AECI MINING

Emulsion Truck Fire Incident

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SAFEX Webinar - October 2022

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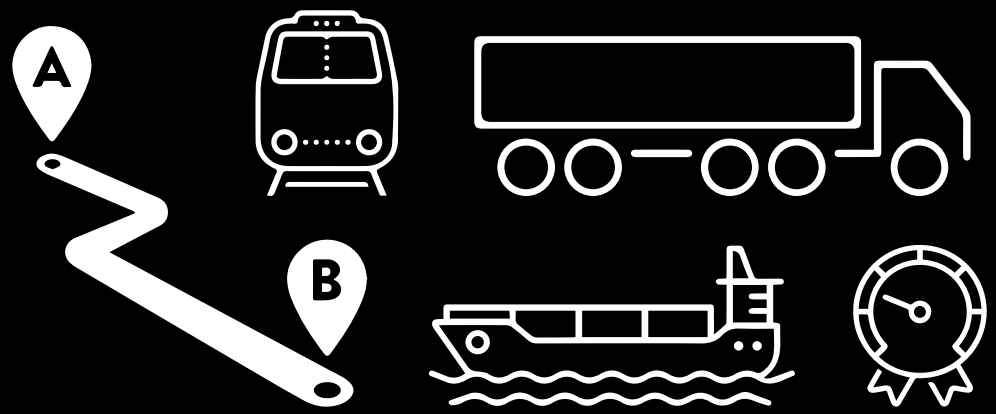
PRODUCT TRANSPORT

Ammonium Nitrate Emulsion Bulk Trailer Fire Wowan – Lechardt Highway Queensland 12/03/2018



ZERO HARM

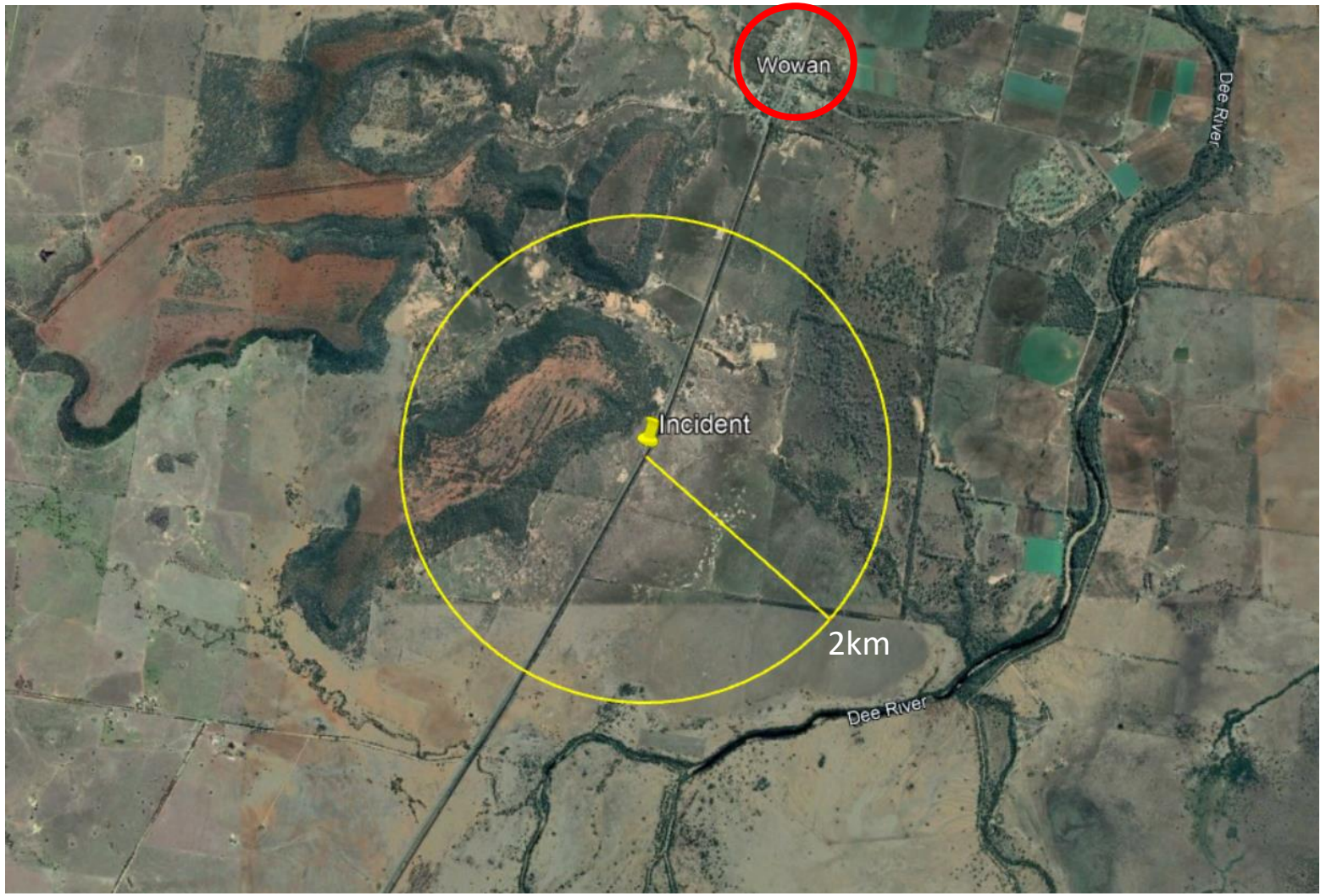
WE ASPIRE TO OPERATE SUSTAINABLY, WITHOUT HARM TO PEOPLE, THE ENVIRONMENT AND THE COMMUNITIES IN WHICH WE OPERATE.

