

1 November 2022

SafeWork NSW

JOHNEX Reference No. MHF 20-16-14

JOHNEX COMMENTS REGARDING THE NSW DISCUSSION PAPER SEPARATION DISTANCES FOR SOLID AMMONIUM NITRATE (AN) (OCTOBER 2022)

1 Introduction

1. JOHNEX currently operates an MHF-licenced facility on the Bogan Gate Explosive Reserve, formally a Royal Australian Airforce ammunition storage depot located at approx. 1.2 km south of Bogan Gate. The Bogan Gate facility has been explosive licensed since 2008 and MHF-licenced since 2019 with no major incidents.
2. JOHNEX's operation includes the production of Ammonium Nitrate based products, which requires a calculated amount of Ammonium Nitrate licensed storage to maintain the weekly demands of an energized and growing mining consumer within NSW.
3. After digesting the proposals stated in the NSW Discussion Paper on Ammonium Nitrate Storage, JOHNEX has the following observations and questions:

2 Australian Standards and Comparison to the international Incidents

The NSW discussion paper refers to several significant incidents to justify the need for further regulation regarding the storage of Ammonium Nitrate.¹ Specifically in more detail and with reference to the Beirut incident in 2020. Whereby it states: ²

The ammonium nitrate storage conditions in Beirut would not comply with the requirements of AS 4326 or the explosive regulations, and therefore would not be permitted by safework NSW. however, the Beirut incident explosion demonstrates the severe consequence of an ammonium nitrate explosion at a facility without significant separation from the community.

While understanding separation distance is a significant factor in the planning approval of an AN storage facility, it is not the only factor that should be considered. Therefore, the premise of the paper is questionable.

Unpacking the above statement:

¹ NSW, Separation Distances for Solid Ammonium Nitrate in NSW, Discussion Paper, (October 2022) Sec 2.3 p8

² Ibid Sec 2.3 p9

1. As well as AS 4326 and current explosive legislation, It can also be said that the Beirut incident would not have been compliant with the:
 - RSHQ information bulletin no. 53, Storage requirements for security-sensitive ammonium nitrate
 - Western Australia, Safe storage of solid ammonium nitrate, Code of Practice. and
 - the SAFEX International Good Practice Guide: Storage of Solid Technical Grade Ammonium Nitrate.

All three documents Safework NSW have referred to when assessing AN storage applications. Regarding Beirut, if the methods and standard of storage had been followed in the above-mentioned documents then it would have been highly unlikely/rare that the Beirut incident would have occurred. Likewise, the standards of storage that were apparent in Beirut because of stringent regulations would not be permitted nationally in Australia. This is evident as there have been no significant incidents regarding the storage and handling of AN here in Australia.

2. The principal factors that were identified as the root cause of the incident were:
 - Inadequate segregation of incompatible products within the storage shed
 - Inadequate separation of incompatible products within the storage shed
 - Inappropriate permit-to-work/ Hot work procedures
 - Ineffective communication and training of workers working at the site

All of the root cause factors stated above are already legislated against in State laws and codes of practice. Companies as part of the safety management systems conducted internal auditing of their storage locations and State Explosive, Dangerous Goods Regulators audit company systems and storage standards.

Therefore, it is suggested that the consequence should not be the primary factor moving forward and being fixated on increasing the separation distance is not the primary solution.

3 Separation Calculation and Comparisons

It was identified in the Discussion Paper that:³

Table notes:

(b) The distance from an ammonium nitrate store to a Protected Work Class A: $D=14.8 Q^{1/3}$, where Q is the quantity of AN (kg) x 32% for TNT equivalence.

(c) The distance from an ammonium nitrate store to a Protected Work Class B: $D=22.2 Q^{1/3}$, where Q is the quantity of quantity of AN (kg) x 32% for TNT equivalence.

