



**SEPARATION DISTANCES FOR SOLID AMMONIUM
NITRATE IN NSW – DISCUSSION PAPER – OCTOBER
2022**

ORICA SUBMISSION

18 NOVEMBER 2022



CONTENTS

1	EXECUTIVE SUMMARY	3
	Diagram One – The current ammonium Nitrate supply chain in New South Wales	6
	Diagram Two – The scope of SafeWork NSW's proposal	7
	Diagram Three – The impact of the SafeWork NSW proposal	8
2	ORICA AND AMMONIUM NITRATE IN NSW	9
2.1	Ammonium nitrate manufacturing at Orica Kooragang Island	9
2.2	Economic contribution of Orica Kooragang Island	9
3	AMMONIUM NITRATE & REGULATION IN NSW	11
4	CONCERNS WITH THE DISCUSSION PAPER AND APPLICATION OF PROPOSED CHANGES	12
4.1	Current risk based assessment is best practice	12
4.2	Referenced incidents are not in scope of the proposed changes	12
4.3	Inconsistent with best practice regulation in Qld and WA	14
4.4	Simplistic assumptions used to assess the consequence of ammonium nitrate explosions	15
4.5	The proposal does not apply to all ammonium nitrate in NSW	15
4.6	Significant government support required	16
5	IMPACTS OF THE PROPOSAL	17
5.1	Bias towards importing ammonium nitrate	17
5.2	Increase in road transport of ammonium nitrate	18
5.3	Impact on the mining industry	18
6	IMPACT ON ORICA OPERATIONS	20
6.1	Impact on Orica Kooragang Island ammonium nitrate manufacture	20
6.2	Impact on small ammonium nitrate storage	22
7	CONCERNS WITH THE PROCESS	24
8	QUESTION RESPONSES	25

1 EXECUTIVE SUMMARY

Ammonium nitrate is a critical, globally traded product required to support the NSW economy through both the mining and quarrying and construction industries. Any change to the regulation of either the manufacture, storage or transport of ammonium nitrate in NSW, will have a significant impact to the productivity and supply chain certainty of these industries.

Whilst Orica supports and complies with the strong regulation frameworks already in place covering the manufacture and storage of ammonium nitrate in NSW, any changes to the current Regulation must:

- deliver a proportionate reduction in material risk across the whole ammonium nitrate supply chain;
- with associated costs of implementation being proportionate to the risk reduction achieved,
- be practical in its implementation,
- be consistently applied across the whole ammonium nitrate supply chain; and
- be considerate to both the economic impact to existing ammonium nitrate manufacturing and storage facilities; and the broader disruption to the current supply of ammonium nitrate in NSW.

Orica strongly believes that these factors were not considered in the development of SafeWork NSW's Separation Distances for Solid Ammonium Nitrate Discussion Paper, nor was adequate consultation with industry undertaken prior to the Discussion Paper being released. Given this approach, our concern is that changes consistent with the Discussion Paper will now be progressed with little consideration of the impact on industry and without any evidence of enhanced safety for the surrounding communities.

The proposed retrospective application of prescribed separation distances represents a significant change from the current risk based regulatory framework and must be subject to a comprehensive Regulatory Impact Assessment or Better Regulation Statement, to further understand the broader cost implications to the mining and agricultural industry and provincial and regional economies of Newcastle and the Hunter in particular.

The properties of ammonium nitrate are well understood by Industry. The achievement of over 50 years of safe handling and storage in New South Wales, without incident, is not attributable to good fortune, but rather to strict adherence to existing controls which have proven effective; with current controls robust and effective in managing fire, contamination and high energy initiation considerations required for the safe storage of ammonium nitrate. A risk based regulatory framework must be recognised, consistent with the current major hazard facility licencing regime in NSW. This will ensure that existing controls are effectively implemented with consideration to site specific factors, at all manufacturing and ammonium nitrate storage major hazard facilities across NSW.

SafeWork NSW's proposal does not include an option for existing sites to undertake a detailed risk assessment, when prescribed separation distances cannot be practically achieved. This is inconsistent with the regulatory approach adopted in both Queensland and Western Australia. It is also contrary to what was communicated by SafeWork NSW in the Discussion Paper about the controls in place in those states and the NSW proposal instead represents the most

conservative regulatory approach in Australia. Orica notes SafeWork NSW's objective to apply consistent prescribed separation distances across explosives, ammonium nitrate emulsions and solid ammonium nitrate. The existing documents that currently provide guideline separation distances for explosives and ammonium nitrate emulsion storage do allow for risk levels to be determined for specific site circumstances, to ensure the risks at an acceptable level.

If adopted, the SafeWork NSW proposal would represent a significant cost burden on existing facilities, driving future investment in ammonium nitrate storage capability to other jurisdictions. This is at odds with SafeWork NSW's stated objective of providing investment certainty for New South Wales.

The retrospective application of prescribed separation distances will also significantly challenge the long-term viability of ammonium nitrate manufacturing in NSW and will drive greater reliance on imported product (currently just eight percent of NSW supply and predominantly from Lithuania and Vietnam, compared with the current nearly 70 percent sourced from Orica's local NSW manufacturing). This significant change will be at the cost of locally manufactured product and will jeopardise access to sovereign supply. This puts at risk the jobs of hundreds of people and thousands more of indirect jobs, which underpin provincial and regional economies within the State.

Of further concern, the proposal will increase the risk profile associated with bringing in imported product. **Because the proposal does not apply to all areas of the AN supply chain, it simply transfers risk of an incident with ammonium nitrate to those sites that fall outside of SafeWork NSW's proposal, including the Port of Newcastle which would experience an influx of imported product to replace locally manufactured product.** Diagram Three which follows this Executive Summary shows the corridor that is created between port and customer sites as a consequence of them not being directly captured by the proposal.

For any regulation of ammonium nitrate in NSW to be effective, and achieve SafeWork NSW's regulatory objective of protecting the community, it must be consistently applied across all areas of the ammonium nitrate supply chain. This includes the handling of ammonium nitrate through ports, truck and rail transportation and intermediate storage facilities including onsite mine storages. And yet, with prescribed separation distances only proposed to be applied to facilities under SafeWork NSW direct regulatory jurisdiction, being ammonium nitrate storage and manufacturing facilities outside of a mine site, and excluding transportation and port operations, SafeWork NSW is creating an inconsistent, unbalanced and patchwork regulatory framework, which will increase regulatory complexity in what is already a highly regulated environment. Such an approach also introduces commercial inequalities. Again, this contradicts another of SafeWork NSW's stated objectives of ensuring a "level playing field".

If the mandatory prescribed separation distances proposed by SafeWork NSW were applied to Orica's Kooragang Island facility, the maximum ammonium nitrate size permitted at the facility for individual piles would be less than 10T and would reduce the total volumes on site by around 95 percent compared with current volumes., This is not sufficient to sustain current operations. Ammonium nitrate manufacturing facilities require access to several services including natural gas, electricity, water and port infrastructure to maintain viable operations and therefore can't practically be relocated easily. Alternate locations that meet both the servicing and buffer zone requirements to sustain a 220,000Tpa solid ammonium nitrate manufacturing facility are non-existent in NSW. To ensure the ongoing viability of ammonium nitrate manufacturing in NSW, ammonium nitrate manufacturing must

be excluded from complying with prescribed separation distances through acknowledging the detailed risk assessment that has been conducted and the adequacy of the current major hazard facility licencing regime and the significant role it has played in the achievement of over 50 years AN manufacturing in NSW without adverse safety event

The importation of greater quantities of ammonium nitrate represents an increased risk to the community due to the potential of product contamination through double handling, cross contamination resulting from the handling of ammonium nitrate in the same areas as other incompatible products and would result in a significant increase in the transport of ammonium nitrate through residential areas, when compared to locally manufactured product. The handling of up to 6,500T per shipment of ammonium nitrate within the port precinct would still be required during ship unloading, however would not be required to comply with the mandatory prescribed separation distances as these operations falls outside of SafeWork NSW regulatory jurisdiction. Not only will this outcome result in an increased risk profile for community but represents a significant ammonium nitrate supply risk to the broader NSW mining industry. Again, this is inconsistent with another of SafeWork NSW's objectives of "increased safety". Currently Orica's Kooragang Island facility has capacity to store only 7 to 10 days of solid ammonium nitrate supply to mines in NSW during peak demand periods. It would not be possible to replace the 'just in time' inventory that local manufacture and storage provides and which the mining industry relies on, without increased importation of ammonium nitrate through the Port of Newcastle.

