000 for a 6.5 tonne ANZAC Memorial bell for the Swan Bell Tower to commemorate the 100th anniversary of the ill-fated campaign. Solved accelerated corrosion of jetty piles at a yacht club as *Heritage Conservation Solutions*.
- 2015** Presented plenary lecture on in-situ conservation of the AE2 submarine in Istanbul and participated in the 100th anniversary ceremonies over the wreck site on board HMAS Anzac. Conducted field work and presented a course in application of micro-climate studies on the mineralogy and microbial activity on rock art sites in Mexico City. Elected to Honorary Professional Life Membership of the AICCM. Part time Ph. D. supervision of Susie Collis at the Grimwade conservation centre. Presented summary of in-situ conservation assessment and treatment of HMAS AE2 with sacrificial anodes at the concluding international workshop at the Maritime Museum in Istanbul in April. I also presented the Stanhope Oration at the annual national conference of the science teachers and school laboratory technicians association. Appointed community reference member for the University of WA Cultural Collections Board.
- 2014** Presented closing plenary lecture at the International Council of Museums' Committee for Conservation Triennial conference, Melbourne on *Innovative Australian conservators preserve heritage* and delivered three papers on aspects of applied conservation research. Elected to Life Membership of the Australasian Corrosion Association. Appointed as corrosion advisor to the USS Lexington (WWII) aircraft carrier search team. Presented a plenary lecture at a corrosion conference in Washington DC on historic aluminium artefacts. Featured in ABC TV *Catalyst* on AE2 submarine in the Sea of Marmara, Turkey.
- 2013** Awarded a Synchrotron grant with David Thorrowgood of the National Gallery of Victoria for access to the X-Ray Fluorescence Microscopy beam line for studying the de Vlamingh plate (1697). I presented the RACI-WA Division Bayliss Youth lecture titled *Chemists and Heritage Conservation* to Year 10-12 High School students in Western Australia and the Northern Territory. I was awarded a Fellowship of the Royal Society of Chemistry. I conducted a corrosion survey on the wreck of HMCS *Protector*, Heron Island, in the Great Barrier Reef. I took on co-supervision of Ph D candidate Maria Jacobsen, University of Haifa regarding the archaeology of the H. L. Hunley (1864) submarine site. Identified a 19th century high quality steel hand axe on ABC TV show *Somebody has been sleeping in my house*. I was appointed by Minister of Science and Innovation to a three member panel to review the operations of the Chemistry Centre of WA and our report has been presented to the Premier of WA.
- 2012** Appointed Editor of *Corrosion and Materials*, the journal of the Australasian Corrosion Association. I became a member of the management advisory committee for the Royal Australian Air Force Association Aviation Memorial Museum in Perth. Engagement with the *Clarence* (1850) site management and excavation - reburial team off St Leonard's, Port Phillip Bay under the auspices of the ARC Cooperative Research Centre on Historic Shipwrecks. Conducted a webinar on stainless steel corrosion in Beijing and a web based

tutorial for American high school students on redox and corrosion chemistry and a web enabled lecture on the conservation of the RMS Titanic at the Royal Institution in Adelaide. Delivered a one-week metals intensive training program to Masters' students that the University of Melbourne's Centre Cultural Materials Conservation program.