Incident Location

- Wowan QLD is approximately 470km NNW of Brisbane.

- Rural town with a few hundred inhabitants

Incident Location (cont.)



- Approximately 5 km SSW from Wowan town on the A5 Leichhardt Highway

- 2km exclusion zone shown for reference

Details of the Incident

- **At approx. 12:30pm AECI Australia received notification from Crawford's Freightliners that a B-Double Truck & Trailer transporting AECI S100 Ammonium Nitrate Emulsion from AECI Bajool to Mt Owen mine in New South Wales (NSW) had sustained a fire on the rear axle and tyres of the "B" trailer (rear trailer) 5km South of Wowan on the Leichardt Highway.**

- **The driver attempted to extinguish the fire using 8 x 9kg Dry Chemical Powder extinguishers (additional vehicle stopped to assist), however he could not extinguish the fire.**

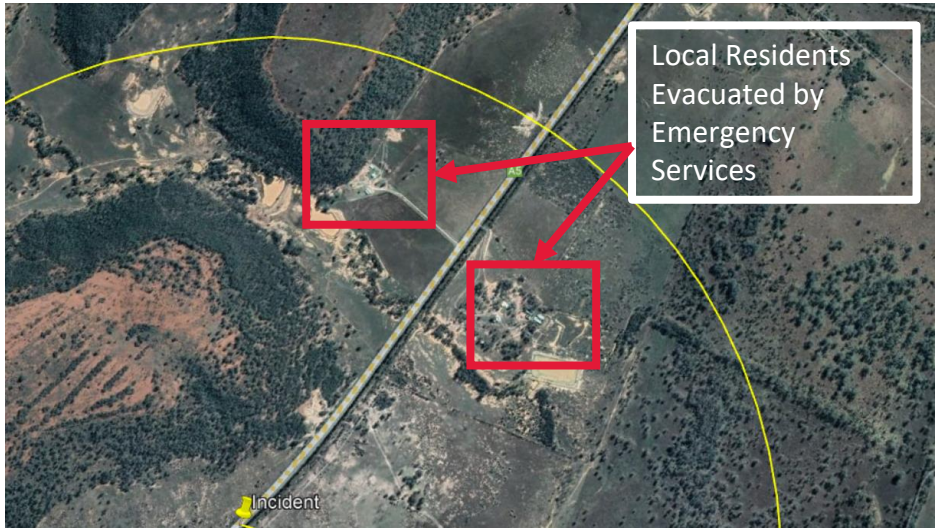
- **The driver then followed the transport company's Transport Emergency Response Plan (TERP) and was able to disconnect the trailer that sustained the fire and drove the prime mover and lead trailer to a safe distance (2km) without injury or damage.**

Details of the Incident (cont.)