If the proposed changes were to be introduced in their current form, the NSW Government would have the most stringent, conservative regulation framework in the world in exchange for a reliance on imported product. The risk of an adverse event would be transferred to those areas of the supply chain outside of SafeWork NSW's jurisdiction and the regulatory controls that have worked so effectively to date and ensured the safety of industry and community for over 50 years.

For Orica, the proposal undermines the commercial viability of the operations on Kooragang Island – currently the only local manufacturer of ammonium nitrate in NSW, producing nearly 70 percent of the State's supply and supplying around 70 percent of NSW's mining industry. Orica, together with the NSW Government and federal government, have made significant investments in decarbonising the manufacture of ammonium nitrate at the Kooragang Island facility. These recent investments have laid the foundation for realising a hydrogen hub on Kooragang Island and the manufacture of green ammonia and green hydrogen. The contribution that these investments are making towards the achievement of a net zero industrial precinct and future-facing employment opportunities are put at risk by the SafeWork NSW proposal.

Orica makes two recommendations, as follows:

- That SafeWork NSW pause their current approach and proposal and develop a comprehensive impact assessment which demonstrates an understanding of the whole AN supply chain and which utilises the extensive work of AEISG in determining separation distances calculated using a scientific basis rather than TNT equivalence as though AN is an explosive.
- That the release of the impact assessment report be accompanied by a Regulatory Impact Assessment of the detailed costs / benefits of the various options and be subject to detailed industry consultation.

DIAGRAM ONE – THE CURRENT AMMONIUM NITRATE SUPPLY CHAIN
IN NEW SOUTH WALES

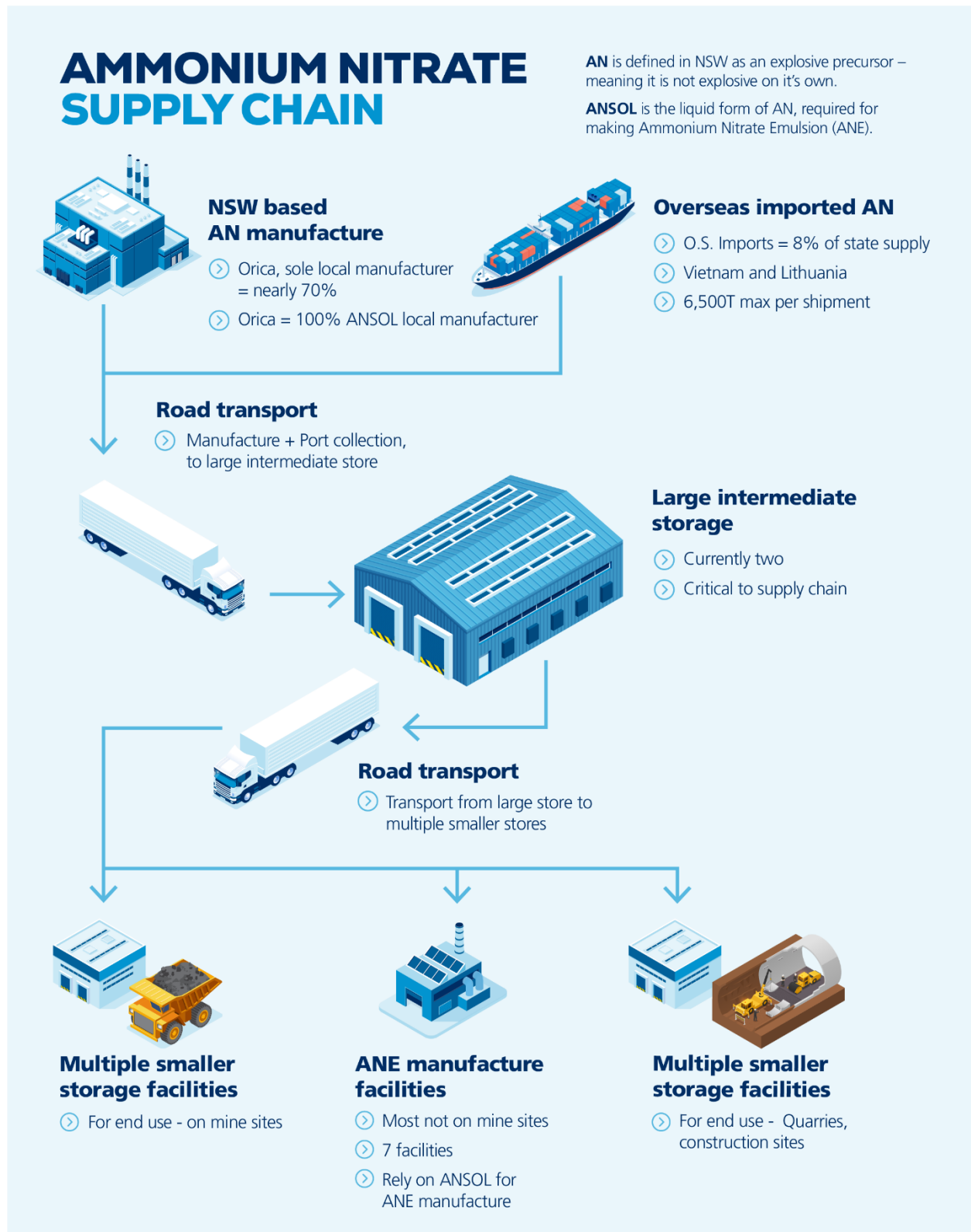


DIAGRAM TWO – THE SCOPE OF SAFEWORK NSW’S PROPOSAL

The dotted red line identifies the parts of the AN supply chain that would be subjected to the proposed mandatory, retrospective separation distances.