- 2011** Principal investigator in ARC Linkage Grant on "In-situ preservation of the *Clarence* (1850) shipwreck in Port Phillip Bay Victoria". Undertook the office of Past President of Australasian Corrosion Association and was Conference chair for the 18th International Corrosion Congress in Perth. Four months at the Getty Conservation Institute in Los Angeles studying the corrosion and conservation of shipwreck artefacts. Presented papers at the ICOM-CC conference in Lisbon on the glycerol treatment of sharks to replace ethanol and on the corrosion of wrecks in Lake Huron, Canada. I undertook a Significance assessment of the ecclesiastical textile collection at the Benedictine community at New Norcia, Western Australia which led to the modelling of treatment prioritisation matrices to assist in the effective management of their collection.
- 2010** Elected President of the Australasian Corrosion Association. Pre-prints committee member for ICOM-CC in Lisbon. Presented work on the Australian submarine AE2 (1915) at the Metal 2010 conference and conducted practical workshops at the Clemson University Conservation Centre in North Charleston. I also presented a paper on the corrosion of iron shipwrecks in Chuuk Lagoon to the NOAA international conference on WWII ocean risks from leaking oil, Newport News, Virginia in October. An *in-situ* corrosion survey of HMVS *Cerberus* showed its back is broken and that the *City of Launceston* is being conserved with anodes.
- 2009** Elected President of the WA Division of the Australasian Corrosion Association and national Vice President. Expert witness in Darlinghurst Supreme Court at the retrial of Phuong Ngo, for the murder of John Newman, MP. Program coordinator for AICCM National Conference in Fremantle, "Conservation of Public and Private Collections", Presented with award for Outstanding Contribution to Research in Materials Conservation by AICCM. Chair of symposium in Belgium on the conservation options for the historic former Antarctic research vessel the *Belgica*, lying wrecked in Norway.
- 2008** Appeared in the documentary *Gallipoli Submarine* with experimental work in Turkey and Australia. Provided commentary on the 4 Corners (ABC TV) program regarding the alleged murder weapon used in the assassination of John Newman MP in New South Wales. Appeared on French TV3 documentary *Phantoms de Chuuk* set in Federated States of Micronesia. External examiner for the University of Stockholm, on the chemistry of sulphur compounds in the Vasa (1628) shipwreck. I presented a plenary lecture on the application of long-term corrosion data to containment of nuclear wastes at the Gordon Corrosion Conference, New Hampshire. I taught a one-week metals conservation intensive at the Centre for Cultural Materials Conservation, University of Melbourne.
- 2007** Appointed Chair of the Swan Bells Foundation, member of the Fulbright Fundraising Committee for Western Australia which raised its \$1 million target in less than a year. Trained divers in conducting corrosion measurements on WWI submarine J5 off Port Phillip Heads. Undertook field measurements in Turkey on the AE2 submarine. Present Rio Tinto sponsored talks to high school students in regional and remote centres. Appointed to the USS Monitor (1862) International Conservation Advisory Panel and made a member of the ICOM-CC preprints team for New Delhi. Data collected on Japanese shipwrecks and aeroplanes in Chuuk Lagoon established new decay mechanisms, leading to improved heritage management outcomes.
- 2006** Appointed to the Editorial board of journal *Conservation and Management of Archaeological Sites*. Appointed corrosion advisor to the Submarine Institute of Australia for the AE2 Marine Archaeological Assessment in Turkey. Determined that the *City of Launceston* could be opened for controlled diving access. Taught a one week course in Metals Conservation for the

University of Melbourne Masters in Conservation program. I presented lectures and workshops for Old Dominion University in Norfolk, Virginia as part of the Distinguished Visiting Speaker program. Supervised and managed the move of two collection stores to the central museum facility in Welshpool.

- 2005** In-situ corrosion studies on HMVS *Cerberus* demonstrated a 25% increase in corrosion rate and the *City of Launceston* returned to its stable rate after experiencing increased decay due to archaeological intervention. I presented a five-day conservation of outdoor sculptures and monuments in Hong Kong workshop with Colin Pearson. Presented the first intensive on Metals Conservation at the University of Melbourne. Motivational speaker for emerging corrosion scientists at the 50th Anniversary conference of the ACA in Brisbane. Reviewed the conservation treatment of the turret, engine and condenser recovered from the USS *Monitor* (1862) at The Mariners Museum, Newport News, USA.
- 2004** Awarded the ***Corrosion Medal*** of the Australasian Corrosion Association for services to the profession and for services to public education and community awareness. Project managed the relocation of the WA Museum staff and collections from the asbestos contaminated 1970's building in Perth to a collections and research facility 9.5 km away in Welshpool. Work involved extensive engagement and planning with architects, HVAC and fire engineers with security advisors and collection management staff. Fortnightly reporting to the Director General, Department of Culture and the Arts, the chair of the Board of the Trustees of the museum and the Minister assisted in bringing the project in on time and within the \$11 million budget.
- 2003** Received a **Centenary Medal** from the Prime Minister for "***For service to Australian Society in metallurgical science and engineering***". Appointed to the Board of the Swan Bells Foundation by the Minister for Culture and the Arts. Presentations at ICCROM in Rome, at the Technological Educational Institution and at the IIC Hellenic Group in Athens. Presented a one-week intensive in the interpretation of corrosion processes on archaeological metals at the Institute for Conservation de Netherlands in Amsterdam. Inspection of corrosion processes on the wreck of the former HMAS Perth in Albany. The quantification of the impact of nitrate and sulphate ions on the acidification of rock surfaces in the Burrup peninsula. A new corrosion mechanism for turbulent wreck sites was developed from data collected on corroded silver coins from an 18th century Portuguese shipwreck.
- 2002** Elected to the Directory Board of the International Council of Museums – Conservation Committee in the Rio de Janeiro for a second term. Appointed to the Ministerial Burrup Rock Art Management Committee. Determined the impact of *in-situ* conservation techniques on the *James Matthews* wreck. Plenary lecturer at the International Congress on the Conservation and Restoration for Archaeological Objects in Nara, Japan. Initiated the first corrosion study of WWII Japanese wrecks in Chuuk Lagoon, Federated States of Micronesia.
- 2001** Expert corrosion witness during a murder trial in the Supreme Court of NSW regarding the immersion period of a Beretta pistol. Provided expert witness on iron corrosion in the Perth Magistrates court. Presented a four-week course on in-situ shipwreck conservation and micro-environmental analysis at Evtek Institute of Art & Design, Finland. Prepared the guided missile destroyer HMAS Perth for corrosion monitoring over the next 100 years.
- 2000:** Elected Fellow of the Australian Academy of Technological and Engineering Sciences (FTSE) and became a member of the Editorial Board of *Reviews in Conservation*. Delivered a speech at the opening of the 600 year-old *Bremen Cog* in Bremerhaven, Germany. Managed the handover of a conserved WWII PBY-5A Catalina at Hawkins, Texas. Published a review of rock art conservation in the inaugural issue of *Reviews in Conservation*.
- 1999:** Elected to the Directory Board of ICOM-CC and Assistant Coordinator, Metals Working Group. Appointed a board member of the Australian American Catalina Memorial Foundation and coordinated the conservation of a WWII PBY5A Catalina in Hawkins, East Texas, USA. Conducted *in-situ* corrosion studies on silver coins from the 18th century wreck the *San Pedro*