1. However, in the NSW discussion paper the calculation figures used for calculating PWA and PWB distances are greater in value than the calculations used by the referred documents:⁴

³ Ibid Sec 4.6 p17

- a) QLD: IB53 Storage requirements for security-sensitive ammonium nitrate (SSAN).⁵
- b) Safex Good Practice Guide: Storage of Solid Technical Grade Ammonium Nitrate.⁶
- c) WA: Safe storage of solid ammonium nitrate.⁷

i. IB53:

Type of work	Overpressure	D Calculation
Associated works	21kPa	$D = 8.0 Q^{1/3}$
Protected works class A	14kPa	$D = 10.4 Q^{1/3}$
Protected works class B	7kPa	$D = 17.8 Q^{1/3}$
Vulnerable facilities	2kPa	$D = 44.4 Q^{1/3}$

ii. Safex International:

RECEPTOR TYPE	MAX. OP (KPA)	EFFECT OF OVERPRESSURE	QD FORMULA FOR MAX OP
Industrial Works	21	<ul style="list-style-type: none"> Reinforced structures distort Storage tanks fail 20% chance of fatality to a person in a building 	$D = 7.8Q^{1/3}$
Public Use or Works Administrative	14	<ul style="list-style-type: none"> Building uninhabitable and badly cracked 	$D = 10.4Q^{1/3}$
Residential & Community Living Areas	7	<ul style="list-style-type: none"> Damage to internal partitions and joinery, but can be repaired Probability of injury is 10% No fatality 	$D = 17.8Q^{1/3}$
Vulnerable or Sensitive	3.5	<ul style="list-style-type: none"> 90% Glass Breakage No fatality and very low probability of injury 	$D = 30.5Q^{1/3}$

iii. Western Australia:

Although Western Australia calculates the AN- TNT equivalent differently i.e. WA; 25%; NSW, Qld and Safex 32%, Western Australia's calculation of a 7kpa blast overpressure is analogous to the IB53 and Safex documents.⁸

$D = 17.8 Q^{1/3}$ for residential buildings including hotels, motels and other accommodation places corresponding to 7 kPa blast overpressure

⁴ Ibid Sec 3.3 p11

⁵ Explosive Inspectorate Resource Safety & Health Queensland, Explosives information bulletin no. 53, Storage requirements for security sensitive ammonium nitrate (SSAN) (12 August 2020 | Version 6)

⁶ SAFEX International Good Practice Guide: Storage of Solid Technical Grade Ammonium Nitrate, SAFEX Good Explosives Practice Series GPG 02 rev02, p45, table B.2.

⁷ Western Australia, Safe storage of solid ammonium nitrate, Code of Practice, (Fourth Edition 2021)

⁸ Ibid , p 14

2. Q. On what research have the NSW regulators proposed a more conservative figure of calculating PWA and PWB distances?
 - *Protected Work Class A: $D=14.8 QI/3$,*
 - *Protected Work Class B: $D=22.2 QI/3$*
3. Q. Where and how were the 14.8 (PWA) and 22.2 (PWB) determined?
4. Q. Why have the NSW regulators not maintained consistency with other jurisdictions' Codes of Practice? Which in its own reference are well founded and stated:⁹

These prescriptive requirements have been in place for over 10 years in Queensland and Western Australia. Both the mining and explosives industries operate successfully with prescribed separation distances in those states.

4 With Warning Notification

1. It is common industry practice when assessing the storage of Ammonium Nitrate and Ammonium Nitrate Emulsion, a factor such as the time it would take for an event to move from a fire to an explosion is considered. Therefore, there is a 'With Warning' consideration when planning a proposed storage facility. The 'With Warning' consideration allows companies to factor in emergency planning, notifications and credible evacuation during such an Ammonium Nitrate event. This consideration was identified in the NSW discussion paper.¹⁰

4.6. Evacuation time requirements

Actively fighting fires involving ammonium nitrate is not recommended. The priority is to evacuate safely.