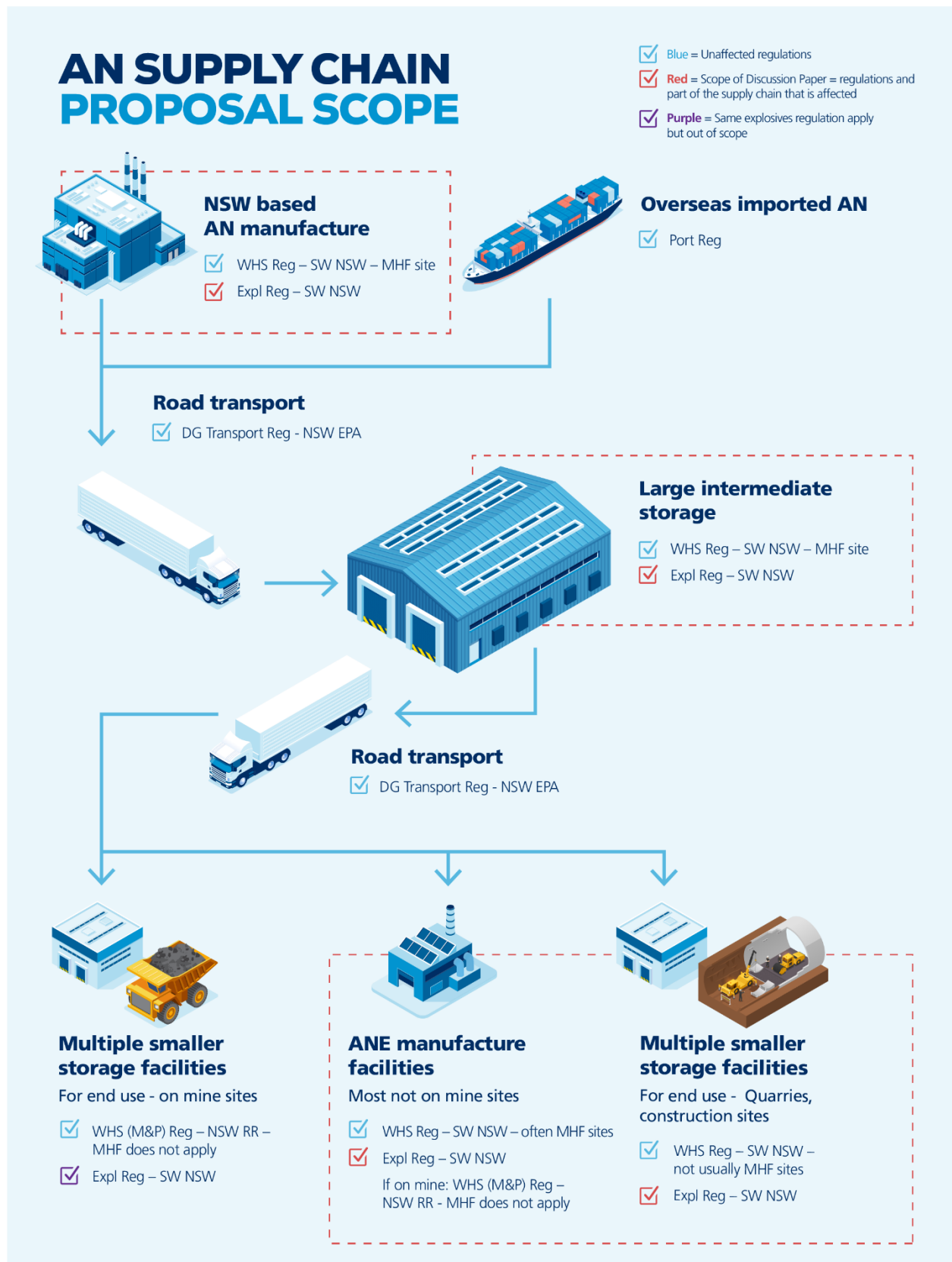


DIAGRAM THREE – THE IMPACT OF THE SAFEWORK NSW PROPOSAL

This shows the corridor that is created between port and customer sites, as a result of local manufacture and large intermediate storage facilities being unable to comply with the proposal to apply prescriptive separation distances, retrospectively.



2 ORICA AND AMMONIUM NITRATE IN NSW

2.1 AMMONIUM NITRATE MANUFACTURING AT ORICA KOORAGANG ISLAND

The Orica Kooragang Island site is an integral part of Orica's global operations, strategically located at the entrance to the Hunter Valley and close to the Port of Newcastle. Orica's Kooragang Island site makes an important contribution to the local and broader NSW economy by supplying critical products to the mining, infrastructure, agriculture, water supply, food, dairy, and medical sectors.

Located at 75 Greenleaf Road Kooragang, the Orica Kooragang Island site is the only manufacturer of ammonium nitrate (AN) in NSW, supplying around 70 percent of the NSW mining industry's demand and almost 70 percent of the State's total supply. The facility occupies an area of around 25 hectares and operates 24 hours a day, seven days a week, employing approximately 200 permanent employees and 40 regular contractors. During maintenance shutdowns there are up to 300 additional workers on site. The site includes an ammonia plant, three nitric acid plants, two ammonium nitrate plants and a product dispatch area. The main products manufactured are ammonia, nitric acid, and ammonium nitrate - solid and liquid ('ANSOL').

The Orica Kooragang Island site manufactures around 430,000 tonnes of ammonium nitrate per year. It is made both in solid and liquid form. Depending on market conditions, typically 200,000 - 220,000 tonnes of the total ammonium nitrate production is solid ammonium nitrate. The solid ammonium nitrate product is >99 percent pure, low-medium density Technical Grade Ammonium Nitrate (TGAN) which is transported off site for use in the manufacture of explosives for the mining and quarrying industries. A small quantity of ammonium nitrate is also sold to the medical industry for the manufacture of nitrous oxide, an anaesthetic and pain relief gas.

Orica Kooragang Island site typically has a total of between 6,000 and 12,000 tonnes of ammonium nitrate on site, depending on customer demand. It is important to note that this is not a single, static stockpile, rather the total working inventory of all dedicated ammonium nitrate areas. Orica Kooragang Island working inventory represents approximately 7 to 10 days stock, which is important for ensuring security of ammonium nitrate supply to Hunter valley mines.

No explosive material is manufactured or stored on the Orica Kooragang Island site and there have been no incidents involving the stored ammonium nitrate since operations commenced in 1969.

2.2 ECONOMIC CONTRIBUTION OF ORICA KOORAGANG ISLAND

In 2021, Orica Kooragang Island spent approximately \$44 million procuring goods and services from 346 local businesses, paid close to \$40 million in wages to 200 employees and contractors, and invested approximately \$35 million in capital and related works. It is estimated that the site contributed an additional \$271.2 million in economic activity and supported an additional 3,478 full-time equivalent jobs in the Hunter region. At a state level, Orica Kooragang Island created an additional \$278.7 million in economic activity and supported an additional 3,574 jobs.

Capital and related works provided a further \$8.8 million stimulus in the Hunter region and \$44.4 million in NSW.

Orica KI also provides grants and sponsorships to local charities and non-profit organisations. In 2021, the site helped more than 40 beneficiaries with around \$300,000 in funding to support a wide variety of projects.

3 AMMONIUM NITRATE & REGULATION IN NSW

Ammonium nitrate is widely used as a fertiliser, due to its high nitrogen content, and is the main component in many types of mining explosives, due to its oxidising nature.

Both fertiliser grade ammonium nitrate (FGAN) and technical grade ammonium nitrate (TGAN), which is used to manufacture explosives used in mining, are classified as oxidising substances, Division 5.1 Oxidising Substances, as determined using United Nations standardised testing and classification. Ammonium nitrate is not classified as an explosive and also does not itself burn, rather, readily supports combustion by contributing oxygen to a reaction. Due to the use of ammonium nitrate as a raw material to manufacture explosives in the mining industry, and given it is a security sensitive product, it is therefore considered an 'explosive precursor' and in NSW is regulated as such by the NSW Explosives Act and Regulation.

As noted by the Discussion Paper, the NSW Explosives Regulations references AS4326 – 2008: "The storage and handling of oxidising agents" which includes a chapter for AN storage. Section 9.3 of AS4326 states advice on separation distances to boundaries, protected places, vulnerable facilities and critical infrastructure must be sought from the local regulator. To date, SafeWork NSW has not issued any publicly available information for determining these distances and this gap is acknowledged by industry.

Since 2008 SafeWork NSW has sought guidance from other codes of practice for establishing separation distances on a case-by-case basis. This process has worked well in ensuring the product is handled safely and no incidents have occurred in NSW or across Australia related to AN storage.

Orica notes SafeWork NSW's objective to apply consistent prescribed separation distances across explosives, ammonium nitrate emulsions and solid ammonium nitrate. The existing documents that currently provide guideline separation distances for explosives and ammonium nitrate emulsion storage do allow for risk levels to be determined for specific site circumstances, to ensure the risks at an acceptable level.

Since 2012 SafeWork NSW has ensured storages of more than 2,500t AN meet the Major Hazard Facility (MHF) obligations from the NSW WHS regulations. These regulations require the development and implementation of detailed risk assessments to ensure appropriate controls are continuously in place to prevent major incidents. SafeWork NSW conducts a vigorous review of these risk assessments, prior to issuing MHF licences, as well as conducting annual site inspections and risk control verification audits. All MHF sites must also undergo frequent assessments and site visits by the emergency services, both the Fire authority and the Police.

This detailed risk-based approach is required not only for ammonium nitrate but is also successfully applied to large quantities of many other dangerous goods at MHF sites such as oil refineries and complex chemical manufacturing plants. Consequently, risk-based assessments are now widely used and accepted by regulators for all dangerous goods industries, for storage and handling, including at sites with storage quantities below the MHF threshold.

Summary: Industry acknowledges the existing gap in the application of AS4326 in NSW regarding separation distances. To date, the use of guidance from other codes interlinked with risk-based assessments has bridged this gap and worked well for safely managing AN storage facilities.

4 CONCERNS WITH THE DISCUSSION PAPER AND APPLICATION OF PROPOSED CHANGES

4.1 CURRENT RISK BASED ASSESSMENT IS BEST PRACTICE

Orica acknowledges and supports the regulation of the risks associated with the storage and management of hazardous chemicals, including ammonium nitrate. However, **NSW's MHF regulations and associated licencing already represents world's best practice in satisfying this regulatory objective, and the Discussion Paper has not identified any gaps in the current regime to justify the proposed change.** MHF sites are by their nature complex, therefore existing regulatory frameworks allow the consideration of risk to account for specific circumstances and controls implemented at that facility. This approach ensures facilities can implement the most cost-effective controls for their circumstances and ensures that only feasible scenarios are accounted for in the assessment of risk.