- **QLD Fire & Emergency Services and police attended the scene and established a 2km exclusion zone, closing the Leichardt Highway in both directions. This was maintained until the fire had self extinguished. Local residents within the exclusion zone were evacuated.**

- **A number of grass fires were initiated by the fire and were bought under control by both Queensland Fire and Emergency Services & local rural firefighters.**

- **The rear trailer continued to burn for an extended period and sustained significant structural damage and loss of containment, spilling approx. 22 tons of S100 Ammonium Nitrate Emulsion to ground. The emulsion was largely contained in road runoff areas.**



OCCUPATIONAL SAFETY

Explosives Hazard Management

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Dangerous goods and Explosives Compliance

- In Queensland, Security Sensitive AN (SSAN) products fall under the Queensland Explosives Regulation 2003 and Ammonium Nitrate Emulsion (UN3375) is classified as a Class 5.1 Oxidising Agent under the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG7), and is classified as a SSAN Product.
- For ammonium nitrate emulsion to be classified as UN3375 and 5.1 Oxidising Agent, it must not be contaminated with organic substances.
- In this occurrence all the spilled Ammonium Nitrate Emulsion had been deemed contaminated and was considered as a 1.1D explosive
- AECI and the Department of Natural Resources and Mines Explosive Inspectorate agreed that by reducing the concentration of the spilled SSAN material down to less than 45% emulsion with an inert substance such as sand, it would negate the Class 1.1D classification and the collected waste material could be transported as UN2071 Ammonium Nitrate Based Fertiliser.

Recovery

- After confirming with QLD Police & -Fire that the area was safe to re-enter; AECI, Crawfords and QLD Department of Natural Resources and Mines (DNRM) representatives attended the scene to assess the situation and determine how the recovery process would occur.
- This planning also included collaboration with Steer Environmental Consulting (AECI Consultant) to ensure that environmental risks were managed.
- 2 Separate Risk Assessments were conducted.
- One to identify the safe and systematic process for lifting and recovering the trailer and its removal from the scene.
- One to identify the safe and compliant process of cleaning up and recovering the spilled material and ensuring no further environmental harm was sustained.

Remains of the trailer

Remains of the trailer

Note the molten aluminium from the load bin

Removal of trailer remains

– **A 20 ton crane was used to lift the remains of the trailer onto a flatbed to transport to Crawford's Yard in NSW for further investigation.**

Loading of trailer

Safe Product recovery

- As mentioned, it was agreed with authorities that by mixing the contaminated product with an inert substance like sand to below 45% concentration it would negate the 1.1 explosive classification. The agreement was between the local Explosives Inspector and also via telephone by the DNRM Scientific department based in Brisbane.
- 27 tons of fine sand was imported to mix with the 23 tons of Ammonium Nitrate Emulsion.
- An excavator was used to mix the sand into the spilled product and load into the top of trailers for disposal.
- 2 x Trucks (a single and a B-Double) were utilised to collect the waste materials and transport to JJ Richards Regulated Waste Depot in Gladstone.

Product Recovery Pictures

ENVIRONMENT

Environmental Remediation

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Environmental considerations

- In Australia the legislative controls and requirements that governed this incident was the Environmental Protection Act 1994 (EP Act 1994). The Act details the required response and possible legislative actions (penalties, enforcement etc.) in relation to the incident.
- Whilst AECI is responsible from cradle to grave for its products the transport was being conducted under contract by a third party (Crawfords Transport). The primary responsibility to ensure the product was being transported correctly, and in compliance with applicable environmental legislation rests with the transport company.
- However, this did not fully exempt environmental responsibility for this incident for AECI. This responsibility prompted the inclusion of a Specialist Environmental Consulting Firm (STEER) to attend the scene to ensure all requirements of the Department of Environment and Heritage Protection were met during the incident response.