- del Alcantara* in the Atlantic Ocean in Portugal. Presented at the planning seminar for the recovery of the confederate submarine *HL Hunley* (1864), Charleston, South Carolina, USA.
- 1998** Presented at the *Metal '98* conference in France and conducted *in-situ* studies on cannon and anchors on the wreck of the *Swan*, Duart Point, Scotland. Reviewed corrosion management strategies through *in-situ* measurements on the *City of Launceston* and HMVS *Cerberus* in Port Phillip Bay. Assessed the condition of a WWII Catalina undergoing restoration in Texas.
- 1997** Awarded Public Sector Management Office Scholarship for *Skills for an Effective Manager*, School of Management, Curtin University and obtained a Distinction. Conducted contracted *in-situ* corrosion studies on iron and composite wood-iron wrecks in Gulf St Vincent and Spencer Gulf in South Australia and on the *City of Launceston* in Victoria. Expert witness at an International Arbitration Court in Kuala Lumpur for the Malaysian Government regarding the conservation of materials from the wreck of the *Diana* (1817).
- 1996** Delivered applied research papers at the International Institute for Conservation conference in Copenhagen, the ICOM-CC meeting in Edinburgh and at the ICOM-CC Waterlogged Archaeological Organic Materials Conference in York. I delivered a lead paper at the 13th International Corrosion Congress in Melbourne on the corrosion of the wreck of HMVS *Cerberus* (1926). Performed corrosion measurements on the *Clan Ranald* (1909) wreck and the *Willyama* (1907) in Investigator Strait, South Australia.
- 1995** Performed an *in-situ* corrosion survey of a series of historic iron shipwrecks in Investigator Strait, South Australia discovering systematic differences in the rate of corrosion, which were dependent on alloy composition. Provided conservation advice on the corrosion of bronzes in the National Museum of Cambodia in Phnom Penh with a UNESCO-ICCROM team of heritage consultants.
- 1994** Awarded an AIATSIS grant for *Microclimate modelling of rock art sites in the Kimberley Region of WA* and a British Council travel grant to perform *in-situ* corrosion studies on the wreck of the *Swan*, a Cromwellian frigate that sank off the Isle of Mull in 1653. Completed the treatment of a carronade from HMS *Sirius* (1790) on Norfolk Island. Performed a corrosion survey of the wreck of HMVS *Cerberus* in Port Phillip Bay and established the method of determining the original thicknesses of metal structures.
- 1993** Awarded a Senior Fulbright Fellowship for study at the Smithsonian Institution and participation in conferences in the United States of America and assessed the wreck of the *USS Arizona* in Pearl Harbour, Hawaii. In Lake Huron I conducted *in-situ* corrosion studies in the Fathom Five National Park at Tobermory. This established the corrosion mechanisms of historic iron-fastened wooden wrecks in cold, fresh water. Elected coordinator of the ICOM-CC Metals Working Group and presented papers at the Waterlogged Archaeological Organic Materials conference in Portland, Maine. Consultant on the conservation of materials just recovered from the wreck of the RMS *Titanic*.
- 1992** Established the methodology for *in-situ* corrosion studies of wrecked barges and paddle steamers in zero-visibility conditions of the River Murray in South Australia. The results of rock art research in the Kimberley region of WA were presented at the Second International Rock Art Conference in Cairns, Queensland. Established model for prediction of desalination rates for corroded iron cannon and how the shipwreck can be dated from the chloride extraction kinetics.
- 1991** Awarded a Western Australian Heritage Council grant for *Microclimate studies and site management strategies II* for wet season rock art conservation research in the West Kimberley Region. Data from shipwrecks in Port Philip Bay established the applicability of corrosion measurements to the management of iron shipwrecks in cool seawater. I presented a paper on corrosion and conservation of ships' fastenings at the Getty Museum conference on Ancient and Historic Metals in Los Angeles, USA.
- 1990** Awarded an AIATSIS grant for *Microclimate studies - effects of animal excreta on rock art*. Presentations to conservators in London, York and at the ICOM-CC conferences in Bremerhaven and Dresden. I was elected coordinator of the ICOM-CC Metals Working Group

