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State Significant Development: Lot 12 DP625053 Crawfords Freightlines Pty Ltd Proposed Ammonium Nitrate MHF Storage Facility

I write to you after reviewing the documents held on exhibition in relation to the above proposed development. Having considered these materials and turning my knowledge of ammonium nitrate and dangerous goods to the matters at hand, I provide you a list of objections for consideration in the approval process.

I must declare that I have a professional interest in the explosive and dangerous goods industry, having worked in this industry for 15 years and am currently still employed in the industry. I provide my submission with the sole intention of promoting the improved storage of ammonium nitrate within the Hunter Valley and broader NSW. The industry is relying on old facilities and assumptions, which I believe are no longer acceptable in our society.

Modern mining operations cannot operate without the use of ammonium nitrate. Consequently the economies of the Hunter Valley and NSW are dependent on this chemical. Ammonium nitrate storage cannot be avoided but the proposed Crawfords Freightlines Pty Ltd (Crawfords) is in no way suitable for a modern, new development, associated with ammonium nitrate storage.

Objections

Flood Risk

1. The EIS discusses, at length the various, flood scenarios. The risk analysis argues that the risk posed to the ammonium nitrate and the impacts on the connected water systems are acceptable.

2. All risk calculations are a prediction based on the best knowledge at the time. Risk management strategies mandate that risk should be eliminated as a first pass. In the year 2013, we as a society, should not be allowing dangerous goods developments to occur within a flood prone location, particularly with the apparent ongoing changes to climate patterns.

3. Furthermore, the flood prone location neighbours a Ramsar wetland and a broad application of the precautionary principle leads to a rejection of this proposal.

4. The risk posed by the impact of fire water onto the local ecosystem has not been considered. A fire involving ammonium nitrate or the thermal decomposition of ammonium nitrate, are treated with the application of large amounts of water in order to cool the ammonium nitrate. Ammonium nitrate will dissolve in this water and no analysis has been provided on this scenario. Should one of these events occur, the quantity of dissolved ammonium nitrate will be significantly greater than the 40 – 50 tonnes of dissolved ammonium nitrate modelled in the EIS.

Threatened Species Impact

5. The Threatened Species analysis, provided in the EIS, focuses on water and ecosystem impacts from ammonium nitrate contamination. The risk posed by an ammonium nitrate detonation is not considered.

6. The risk of killing threatened species and / or the loss of threatened species habitat via a detonation are silent in the EIS.

7. The storage of ammonium nitrate in close proximity to a Ramsar wetland is totally unacceptable.

Detonation and Overpressure Risk

8. The detonation risk posed by ammonium nitrate is the greatest perceived risk.

9. Low risk storage of ammonium nitrate essentially requires two control measures:
   a. Prevent the thermal decomposition of ammonium nitrate, and
   b. Should a detonation occur in one stack / store, prevent it from propagating to a neighbouring store.

10. To achieve 9b, the energy from a detonation needs to be redirected, absorbed or dissipated so that the energy impacting a neighbouring store / stack is below the energy of detonation. The most common method to achieve this is through physical separation.

11. The status of what is sufficient separation is not set in stone. Different jurisdictions have different views.

12. In section 4.3.4 of the Hazard Analysis Revision 4 (EIS Volume II) reference is made to the paper written by Eric Nygaard, *Storage of Technical (Porous) Ammonium Nitrate*, in which separation distances are set at 16m (this being for 500 tonne stacks stacked in a traditional block configuration). The EIS argues that this distance is not applicable to this development proposal and on this matter they are in error.
    a. The experimental data that lead to Eric Nygaard's conclusions was based on ammonium nitrate manufactured by Yara International. The EIS states:
    "it is unclear as to whether the experimental research is directly applicable to the types of products and storage conditions in Australia".
    This conclusion is quite interesting since Photograph 1.4 on page 17 of EIS Volume I shows a Yara International ammonium nitrate bag being transported at the proposed development. The ammonium nitrate to be stored at the proposed development will react in the same manner as the ammonium nitrate used in Eric Nygaard's experiments.
    b. The SAFEX guidance material, which is based on Eric Nygaard's conclusions, has been adopted by the Western Australian Department of Mines and Petroleum in the 2nd edition

of the *Code of Practice - Safe storage of solid ammonium nitrate*[1]. The EIS states that the 1st Edition of this code (section 4.2.4 of the Hazard Analysis Revision 4) is the latest but this is untrue. The 2nd Edition was published in 2012 and should have been correctly referenced in the EIS.

13. With stack separation distances being less than the latest industry endorsed guidance, the assumption that only half a stores quantity will be involved in a detonation is a poor assumption. Detonation modelling has been understated.