It is acknowledged the proposal to apply prescriptive, checklist-style requirements for sites is simpler and therefore expedient for regulators. However, it comes with excessive costs both from a capital and operating perspective that are disproportionate to the risk benefit, especially for existing facilities subject to retrospective application of the proposed requirements. The resources associated with administration of the existing MHF licencing regime are funded by licensees via substantial licence fees and hourly rate cost recovery for SafeWork NSW staff. Orica is supportive of continuing to fund the reasonable costs of government resources to administer the existing risk-based licensing regime when compared to the significant costs to comply with the requirements in the discussion paper.

The intent to move away from subjective, case-by-case assessments of ammonium nitrate storage potentially conflicts with a possible replacement prescriptive system with allowance for exemptions assessed on a case-by-case basis, as allowed under the NSW Explosives Regulation.

4.2 REFERENCED INCIDENTS ARE NOT IN SCOPE OF THE PROPOSED CHANGES

The Discussion Paper refers to previous ammonium nitrate incidents as the justification for the proposal and the reason for heightened safety concern, even though the paper notes that the storage environment at the time of these incidents "would not be permitted by SafeWork NSW". This calls into question the rationale for the proposal. Furthermore, three of the incidents cited are not considered in scope of the discussion paper and it is misleading to equate the consequences from these explosions with the storage and manufacture of TGAN in New South Wales, given the existing rigorous safety controls under the current regulatory regime to prevent a similar incident occurring.

The identified events associated with Tianjin, China and Beirut, Lebanon related to the inappropriate storage of fertiliser-grade AN (FGAN) at port facilities, which are outside of the

scope of the Discussion Paper. Similarly, the West, Texas incident was a result of significant health and safety failings relating to the co-storage of incompatible materials with fertiliser-grade ammonium nitrate, in a store constructed of combustible material. These failings were further exacerbated by the inappropriate emergency response to the incident.

In all three incidents, the ammonium nitrate was not being stored in accordance with world best practice and the storage practices would not be allowed by any Australian jurisdiction and certainly are not used by Australian industry. It is acknowledged that the consequences of a significant incident in handling ammonium nitrate, like most other hazardous dangerous goods, could be disastrous. However, the risks associated with ammonium nitrate are well known and have been managed extremely well in NSW by industry through current legislation and world best practices. To date no significant incidents have occurred in the handling and storage ammonium nitrate in NSW or indeed in any ammonium nitrate store in Australia. The Discussions Paper does not reflect this achievement. Instead, it may create community alarm and concern that ammonium nitrate is not being managed safely in NSW.

The Angellala Creek, Queensland (2014) incident related to the transport of ammonium nitrate, which SafeWork NSW has not considered in the scope of the Discussion Paper.

Summary: The overseas incidents detailed in the Discussion Paper do not justify the reform as these incidents involved completely different storage environments that are illegal in Australia.

Recommendation: That such examples are not further utilised by SafeWork in their communications given the events depicted are neither analogous with the controls in place in Australia or of the supply chain sections that are subject to SafeWork's proposal.

The adequacy of existing controls was reinforced by the UN response following the Beirut Port Explosion. The UN's Organisation for Economic Cooperation and Development (OECD) held a seminar on December 14, 2021 as a follow-up to the Beirut port explosion. There were four sessions that covered lessons learned, international legal instruments, good practices, and a discussion panel.

There was no call for additional regulations and the emphasis was on disseminating the existing knowledge and practices, given it was a failure to follow current industry standard practices that resulted in the incident. The detailed summary listed international instruments that apply throughout the lifecycle of ammonium nitrate, and listed the following industry guidance and good practices:

- Fertilizers Europe runs a product stewardship program to establish and enhance safety, security, health and environment performance, including with mandatory implementation for all member companies and audits by independent third parties.
- Australasian Explosives Industry Safety Group (AEISG) has developed a code of practice on the storage and handling of solid ammonium nitrate.
- SAFEX produced a guide "Good Practice Guide: Storage of Solid Technical Grade Ammonium Nitrate". ('GPG for TGAN')
- Institute of the Makers of Explosives (IME) has developed guidance on the safe handling of solid ammonium nitrate.
- NFPA's Code 400 has a chapter dedicated to ammonium nitrate.

4.3 INCONSISTENT WITH BEST PRACTICE REGULATION IN QLD AND WA

There are three different codes related to ammonium nitrate storage applied within Australia – Australian Standard ‘AS4326’, the Queensland Information Bulletin IB53 and the Western Australian Code of Practice – “*Safe storage of solid ammonium nitrate*”. None of these codes are consistent with each other when calculating separation distance nor is there consistency with the ammonium nitrate TNT equivalence used in calculating these distances. Another method for calculating separation distances is not required. Industry would much prefer a single code of practice accepted by all Australian jurisdictions, with separation distances determined through a scientific basis.

Due to the lack of harmonisation, together with concerns on the lack of scientific basis for determining separation distances, AEISG has developed and published a comprehensive code of practice based on all the existing Australian codes and the internationally recognised Safex Good Practice Guide. AEISG is now seeking to have this code of practice, “*Storage and Handling of Solid Ammonium Nitrate*” recognised by all Australian jurisdictions. An example of the adoption of a code across all jurisdictions is provided by a similar AEISG code of practice on the storage and handling of ammonium nitrate emulsion (ANE, UN No. 3375). This code has been well accepted by all Australian jurisdictions and is referenced by SafeWork NSW and other Australian regulators.

The Discussion Paper mentions raising safety standards ‘*to the best-practice standard already used in other Australian jurisdictions*’. Aside from the variation in how separation distances are calculated, which differs across all three codes, the Discussion Paper has a fundamental inconsistency with both the QLD and WA codes through not acknowledging separation distances may be varied through conducting a detailed risk assessment. It is unclear why this practice, legally required and accepted by all regulators in relation to regulating the chemical industry and MHF sites, is not included in the proposal. This inconsistency may relate to a bias within SafeWork NSW against accepting risk assessments when applying the Explosives regulations.

Orica notes SafeWork NSW’s objective to apply consistent prescribed separation distances across explosives, ammonium nitrate emulsions and solid ammonium nitrate. The existing documents that currently provide guideline separation distances for explosives and ammonium nitrate emulsion storage do allow for risk levels to be determined for specific site circumstances, to ensure the risks at an acceptable level.

MHF sites are by their nature complex, and this is why existing regulatory frameworks require the consideration of risk to account for specific circumstances and controls implemented at that facility. This approach ensures facilities can implement the most effective controls for their circumstances, whilst still requiring MHF sites to demonstrate that the risks are controlled so far as is reasonably practicable.

This lack of recognition of a detailed risk assessment has a significant detrimental effect on industry as a risk-based approach is fundamental to the regulatory framework for MHF sites, leading to directly conflicting requirements between two different sets of regulations administered by SafeWork NSW.

Summary: The proposed changes do not align NSW with the best-practice standard applied by Qld and WA. Instead, the proposal represents an ultra-conservative regulatory requirement without parallel in Australia or overseas. Both WA and QLD allow for recognition of a detailed risk assessment as an alternative pathway to achieving the outcome of community safety. This has not been reflected in SafeWork NSW's proposal.

Recommendation: That SafeWork NSW adopt a consistent approach to the best-practice standard of WA and Qld that allow for recognition of a detailed risk assessment as an alternative pathway to achieving the outcome of community safety – as those two states have applied.

4.4 SIMPLISTIC ASSUMPTIONS USED TO ASSESS THE CONSEQUENCE OF AMMONIUM NITRATE EXPLOSIONS

The overall TNT equivalence of ammonium nitrate is an estimate of the blast energy generated from a detonation relative to TNT and is a combination of both the chemical TNT equivalence and the explosive yield or the efficiency of the explosion. SAFEX GPG for TGAN publishes for ammonium nitrate a chemical equivalence of 32% of TNT. The explosive yield is the proportion of ammonium nitrate consumed in the explosion and varies based on the properties of the ammonium nitrate and how an explosion is initiated.

Overall TNT Equivalence = Chemical TNT Equivalence x Explosive Yield

The explosive yield of ammonium nitrate is largely dependent on three variables; temperature, confinement and contamination. Without any of these three being present, ammonium nitrate would require a strong initiation charge (i.e. high explosive) to detonate at all.