- *Under the proposal, facilities storing ammonium nitrate would be required to:*
 - *Document, implement and periodically test plans to evacuate the site and the surrounding area in case of an emergency involving ammonium nitrate.*
 - *Demonstrate that testing of the evacuation plan can evacuate all persons on and off-site in a Protected Works Class B distance within 45 minutes of the evacuation commencing. It is recommended that a target evacuation timeframe of 30 minutes be adopted.*
 - *Demonstrate that the evacuation plan specifies the conditions under which evacuation will commence. At a minimum, evacuation must commence when a fire begins to involve or impinge on ammonium nitrate.*

2. Therefore, is the discussion paper's proposal stating that if a 30 - 45min evacuation of nearby PWB is credible then there will be a 'With Warning' exemption regarding the prescribed distance table stated?
 - a) As per the referred AEISG Code of Practice: *Storage and Handling of Un3375*:¹¹

Table 6.3: Required Separation Distances

With	ANE Associated Works	No minimum distance provided evacuation is credible (but see note
------	----------------------	---

⁹ NSW, Separation Distances for Solid Ammonium Nitrate in NSW, Discussion Paper, (October 2022) Sec 3.3 p11

¹⁰ Ibid sec 4.6, p17

¹¹ AEISG Code of Practice Storage and Handling of UN3375 Edition 5 2018, p 31 table 6.3

Warning	(any activity level)	1).
	Protected Works Class A	PWA distance, but may be reduced if evacuation is credible to: if there is a mound, Process Buildings distance if there is no mound, 50% PWB. The required separation may be further reduced (or eliminated, subject to note 1 below) if evacuation is credible AND the owner of the protected works and any occupiers, are involved in the relevant emergency response procedures/plans.
	Protected Works Class B	PWB distance, but may be reduced if evacuation is credible to: if there is a mound, Process Buildings distance if there is no mound, 50% PWB. The required separation may be further reduced (or eliminated, subject to note 1 below) if evacuation is credible AND the owner of the protected works and any occupiers, are involved in the relevant emergency response procedures/plans.
	Vulnerable Facility	PWB distance

- b) Furthermore, If a suitable emergency and security plan is documented and tested, As per *RSHQ IB53* then also an exemption to the prescribed table is permissible?

Where the separation distance cannot be achieved the licence holder must put in place stringent housekeeping requirements, additional security requirements and an emergency response plan that ensures minimum effect on personnel and property. These should be documented, tested, and acceptable to the Explosives Inspectorate.¹²

5 Commercial Impacts:

1. If the prescribed separation distances outlined and proposed within the discussion paper come to fruition, and the credible evacuation factor does not negate the prescribed distance, then the JOHNEX storage of Ammonium nitrate storage area at the Bogan gate facility would not be compliant as it would not meet the prescribed separation distance for the quantity of Ammonium nitrate stored.
2. This determination would have a significant impact on the survivability of JOHNEX Ammonium Nitrate-produced products. Its impacts would most certainly affect JOHNEX's ability to maintain its current workforce with the consequence of reducing its workforce at the Bogan Gate reserve.
3. Furthermore, JOHNEX's ability to maintain a service to the mining industry in the NSW jurisdiction has a broader commercial impact within the state of NSW.

6 Conclusion

The NSW discussion paper references recent international incidents, particularly the 'Beirut Incident'. However, Safework appears to have set aside the root causes and focused on the consequence of the incident. As result, Safework has proposed what appears to be arbitrary separation distances to mitigate against the

¹² Explosive Inspectorate Resource Safety & Health Queensland, Explosives information bulletin no. 53, Storage requirements for security sensitive ammonium nitrate (SSAN) (12 August 2020 | Version 6), p27

consequence. Because of current legislation and oversight, there have been no significant incidents regarding the safe storage and handling of Ammonium Nitrate here in Australia.

Furthermore, JOHNEX reviewing the NSW Safework discussion paper and would like further clarification regarding the proposed prescribed separation distances.

1. Is a 'WITH WARNING' notification, with a credible evacuation and documented emergency planning, does this permit an exemption from the prescribed separation distance table?
2. How did NSW determine new overpressure figures?
3. Why has NSW not remained consistent with other jurisdictions?

Pending further clarification, JOHNEX believes that when the standards of storage AN are maintained there is no requirement to increase the current separation distances, the table should not be mandated, and a case-by-case method currently used by NSW is maintained.

JOHNEX's primary interests are focused on the safety of its workers and the local community and will always have this a principal factor when making commercial decisions. Therefore, JOHNEX is committed to working with regulators and the community to ensure the company is constantly improving its safety expectations.

I look forward to hearing from you.

Kind Regards

David McCulloch

David McCulloch LLB
Safety, Health, Environment, Quality and Training Advisor