and chaired the UNESCO–UNDP of ASEAN Heads of Conservation meeting in Bangkok. Awarded Honorary Life Membership of the Australian Institute for the Conservation of Cultural Materials.

- 1989** Conducted a series of museum assessments and conservation workshops during a four-week UNESCO-UNDP Consultancy while based at the National Museum of the Philippines in metro-Manilla. Interviewed for the ABC Radio Science Show regarding iron corrosion, phosphorus impurities and their effects on concretion formation. I participated in the ABC TV and Science Bookshop interviews on conservation of underwater archaeological sites.
- 1988** Presentation plenary at the 3rd Australasian Archaeometry Conference, Adelaide on the Archaeometallurgy of 19th century shipwreck fastenings. Delivered the P.F. Thomson Memorial Lecture on *'Marine corrosion on historic shipwrecks and its application to modern materials'* and the paper "*Conservation of corroded concreted iron*" at the Australasian Corrosion Association Bicentennial Conference in Perth, Western Australia.
- 1987** Elected fellow of the International Institute for the Conservation of Historic and Artistic Works (FIIC). Organised the first combined meeting of the ICOM-CC metals and waterlogged organic archaeological materials working groups in Fremantle. Presented papers on rock art, metals conservation and desalination of ceramics at the ICOM-CC Triennial Conservation Conference, Sydney and at the ICOMOS Built in Wood Conference, in Brisbane. I was awarded an ARGs continuation grant for research into pewter and composite object conservation. Awarded Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) grant for conservation work on rock art at MacKay Caves and for conservation studies of the rock art at Walga Rock. Awarded a National Estate Program grant for a four-year program on *Microclimate studies and development of site management programs* for conservation of rock art in West Kimberley Region of Western Australia.
- 1986** Elected fellow of the Royal Australian Chemical Institute (FRACI). I presented on the ABC Science program *Quantum* on the use of oxygen isotope ratios in barnacles to determination of the seawater temperatures and to track the voyage of a ship in 1811. Chemical analysis of wines provided an insight into the American China trade before the 1812 war with Canada.
- 1985** Awarded a three-year Australian Research Grants Scheme (ARGs) grant to study the *Conservation and degradation of pewter and wood-iron composite materials recovered from historic shipwrecks*.
- 1984** Bayliss Youth Lecturer, Royal Australian Chemical Institute (WA Branch) which involved presenting the address "*Conservation Chemistry*" around Western Australia to year 10 & 11 high school chemistry students. Attended the ACA Conference at Rotorua, New Zealand and presented on the effects of concretion on the corrosion of non-ferrous metals. Conducted a feasibility study on relocation of the vessel *Edwin Fox* to Western Australia.
- 1980** Joint award with Neil North for the Best Research Paper at Conference 19 - Australasian Corrosion Association, Perth 1979 for the paper entitled "*350 years of marine corrosion in Western Australia*."