An overall TNT equivalence of 32% as proposed in the discussion paper is obtained by assuming the explosive yield is 100 percent, i.e.. the entire mass of an ammonium nitrate pile is consumed in an explosion. This is a simplistic, conservative assumption and is inconsistent with the risk-based approach recommended by SAFEX to assess the impact of a potential ammonium nitrate explosion using 32% when ammonium nitrate is detonated from high velocity projectiles, and lower explosive yields when explosions are initiated by fire or contamination.

The use of 32% to assess a potential explosion is not appropriate at facilities where there are no detonators or explosives stored on the site. A detonation of an ammonium nitrate pile due to impact from a separate explosion is not a credible scenario due to the extreme pressure required to initiate an explosion in ammonium nitrate.

Summary: Applying a 32% TNT equivalence in the calculation of prescribed separation distances, being the theoretical maximum TNT equivalence for ammonium nitrate, is too simplistic and does not consider the credibility of the ammonium nitrate decomposition pathway.

4.5 THE PROPOSAL DOES NOT APPLY TO ALL AMMONIUM NITRATE IN NSW

Currently the scope of the Discussion Paper is limited to only a small but critical part of the ammonium nitrate supply chain and does not include mine site ammonium nitrate storage, even though the NSW Explosives Act and Regulations do not differentiate legal obligations based on location. Whilst the NSW Resources Regulator is the regulatory authority for mine site storage, the regulations are the same and all ammonium nitrate storage licences are issued by SafeWork

NSW. Orica estimates that non-mine site locations represent less than half the total number of sites licensed by SafeWork NSW for ammonium nitrate storage.

Through limiting the scope of the Discussion Paper, this gives a misleading impression of a low number of sites affected by the introduction of separation distances. Hence, any collation of the impact from the adoption of the Discussion Paper will be missing the impact on a significant percentage of the existing licensed NSW sites. (Diagrams One, Two and Three, which follow the Executive Summary, help to illustrate the whole ammonium nitrate supply chain, the application of regulatory controls and the consequences of the proposal for the entire supply chain, not just those under the direct jurisdiction of SafeWork NSW.)

Ammonium nitrate in transit (road, rail and sea) is also excluded from the proposed requirements as is ammonium nitrate handled through ports.

Recommendation: As only SafeWork NSW has accurate information of the sites currently licensed for AN storage, the total number of sites impacted by the proposal must be identified and tabled by SafeWork NSW together with SafeWork NSW's assessment of compliance, or otherwise, with the proposal.

4.6 SIGNIFICANT GOVERNMENT SUPPORT REQUIRED

The Discussion Paper is mostly silent on measures that government could enact, to assist with the objective of reducing potential consequences from a worst-case incident with ammonium nitrate storage. The following measures should be investigated by government, in consultation with industry:

- The identification of suitable parcel(s) of land for industry to use.
- Establishment of land use management restrictions / buffer zones around facilities, to minimise the risk of encroachment.
- Establishment of government reserves with parcel(s) of land that could be used by industry for large ammonium nitrate storage.
- Development of the necessary infrastructure (roads, power, water, services) to ensure locations for new storage facilities can be operated safely.
- Resourcing for local emergency services, to ensure appropriate response arrangements are supported.
- Fast tracking of planning and other government approvals for new storage facilities.

Orica has been working to minimise the consequence of any potential ammonium nitrate explosion by assessing the location and size of ammonium nitrate piles stored at the Kooragang Island site. Over the last 18 months various ammonium nitrate storage configurations have been assessed to determine the impact on potential consequence reduction and site operation. A significant reduction in AN pile size and associated change to the ammonium nitrate storage and dispatch operating model requires substantial investment. The preferred option is currently being finalised before approval and funding are sought. This project is in line with one option mentioned in the Discussion Paper on reducing potential consequences.

5 IMPACTS OF THE PROPOSAL

The impact of the changes proposed in the discussion paper are a disproportionate response to recent incidents involving ammonium nitrate and pose significant and inconsistent approaches for ammonium nitrate manufacture, storage and associated industries.

5.1 BIAS TOWARDS IMPORTING AMMONIUM NITRATE

The Discussion Paper proposal in its current form (i.e. retrospective application of mandatory separation distances to existing facilities) jeopardises the viability of the local manufacture of ammonium nitrate. As a trade or import exposed sector, this is likely to promote increased offshoring of ammonium nitrate supply and manufacturing, resulting in a loss of economic activity to the state of NSW. It may also have a potentially adverse effect on the sustainability footprint of the supply chain due to the emissions associated with importation.

Hence, a foreseeable impact from the proposal is a significant increase in the importation of ammonium nitrate. As SafeWork NSW is not the regulator of port operations, the handling of ammonium nitrate through ports is not within the scope of the proposal. Therefore, the impact from any increased imports is not captured, even though two of the noted significant ammonium nitrate incidents: Tianjin and Beirut involved port operations.

A bias towards the importation of ammonium nitrate will probably increase community risk due to:

- Higher volumes of ammonium nitrate imports to meet the mining industry's needs. These shipments can be up to 6,500 tonnes per vessel;
- Imported ammonium nitrate will be handled and transported in close proximity to population centres and industrial assets;
- Increased ammonium nitrate handling by operators with potentially lesser understanding of critical safety controls;
- Using facilities that are not specifically dedicated to manage ammonium nitrate will mean a higher likelihood of co-storage and/or handling with incompatible materials, rather than handling within the current well controlled environment.

Ammonium nitrate importation will increase security of supply risks due to the lengthening of supply chains and associated lead times. Perversely, this has the potential to result in larger quantities of ammonium nitrate being required to be stored locally, as a contingency against supply chain disruption - instead of a buffer of 10 days' stock at KI, and the intermediate storage stock, industry will need to increase the buffer to 90 days' stock, or greater. This is evidenced by the recent and ongoing impacts of COVID on seaborne freight supply chains.

As per AS3846 and the associated regulations for handling dangerous cargo through ports, any vessel with large quantities of ammonium nitrate must be loaded / unloaded as quickly as possible, with stringent time limits. Hence, the road transport journey for the ammonium nitrate must be kept relatively short. As the current proposal puts in jeopardy the existing intermediate storage sites located relatively close to the port, it is foreseeable that much longer road transport will be required to any remote storage facilities. Hence, there will be a significant increase in the required number of vehicles on the road transporting ammonium nitrate.

The importation of a manufactured product such as ammonium nitrate will reduce Australia's sovereign capacity for ammonium nitrate manufacture. This is inconsistent with recent initiatives

from all levels of government to increase local manufacturing, reduce the risk of supply disruption, and increase the independence of the Australian economy. These risks continue to be highlighted by the COVID-19 pandemic.

Summary: An unintended consequence of the likely adverse impacts on local ammonium nitrate supply will be increased importation of ammonium nitrate. These increased port operations and the associated transportation to remote storage facilities will result in higher risks to the community.,

Recommendation: SafeWork NSW need to assess the impacts from the proposal across the entire ammonium nitrate supply chain.

5.2 INCREASE IN ROAD TRANSPORT OF AMMONIUM NITRATE

A result of increasing importation of ammonium nitrate is additional truck movements required to transport ammonium nitrate from the Port to an intermediate storage facility and from the intermediate storage facility to the mine or emulsion manufacturing site. It is likely at least double the amount of ammonium nitrate truck movements would be required to supply the NSW mining industry with ammonium nitrate via Ports. Should the proposal require the existing intermediate storage facilities to relocate further from the port, then additional road transport will also be required to ensure supply.

5.3 IMPACT ON THE MINING INDUSTRY

Ammonium nitrate is manufactured, imported, transported, and used within NSW predominantly as an explosive in mining operations with approximately 200,000 – 220,000 tonnes consumed per year.

As previously noted, ammonium nitrate is a critical product required to support the NSW economy through both the mining and quarrying and construction industries, with any change to the regulation of the storage of ammonium nitrate having a potential significant impact to the productivity and long-term viability of these industries.

The impact on the NSW mining industry from the mandatory separation distance proposal is two-fold. Firstly, there are foreseeable disruptions to ammonium nitrate supply as the proposal jeopardises existing manufacturing and intermediate storage facilities that cannot meet the prescribed separation distances, leading to a period of uncertainty.