Detonation – Individual Fatality Risk

14. Using 4500 tonnes and a TNT equivalence of 32%, the resulting overpressures are expected at the following distances from the store:

Over Pressure (kPa)	Probability of Fatality	Contour Distance (SAFEX)
70	100%	451m
35	50%	678m
21	20%	903m
7	0%	2010m

Table 1: Overpressure vs Distance Comparison

The overpressure contours provided in the EIS are underestimated.

15. With the overpressure contours being underestimated in the EIS, the subsequent Individual Fatality Risk contours are also underestimated. The distances to nearby premises and facilities provided in the HSE Study are extracted in Table 2.

Premises	Distance (m)
Scafflink	60
Golf Range	120
Caltex Service Station	350
Sandgate Residential	440
St Joseph's Home	580

Table 2: Distance to Neighbours

16. Without going into detailed calculations, a comparison of Tables 1 and 2 indicates that the likely Individual Fatality Risk at all of these locations will exceed the HIPAP No.4 suggested criteria.

17. The storage of ammonium nitrate at the proposed Crawfords development is not "As Low As Reasonably Practicable".

18. Supporting the preceding analysis is Table 4.1 in the Western Australian *Code of Practice*. Based on increased separation distances, this code still recommends that a separation (for a 500 tonne stack) of 890m is required to "Off-site protected works" and a distance of 1,110m to "Vulnerable facilities and critical infrastructure".

19. The definition of a "protected works" is: *These are deemed to include a dwelling, public building, place of worship, theatre, cinema (or other building or structure where the public is accustomed*

[1] http://www.dmp.wa.gov.au/documents/Code_of_Practice/DGS_COP_StorageSolidAmmoniumNitrate.pdf

to assemble), shop, factory, warehouse, store, building in which any person is employed in any trade or business, store for the keeping of dangerous goods.

20. The definition of a "vulnerable facility" is: *A category of facility that includes, but is not restricted to, multistorey buildings (eg above four storeys), large-glass fronted buildings of high population, health care facilities, childcare and aged care facilities, schools, major traffic terminals (eg railway stations and airports), major public utilities (eg gas, water and electricity works) and sports stadiums.*

21. Off-site protected works within 580m of the proposed development include:
    a. Sandgate residential dwellings
    b. Caltex Service Station (which is a dangerous goods store)
    c. Sandgate Industrial Area
    d. Mullane Plumbing
    e. Sibelco mineral processors

22. Vulnerable facilities within 1,110m of the proposed development include:
    a. St Joseph's Aged Care Facility
    b. Sandgate Railway Station

Detonation – Property Risk

23. Further to the individual fatality risk the property damage risk is unacceptable.

24. HIPAP No.4 (Table 7) estimates that houses become unrepair at an overpressure of 35kPa. Under the proposed storage configuration the 35kPa contour is approximately 678m. At this distance most of the residential buildings to the north east of the facility (opposite St Joseph's) will be destroyed should a detonation occur. Also many of the residential buildings to the south east (near the railway station) are likely to be destroyed.

25. Also within the 35kPa contour is St Joseph's Aged Care Facility, indicating that this facility is at risk of irreparable damage.

Detonation – Other

26. The proposed storage facilities contain asbestos. Should a detonation occur the surrounding area (residential, aged-care and wetlands) will be exposed to asbestos fibres. A new ammonium nitrate storage facility cannot be constructed of asbestos.

27. The proximity of the development to the Maitland Rd and Shortland bypass arterials is unacceptable. The potential loss of life should a detonation occur during peak traffic periods has not be considered and is a significant oversight.

Historical Use

28. The notion that the facility has been in operation for many years and no incidents have occurred must not be entertained as a valid consideration.

29. The use of the land for ammonium nitrate has been unlawful. A development application for ammonium nitrate storage was made to Newcastle City Council in the year 2000 by the land owner, Sierra Sun. This application was rejected; however, the land owner allowed unlawful use and has profited from this.

30. The Newcastle City Council saw fit to reject the application 13 years ago. The societal standards have increased since that time, evidenced by the enactment and implementation of Major Hazard Facility legislation. The land was unsuitable then and is even more unsuitable today.

31. The proposed development should be considered as a Greenfields site and assessed appropriately.

Conclusion

The proposed Crawfords ammonium nitrate storage facility is attempting to use old infrastructure to provide substandard ammonium nitrate storage. There are suitable locations within the Newcastle and Hunter Valley region that provide adequate separation distances, free of flood risk and not adjacent to a Ramsar wetland. The opportunity now exists to establish a modern standard for the storage of ammonium nitrate in NSW.

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