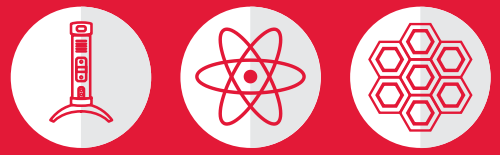
Environmental considerations

To ensure the incident site was returned to a satisfactory condition, the following actions took place:

- **A sump was constructed prior to any clean up operation to ensure that waste water used from the clean up did not leave the immediate site and potentially pollute any nearby waterways or land. This sump however became redundant as the clean up required very little water.**
- **The clean up operation was attended by the legislators who had 2 officers on-scene to ensure that the environmental damage caused by the incident was repaired to an acceptable level**
- **Soil samples were collected in 5 locations in the immediate surrounding area to determine baseline results prior to clean up. Additional sampling was done after 4 weeks time to determine any potential pollution.**
- **The incident site was also monitored over the next few months to ensure there were no ongoing negative environmental impacts on the site.**

Environmental considerations

- Inspection visits were conducted and no significant concerns were noted during any of the inspections.
- AECI conducted an additional final debrief with the appropriate administering agencies, such as the Department of Environment and Heritage Protection and the Department of Natural Resources and Mines (DNRM) Explosives Inspectorate.
- It was confirmed that AECI managed the incident to compliant level, and fully met all responsibilities required by the Australian Environmental Protection Act 1994.



MEDIA

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Media and Social Media

– A Media Statement was drafted within a short period of the incident occurring in preparation of possible media coverage.

– Media coverage was minimum with very little communication observed on social media

INVESTIGATION FINDINGS

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Findings

- No effective warning systems are in place that measure the acceptable wheel temperatures and provide adequate warning to the driver whilst in transit.
- As per the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG) and the Australian Code for the Transport of Explosives by Road and Rail, the Contracted Transporter had equipped the vehicle combination with dry chemical powder (DCP) fire extinguishers to transport dangerous goods. In the case of tyre fires the DCP extinguishers have limited effectiveness in extinguishing or controlling the fire as they did not remove any of the heat sources within the tyre which then leads to re-ignition.
- A review of the service history of the trailer determines that the wheel bearings were not replaced during the life of the trailer. The manufacturer guarantees the use of the bearing for 1,000,000km. The manufacturer does not make any recommendations for the interval to replace the bearing. The Contracted Transporters Maintenance System also does not make any recommendations for the replacement of the bearing based on distance usage. It was found that the trailer travelled a total of approximately 1,042,149km, prior to the mechanical failure.
- It was determined that the trailer travelled a total of approximately 48,226km since the last bearing service where the hub was opened, bearings physically inspected, adjusted and greased. This occurred on the 28/11/17 which is outside the Contracted Transporters Maintenance Schedule.

Origin of the fire

- The fire was most likely caused by excessive friction due to the mechanical failure of a main bearing within the second triaxle group on the trailer.
- Although it was difficult to clearly identify the failure mechanism after the prolonged exposure to fire, a detailed inspection of the second axle found this area as the most likely point of initial failure.
- The initial ignition of the adjacent tyre material was most likely due to the intense direct heat generated from mechanical failure of the bearing, and ejected hot fragments,

359QLU Passenger Side Front Axle

In closing…

Prevent

Preventative inspection & maintenance. Standard of engineering.

Mitigate

Fire extinguishing measures. Routes. Inspection post trip.

Prepare

Know your plan. Accountable persons identified upfront and trained.

Respond

Practice your plan; even at desktop level helps.

Recover

Understand the business impact and plan accordingly.

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Thank you

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