Secondly, the Explosives regulations apply to both mining operations and non-mine sites. Hence, it would be inconsistent if different separation distances were to be applied to storage on a mine site, vs storage off a mine site. Preliminary assessment of some existing mine site storages, with relatively small quantities of ammonium nitrate, indicates that these facilities may not have sufficient separation distances to significantly increase the storage quantity and still comply with mandatory separation distances. Hence, it is probable that even for mine sites, new facilities would be required in order to accommodate larger storages to cater for potential ammonium nitrate supply disruption.

Summary: Possible retrospective application of consequence driven, mandatory separation distances will have a major and significant impact on the mining industry through disruption of the AN supply chain.

Summary: The application of consequence driven, mandatory separation distances on a mine site will most likely require new facilities to be built as existing facilities have limited ability to increase storage quantities.

Recommendation: SafeWork NSW need to assess the impacts from the proposal across the entire ammonium nitrate supply chain.

6 IMPACT ON ORICA OPERATIONS

The Discussion Paper requests industry to provide feedback on the impacts of the proposal on existing facilities, from the retrospective application of mandatory, consequence-based separation distances. Whilst further work would be required for Orica to definitively determine the costs and business and market impacts of the proposal, preliminary information on the key impacts is outlined below.

6.1 IMPACT ON ORICA KOORAGANG ISLAND AMMONIUM NITRATE MANUFACTURE

Should the retrospective application of the proposed mandatory separation distances be implemented in its current form there will be wide reaching consequences on the ammonium nitrate industry, due to the disruption to the existing supply model, including jeopardising Orica's Kooragang Island ammonium nitrate manufacturing facility.

Individual ammonium nitrate piles at the Kooragang Island site would be limited to less than 10 tonnes, based on the prescriptive separation distances proposed in Table 3 of the discussion paper, which is not sufficient to sustain the current mode of operation.

To comply with the proposed requirements the Kooragang Island site would have two options

- Cease production of solid ammonium nitrate
- Construct a solid ammonium nitrate manufacturing facility which complies with the proposed separation distances

The cost of constructing a new, remote solid ammonium nitrate manufacturing facility in NSW to comply with the proposed discussion paper requirements is significant and prohibitive. If the production of solid ammonium nitrate were to cease, this would result in the NSW mining industry needing to source up to 220,000 tonnes of solid ammonium nitrate annually from an alternate supplier, this may be from interstate or imported.

Should the Kooragang Island facility become unsustainable then, in addition the ammonium nitrate supply disruption, there would be negative impacts on the supply of other products manufactured at KI, such as ammonia (used extensively for water treatment and in refrigeration systems) and carbon dioxide (used in hospitality and other industries). Downstream industries that rely heavily on these inputs would be forced to seek alternatives. It is important to note that Kooragang Island will be the sole ammonia manufacturing facility on the east coast of Australia by the end of this year, when the only other facility in Brisbane (operated by IPL) is closed.

Summary: Possible retrospective application of consequence driven, mandatory separation distances will jeopardise the ammonium nitrate manufacturing site at Kooragang Island and have a major and significant impact not only on ammonium nitrate supply but also on downstream industries who rely heavily on the other products manufactured onsite (e.g., ammonia and carbon dioxide).

Recommendation: SafeWork NSW need to assess the impacts from the proposal across the entire ammonium nitrate supply chain.

It is unclear from the discussion paper whether truck loading on a manufacturing site must comply with the proposed mandatory separation distances. This needs to be clarified before an assessment of the impact of moving ammonium nitrate to a remote storage location can be completed.

While Orica has not had sufficient time to assess the availability of a suitable remote property, or the likelihood of receiving approval for development, it would be necessary to acquire a large parcel/s of land to meet the separation distances within the property boundary, as per the Discussion Paper. Initial calculations based on the proposed distances, i.e., 2.4km to vulnerable facilities with a 500-tonne pile / stack, indicate a required land parcel size in the order of 2500Ha (i.e., 100 times larger than KI). In all likelihood, any suitable land would be a significant distance from main freight routes, requiring a significant capital expenditure to ensure suitable infrastructure is in place, resulting in higher operating costs and lengthy development timeframes.

Under the proposal, any alternative ammonium nitrate storage will be remote due to the separation distances required, and therefore the site will probably be in a setting with limited or inadequate associated infrastructure. Given the change is proposed to be imposed retrospectively, should infrastructure upgrades be required, the Government should either undertake the necessary works or provide funding for them, including:

- utilities (power, water, electricity)
- safe access (road upgrades/widening/drainage, bridge upgrades/widening, street lighting, signalisation of intersections)
- emergency services (adequate response times)
- any other infrastructure required for the effective and safe access and management of the facility.

Such uncertainty around the future operation of the Kooragang Island site is likely to affect capital investment, operating costs and Orica's commitment and partnership with government to, firstly, reduce greenhouse gas emissions and, secondly, provide sustainable green hydrogen / ammonia supply.

Summary: Possible retrospective application of consequence driven, mandatory separation distances will have a major and significant impact on industry which to date has been very safe in the handling and storage of ammonium nitrate.

Recommendation: SafeWork NSW need to assess the impacts from the proposal across the entire ammonium nitrate supply chain.

The NSW Government is supporting the implementation of tertiary abatement technology on Orica Kooragang Island's three nitric acid plants, which will result in a significant reduction in the site's greenhouse gas (GHG) emissions. Should locally produced ammonium nitrate be displaced by imported AN, the GHG intensity of the supply chain will increase considerably. This outcome would be inconsistent with the NSW Government's Net Zero Plan, which Orica is supporting through its own strategy. Orica is committed to reducing GHG emissions by 40% by 2030 and has an ambition to achieve net zero emissions by 2050. This ambition is supported by the abatement project noted above and includes a recent renewable power purchase agreement with Lightsource BP that is expected to supply approximately 50 percent of Orica's Australian electricity needs by 2025, further reducing the emissions intensity of Orica and its ammonium nitrate relative to alternate suppliers.

In addition, Orica is currently partnering with Origin to develop a green hydrogen supply which will offset the amount of natural gas required to produce ammonia, and therefore per tonne of ammonium nitrate at the Orica KI site. While significant investment would be required, this initiative has the potential to be expanded over time to achieve 100% green ammonia, which will further reduce the footprint of ammonium nitrate produced at the Orica Kooragang Island site relative to imported product.

Summary: Jeopardising local AN manufacturing is not aligned with government's focus of reducing greenhouse gas emissions, developing green hydrogen and ammonia, and supporting local manufacturing industries.

Recommendation: A whole of government assessment is required to ensure that this proposal is not working at cross purposes with other areas of government policy- including the pursuit of net zero industrial precincts and related policies.

6.2 IMPACT ON SMALL AMMONIUM NITRATE STORAGE

In addition to reviewing the impact to Orica's NSW ammonium nitrate manufacturing site at Kooragang Island, Orica has also conducted a preliminary assessment of the impact on existing small storage sites strategically located to service the mining, quarrying and construction industry. This preliminary assessment indicates that most existing sites are probably not compliant with the proposal, even when located on a mine site.

Orica has not been able to complete a more detailed assessment due to several ambiguous aspects of the NSW proposal. Further clarification from SafeWork NSW is requested, to allow a more detailed analysis to be undertaken.

Clarification is sought from SafeWork NSW on the following aspects:

- There are issues related to the feasibility and practicality of the installation of a “*suitable automatic fire detection system*”, in order that on-site protected places may be located 15m from the storage, rather than Protected Works B distances (e.g. 705m for 100t of AN), as per Section 4.6. What parameters has SafeWork NSW used to determine that this is a viable control?
 - Installing automatic fire detection systems will be impracticable and most likely ineffective for these storage types: outside ammonium nitrate storage; storage of loose ammonium nitrate in exchanged shipping containers; storage in silos; and transit bin storage.
 - The majority of the sites do not have a permanent power supply available for any fixed detection system.
 - WHS obligations require Orica to provide personnel with readily accessible amenities, rather than amenities at a remote location. Hence, it appears that facilities such as a small site office, crib room or basic amenities may not be possible under the discussion paper proposal, in conflict with WHS obligations.
- Will mandatory separation be required where it is credible to evacuate a small number of Protected Works nearby to existing facilities? As per current NSW Explosives regulations and the AEISG Code for ANE storage, procedures have been developed and implemented for the credible evacuation of nearby facilities, in a worst-case fire scenario.