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- MacLeod, I.D. & Ritchie, I.M. (1981) "The detection of debasement in (forged) silver coins by means of corrosion potential measurements", *Archaeometry*. 23: 65-70.
- MacLeod, I.D., (1981) "Shipwrecks and applied electrochemistry", *J. Electroanalytical and Interfacial Electrochemistry*, 118: 291-303.
- MacLeod, I.D. (1981) "Bronze disease - an electrochemical explanation", *ICCM Bulletin VII* (1): 16-26.
- MacLeod, I.D. & North, N.A. (1982) "Conservation of a composite cannon –Batavia (1629)", *International J. Nautical Archaeology* 11(3): 213-219.
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Proposed Technical Ammonium Nitrate Production Facility (EPBC 2008/4546)

Consolidated Approval Notice Condition 10A, On-going Rock Art Monitoring

METHODOLOGY

For 10 years (2004 to 2013), petroglyphs at seven specially selected sites (chosen under the guidance of indigenous elders) in the Burrup Peninsula were measured using colour and reflectance spectroscopy measurements. Three spots on each engraving and three spots on each background rock were measured *in situ* using a portable photospectrometer for colour measurement and a reflectance spectrometer for visible and near infrared analysis. In 2014, the rock art monitoring project expanded at the request of Yara Pilbara Nitrates Pty Ltd (YPNPL). The company was building a Technical Ammonium Nitrate (TAN) Production Facility Project (TAN) on the Burrup Peninsula, and to adhere to the requirements of the Environment Protection and Biodiversity Conservation Act 1999, YPNPL needed to engage a heritage monitor to survey the rock art sites within a two kilometre radius of the project site. CSIRO had been a heritage monitor for the then West Australian Government "Department of Environment Regulation (DER)", now the Department of Water & Environment Regulation (DWER) for the monitoring of the Burrup petroglyphs for the last decade and was considered appropriate to be the heritage monitor for YPNPL.

The rock art study dedicated for the TAN Project required the heritage monitoring of petroglyphs sites within 2km of the plant site. Selected sites were determined in consultation with members of Murujuga Aboriginal Corporation to respect the cultural laws of the traditional owners for the entitlement of access. The selected petroglyphs were firstly evaluated for their appropriateness for scientific study, including petroglyph size and quality, direction of exposure, elevation, dominant and wind direction. From the six selected monitoring sites, three were already part of the decade-old and ongoing Burrup Rock Art Technical Working Group (BRATWG) monitoring program and an additional three sites were also selected. After initial monitoring in February 2014, the three new sites have become part of the BRATWG monitoring program. As well as the three new sites, an extra spot (both engraving and background) was added on each monitored petroglyph panel, bringing the total to eight sampling spots (four areas classified as 'engraving' and four areas classified as 'background') to increase the accuracy of future statistical analysis of measurements.

Proposed methodology for 2017 rock art monitoring to ensure compliance with Condition 10 of EPBC 2008/4546:

The six sites previously sampled are as follows:

Site name	Coordinates (GDA 94, Zone 50)	
Burru Rd	475,959	7,719,771
Water Tanks	477,698	7,720,137
Deep Gorge	477,956	7,717,987
Yara West	476,558	7,719,223
Yara North East	479,112	7,720,155
Yara East	478,849	7,719,565

At each of these sites, and in the same locations as previous sampling, measurements will be taken as follows:

1. Colour and colour contrast

Spectrophotometry. Colour measurements will be collected by the use of a portable, hand-held spectrophotometer that measures the degree of lightness (L^*), degree of red/green (a^*) and degree of yellow/blue (b^*) to provide a tri-stimulus value (3D $L^*a^*b^*$) for each sample point on the specimens. Differences in 3D values across time can be numerically evaluated to identify potential changes in colour.

2. Mineralogy

Reflectance spectrography. A portable spectrometer operating over a 400 to 2500nm wavelength range will be used. An internal light source will be used to irradiate the surface of the rocks, with the reflected light detected by an array of photodiodes. A spectrum of reflectance vs wavelength is generated for each monitoring point on the surface of the rocks, which is then compared to previously collected data from the same points on the same rocks. Changes in the spectra are an indicator of changes in the mineralogy of the rock surface.