- When the storage is on a mine, directly servicing that mine, are any nearby mine facilities classified as Protected Works? The ammonium nitrate storage facility is directly associated with mine operations and operates under the mine's safety management system and hazard control plans.
- Whether the existing land parcels are deemed insufficient, if the separation distances extend beyond the boundary, even if there are no Protected Works within the required distances.
- The aggregation process is unclear, particularly when identifying the required separation distances to vulnerable facilities, for sites storing both ammonium nitrate and ammonium nitrate emulsion. The proposed ammonium nitrate separation distances to vulnerable facilities are 100% larger than the current ANE separation distances required under the AEISG UN3375 code. More information or examples are required on the aggregation process.

Summary: Orica has not been able to undertake a more detailed assessment for existing small storages of ammonium nitrate due to several ambiguous aspects of the NSW proposal.

Recommendation: Further clarification from SafeWork NSW is required, to allow a more detailed analysis to be undertaken.

7 CONCERNS WITH THE PROCESS

Orica appreciates that SafeWork NSW has issued the proposal for separation distances as a Discussion Paper, seeking feedback from industry and commits to continue working with government to ensure ammonium nitrate is manufactured, stored, handled and transported safely.

Industry consultation prior to public release of the paper would have ensured a balanced and holistic assessment of the merits of the proposal and ensured a complete understanding of the ammonium nitrate supply chain operating in New South Wales. Early industry consultation would also have ensured sufficient technical input to allow a much more thorough assessment of cost and business impacts to inform decision making. The process to date has been inconsistent with the NSW Government's Better Regulation Statement, has not been supported by a Regulatory Impact Statement and is not consistent with the NSW Government's own principles, in particular not pre-justifying a particular option.

Orica submits that genuine and direct engagement with industry should occur before any further steps are taken to change the way ammonium nitrate storage is regulated in NSW. This should include consultation on realistic and feasible options for the reconfiguration of ammonium nitrate stores at Orica facilities, under the existing risk-based regime so as to minimise risks to the community and avoid the unnecessary costs of the proposed, overly conservative prescriptive requirements.

8 QUESTION RESPONSES

The Discussion Paper poses 11 questions as part of gathering responses on the proposal. Orica's response to these questions is provided below.

1. Do you have concerns about the storage of ammonium nitrate in or around your local community? If -yes, what are your concerns?

No, Orica does not have any concerns regarding the storage of ammonium nitrate in NSW and strongly advocates that the current licensing regulation applied to the storage of ammonium nitrate is robust, effective and represents world's best practice. The properties of ammonium nitrate are well understood by Industry including the controls required for the safe storage of ammonium nitrate. The achievement of over 50 years of safe handling and storage of ammonium nitrate in NSW, without incident, is not attributable to good fortune, but rather to strict adherence to existing controls which have been proven effective in managing potential fire, contamination and shock initiation pathways, required to maintain the safe storage of ammonium nitrate.

The incidents listed in the ammonium nitrate Discussion Paper, that have been used by SafeWork NSW to justify the implementation of mandatory prescribed separation distances, including incidents at Tianjin, China, West, Texas and Beirut, Lebanon, all involved the storage of fertiliser-grade ammonium nitrate (FGAN) with incompatible and flammable materials, in one instance being stored with fireworks. Whilst these events were tragic, they highlight the importance of strong regulation to assure that existing controls remain effective, 100% of the time.

Since 2012 SafeWork NSW has ensured storages of more than 2,500t of ammonium nitrate meet the Major Hazard Facility regulatory requirements. These regulations require the development and implementation of a detailed risk assessment to ensure appropriate controls are effective and continuously in place to prevent a major incident from occurring. Further, MHF sites have a regulatory requirement to demonstrate that the site risks have been reduced to so far as is reasonably practicable, requiring constant review and upgrade to site controls. These controls include emergency response infrastructure, a detailed emergency plan, a state-level emergency plan for the Kooragang Island precinct and an assessment by the emergency services of the site's emergency preparedness. These plans are regularly tested to ensure effectiveness. SafeWork NSW conducts a vigorous review of these risk assessments, prior to issuing MHF licences, as well as conducting annual site inspections and risk control verification audits.

2. Does the proposal incorporate appropriate measures to manage the risks associated with the storage of ammonium nitrate?

No. The risks associated with the storage of ammonium nitrate are already well managed through the existing licensing regime. In fact, the proposal will most likely increase risks through shifting and increasing the risk profile to other parts of the ammonium nitrate supply chain.

Currently the scope of the Discussion Paper is limited to only a small but critical part of the ammonium nitrate supply chain and does not include mine site ammonium nitrate storage, even though the NSW Explosives Act and Regulations does not differentiate legal obligations based on location.

For any regulation of ammonium nitrate in NSW to be effective, and achieve SafeWork NSW's regulatory objective of protecting the community, it must be consistently applied across all areas of the ammonium nitrate supply chain. And yet, prescribed separation distances are only proposed to be applied to facilities under SafeWork NSW direct regulatory jurisdiction. SafeWork

NSW is creating an inconsistent, unbalanced and patchwork regulatory framework, which will increase regulatory complexity in what is already a highly regulated environment.

The retrospective application of prescribed separation distances will significantly challenge the long-term viability of ammonium nitrate manufacturing in NSW, biasing the importation of ammonium nitrate through NSW ports, over locally manufactured product. If mandatory prescribed separation distances were applied to Orica's Kooragang Island facility, the maximum ammonium nitrate stockpile quantity permitted at the facility would be less than 10T, which is not sufficient to sustain current operations.

The prescribed separation distances are highly conservative in their calculation, particularly when applying the maximum theoretical TNT equivalence of 32% to solid ammonium nitrate, and do not consider site specific factors that are relevant in evaluating the consequence of a potential unplanned explosion, as determined through detailed, rigorous risk assessments.

Orica notes SafeWork NSW's desire to apply consistent prescribed separation distances across explosives, ammonium nitrate emulsions and solid ammonium nitrate. The existing documents that currently provide guideline separation distances for explosives and ammonium nitrate emulsion storage do allow for risk levels to be determined for specific site circumstances, to ensure the risks at an acceptable level. This allowance for risk assessment is also contained in the best-practice standard adopted by both Western Australia and Queensland, but was not acknowledged by SafeWork in their description in the Discussion Paper.. To reflect that detailed risk assessments have been successfully applied in safely managing the current major hazard sites and, to align with the best-practice standard adopted by Western Australia and Queensland, a risk-based assessment option, as allowed for explosives and ammonium nitrate storage, should also be allowed for ammonium nitrate storage.

In lieu of locally manufactured ammonium nitrate, to maintain ammonium nitrate supply to the mining industry in NSW, imported ammonium nitrate would be required to be transported through the Port of Newcastle. Currently Orica's Kooragang Island facility has only capacity to store 7 to 10 days of solid ammonium nitrate supply to mines in NSW during peak demand periods. If an importation model was required due to loss of locally manufactured product, to maintain security of supply of ammonium nitrate, storage of ammonium nitrate in NSW would be required to be increased to accommodate approximately 90 days of demand, requiring a significant increase in both the quantity and number of storage facilities in NSW. If ammonium nitrate solution manufacturing was to also cease at Orica's Kooragang Island facility the quantity of ammonium nitrate would further significantly increase. The importation of ammonium nitrate represents an increased risk due to the potential of product contamination through handling of ammonium nitrate in the same areas as other incompatible products and would result in a significant increase in the transport of ammonium nitrate through residential areas near the port, when compared to locally manufactured product.

If the proposed changes were to be introduced in their current form, the NSW Government would have the most stringent, conservative regulation framework in the world in exchange for a reliance on imported ammonium nitrate product and the transference of risk of a potential adverse event occurring, to those areas of the supply chain outside of SafeWork's jurisdiction and outside of the MHF regulation that have worked so effectively to date and ensured the safety of industry and community for over 50 years.

3. How can ammonium nitrate storage facilities located near residential and commercial areas be made safer?

Ammonium nitrate storage facilities near residential and commercial areas should undergo detailed risk assessments reviewed by SafeWork NSW MHF, to ensure the risks are reduced to

as low as reasonably practicable and the appropriate controls are in place to maintain safety. Orica maintains that the methodology that underpins the MHF legislation, requiring MHF sites to demonstrate that the risk associated with the manufacture and storage of ammonium nitrate has been reduced to so far as is reasonably practical is effective in maintaining the safe storage of ammonium nitrate near residential and commercial areas.

4. What will be the impacts on industry and the community if the NSW Government's proposal is adopted?

The retrospective application of prescribed separation distances will significantly jeopardise the long-term viability of ammonium nitrate manufacturing and existing intermediate ammonium nitrate storage facilities in NSW, biasing the importation of ammonium nitrate through NSW ports, over locally manufactured product. In 2021, Orica Kooragang Island site spent almost \$44.6 million procuring goods and services from 346 local businesses, paid close to \$40 million in wages to 200 employees and contractors, and invested around \$35 million in capital and related works. It is estimated that the site contributed an additional \$271.2 million in economic activity and supported an additional 3,478 full-time equivalent jobs in the Hunter region.

As detailed in the online consultation survey, SafeWork NSW identified benefits to Industry in introducing separation distances that included: standardised rules for all facilities that store ammonium nitrate, clearer rules that provide more investment certainty, more efficient licence assessments and approvals (replacing the current case-by-case approach) and alignment with best-practice standards of other states and territories. Unfortunately, these claims are misleading.

As detailed in the Question 2 response, with prescribed separation distances only proposed to be applied to facilities under SafeWork NSW direct regulatory jurisdiction, SafeWork NSW is creating an inconsistent, unbalanced and patchwork regulatory framework, that will result in an uneven "level playing field" and introduces commercial inequalities across the industry. It would also ensure NSW would also have the most stringent, conservative regulatory framework relating to the storage of ammonium nitrate in the world; that will significantly jeopardise the long-term viability of existing ammonium nitrate manufacturing in NSW. Future investment will be directed to other states and overseas ammonium nitrate manufacturing plants which is at odds to SafeWork NSW's stated objective of providing investment certainty for New South Wales.

SafeWork NSW have cited the success of the QLD and WA codes with *"both mining and explosive industries operating successfully with prescribed separation distances in those states"*. SafeWork NSW's proposal however removes the option for existing sites to undertake a detailed risk assessment, when prescribed separation distances can't be practically achieved, an option that is allowed under the approach adopted in both Queensland and Western Australia. The existing documents that currently provide guideline separation distances for explosives and ammonium nitrate emulsion storage in NSW also include allowance for risk levels to be determined for specific site circumstances, to ensure the risks at an acceptable level.

5. What is an appropriate transition period to provide to existing sites which may have difficulty complying with prescriptive separation distances? What other strategies should be considered to enable existing sites to comply with prescriptive separation distances?

The current proposal should be paused while government conducts a detailed assessment of the impacts across the entire supply chain, in consultation with industry. Orica has the firm belief that

many existing storage and manufacturing facilities will not be able to comply with the mandated prescribed separation distances outlined in the discussion paper, resulting in significant impacts, which, if applied, will transfer the risk profile to other areas, rather than reduce the overall risks.

6. What barriers are there for existing facilities moving or relocating ammonium nitrate stores within sites, to comply with prescriptive separation distances?

Ammonium nitrate manufacturing facilities require access to several services including natural gas, electricity, water and port infrastructure to maintain viable operation and therefore can't practically be relocated easily. Considerable costs will be incurred in the establishment of new sites, if a suitable location can be found, with lengthy approval, planning consent and land use requirement processes. Alternate locations that meet both the infrastructure and buffer zone requirements to sustain a 220,000Tpa solid ammonium nitrate manufacturing facility, consistent with Orica's Kooragang Island solid ammonium nitrate manufacturing quantity are non-existent in NSW. Based on the proposed NSW separation distances for a 500t ammonium nitrate stock / pile, this would require a land parcel approximately 2,500 ha (100 times the size of Kooragang Island).

Changing the configuration and/or location of ammonium nitrate storage within the Kooragang Island site has been investigated by Orica for the past 18 months and various ammonium nitrate storage configurations have been assessed to determine the impact on potential consequence reduction and site operation. A significant reduction in AN pile size and associated change to the ammonium nitrate storage and despatch operating model requires substantial investment. The preferred option is currently being finalised, with discussions planned with SafeWork NSW upon finalisation.

7. Are there any unintended consequences associated with the NSW Government's proposal, for industry and/or communities located within the vicinity of an ammonium nitrate storage facility?

As noted in the response to Question 2, the proposal will most likely increase risks through shifting and indeed increasing the risk profile to other parts of the ammonium nitrate supply chain, many of which are not within the scope of SafeWork NSW's jurisdiction.

For Orica, the proposal undermines the commercial viability of the operations on Orica's Kooragang Island – currently the only manufacturing ammonium nitrate facility in NSW, supplying approximately 70% of NSW's mining industry. Orica, together with the NSW Government and federal government, have made significant investments in decarbonising the manufacture of ammonium nitrate at the Kooragang Island facility. These recent investments have laid the foundation for realising a hydrogen hub on Kooragang Island and the manufacture of green ammonia and green hydrogen. The contribution that these investments are making towards the achievement of a net zero industrial precinct are put at risk by the SafeWork NSW proposal.

Should the Kooragang Island facility become unsustainable then, in addition the ammonium nitrate supply disruption, there would be negative impacts on the supply of other essential products produced at Kooragang Island, such as ammonia (used extensively in critical water treatment systems and refrigeration systems), nitric acid (used in the dairy and medical sectors) and carbon dioxide (used in hospitality and other industries). Downstream industries that rely heavily on these inputs would be forced to seek alternatives. It is important to note that Kooragang Island will be the sole ammonia manufacturing facility on the east coast of Australia by the end of this year, when the only other facility in Brisbane (operated by IPL) is shutdown.

8. Do you think the prescriptive separation distances will achieve the desired safety outcome?

Orica maintains that that current ammonium nitrate regulatory framework applied in NSW already achieves the safety outcome that SafeWork NSW is proposing. A risk-based approach will achieve the desired safety outcome, without making NSW's ammonium nitrate manufacturing industry unviable and without simply shifting the risk profile to another part of the ammonium nitrate supply chain, which may increase overall risks to the community.

9. Are there other costs that the proposal should consider, such as socio-economic costs?

As noted in the response to Question 4, the retrospective application of prescribed separation distances will significantly jeopardise the long-term viability of ammonium nitrate manufacturing and existing intermediate ammonium nitrate storage facilities in NSW, biasing the importation of ammonium nitrate through NSW ports, over locally manufactured product. In 2021, Orica Kooragang Island site spent almost \$44.6 million procuring goods and services from 346 local businesses, paid close to \$40 million in wages to approximately 200 employees and contractors, and invested around \$35 million in capital and related works. It is estimated that the site contributed an additional \$271.2 million in economic activity and supported an additional 3,478 full-time equivalent jobs in the Hunter region.

The proposed retrospective application of prescribed separation distances represents a significant change and must be subject to a comprehensive Regulatory Impact Assessment or Better Regulation Statement, to further understand the broader cost implications to all associated industries and to consider all possible alternative options.

10. What measures can be taken to offset the potential economic impact of some within the industry?

The proposal represents a massive and unprecedented disruption to ammonium nitrate supply in NSW, the scale of which is difficult to assess without a detailed assessment by government considering - the total socio-economic costs, together with the effects on:

- greenhouse gas emission reduction projects
- future green ammonia and green hydrogen hubs;
- the entire ammonium nitrate supply chain
- industries that rely on the critical downstream products also produced during ammonium nitrate manufacture, i.e., ammonia, carbon dioxide, nitric acid, etc.

11. Do you have any further comments regarding the NSW Government's proposal and the storage of ammonium nitrate in NSW?

Yes. Orica has provided a detailed submission from our review of the proposal, for the Government's consideration.

Orica makes two recommendations, as follows:

- That SafeWork NSW pause their current approach and proposal and develop a comprehensive impact assessment which demonstrates an understanding of the whole AN supply chain and which utilises the extensive work of AEISG in determining separation distances calculated using a scientific basis rather than TNT equivalence as though AN is an explosive.

- That the release of the impact assessment report be accompanied by a Regulatory Impact Assessment of the detailed costs / benefits of the various options and be subject to detailed industry consultation.