Data Analysis Australia review, conclusions and responses

In 2017 DWER commissioned Data Analysis Australia (DAA) to undertake a review of CSIRO work to date (Henstridge *et al* 2017). In terms of the recommendations that were made by Data Analysis Australia in 2016, the following summarises compliance with responses in ***bold italic***:

1. *The historical data collected by the CSIRO should be systematically archived and held by DER, with consistent naming conventions, both to provide a baseline record and to facilitate comparisons with future data. The archival data format should enable ready access to the data via standard statistical software such as R.*

We would describe this as **largely** met:

- The management of the data appears to have improved considerably, although it is not perfect in that the metadata – details of how the data was collected and hence what the data might therefore mean – is not systematically available.

This will be rectified in the current study. Detailed records will be kept on data collection according to scientific norms.

- We remain concerned that there are undocumented features of the data collection process that should be taken into account in any analysis. For example, the substantial year-to-year variation in the ASD data is only partially explained by the differences in recording practices described in the Reports, and the descriptions that do exist are not always consistent.

This will be taken into account.

2. *The CSIRO should be asked to revisit the cross-calibration issues with the BYK and KM spectrophotometers, both to ensure that the historical data is properly understood and to confirm whether or not the historical BYK data is capable of comparison with current and future measurement instruments.*

We would describe this as being **not addressed** in the Draft Report:

- The cross validation methodology for the BYK data has not been revised and is still deficient. The Draft Report appears ambivalent about the utility of the BYK data.
- Whilst the Executive Summary does state “the BYK spectrophotometer data appears unreliable for drawing conclusions on colour change in the rock art”, the data is still given undeserved prominence in the report and the ASD colour data is not discussed as a credible replacement.
- However we suggest that the first part of this recommendation from 2016 concerning the cross calibration should not be given high priority as one solution may be to largely drop reference to the BYK data.

This will be taken into account. Consideration will be given to taking two readings for every point using firstly the previous BYK instrument and then the KM instrument to allow comparison of contemporaneous readings. This will also allow comparison across historical data sets.

3. *An analysis similar to that of Black and Diffey should be conducted using verified ASD estimates of L^* , a^* , b^* , ideally using the original ASD spectra rather than the averaged spectra.*

We would describe this being only **partially** met:

- The analysis in the Draft Report does use linear mixed models as suggested by Black and Diffey. However this is poorly reported and not convincing. Whilst the conclusion given in the Draft Report is that there is no evidence of relevant changes to the rock art in the areas close to the industrial development, it remains arguable that a more careful analysis would demonstrate changes.

This will be addressed in the analysis of data collected in the field.

4. *Future work by the CSIRO should be based upon an agreed analysis plan certified by a competent statistician. Since each year the CSIRO reports have covered the full data set since 2004, it would be appropriate for the next published report to incorporate this improved analysis and in doing so, make it clear that it should replace the analyses in their previous reports.*

We would describe this as **not** being met:

- No formal analysis plan appears to exist. The analysis methods in Chapters 4 and 5 of the Draft Report are essentially unchanged.

Noted, once data has been collected consideration will be given to commissioning a competent statistician to certify the analysis.

5. *Consideration should be given to expanding the number of measured sites and in doing so, improving the balance of the design to include more effective controls, if feasible.*

We would describe this as **not** being met:

- No change has been made to expanding the data collection or to include improved controls, although we recognise that the time of the data collection in 2016 meant it could not be affected by our 2016 Recommendations.

- The Draft Report does not discuss possible changes to the design of the data collection.
This will be addressed through consultation with Murujuga Aboriginal Corporation. Consideration will be given to expanding the data set by data collection at additional rock art sites.

7. *To maintain scientific rigour, future data collection should follow a fully documented and detailed protocol, and ensure that departures are documented.*

We would describe this as **not** being met:

- Documentation of the data collection protocol does not appear to have improved.
Documentation of the data collection protocol will be improved and will meet international scientific norms and benchmarks.

REFERENCES

Henstridge, J. Haskard, K.Mehryar, M. 2017 Review of CSIRO Report on Burrup Peninsula Rock Art Monitoring. Data Analysis Australia for the Department of Environment Regulation.



2018 Annual Compliance Report
EPBC 2008/4546
Technical Ammonium Nitrate Plant

04-06-2020 600-200-ACR-YPN-0007 Rev 1

Attachment- Site Photos



Condition 8: 2.5 m chain link perimeter fence and signage near main entrance/exit



Condition 8: 2.5 m chain link perimeter fence and signage near truck parking entrance/exit



Condition 8: 2.5 m chain link perimeter fence and signage near Integration Road entrance/exit



Condition 8: 2.5 m chain link perimeter fence and signage near emergency exit