Dangerous Goods Safety Bulletin No. 0320

Safe Storage of Ammonium Nitrate

Background

Western Australia manufactures and imports large amounts of ammonium nitrate (AN). It is predominantly used as a precursor for WA's bulk mining explosives (more than 99%). It is also used as a nitrogen fertiliser.

AN is classified as a Dangerous Good, Division 5.1 (Oxidising Substance). All safety and security aspects of its manufacture, import, transport, storage and use are strictly regulated under the *Dangerous Goods Safety Act 2004*.

Summary of hazard

If stored or handled incorrectly, AN has the potential to inadvertently detonate causing a large overpressure. These events can, and have, caused catastrophic damage to the surrounding area and significant loss of life.

Although this type of event has not happened in Western Australia, there is a long history of these incidents occurring around the world and in other parts of Australia.

Further to the detonation hazard, if exposed to a fire, AN will decompose and emit toxic gases.

Contributory factors

Although pure AN is stable to mechanical shock and does not burn, if exposed to a fire, detonation of the molten AN is a possibility. External fires from surrounding items such as tyres, pallets, building materials, electrics or other combustible materials need to be considered.

Exposure of AN to contaminants can sensitise the AN and increase the potential for detonation. The exposure to oils, wood, plastics, metals or other contaminants greatly diminishes the stability of AN and increases the possibility of detonation.

In the event of AN sensitisation, due to fire or contamination, the probability of detonation is greatly enhanced by confinement.

The consequences of inadvertent detonation also needs to be considered when storing AN. Appropriate buffer zones need to be in place to ensure the safety of the public. To minimise the power of an accidental detonation, packaged AN needs to be segregated into stacks of less than 500 tonnes, with adequate separation distances between the stacks.

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Actions required

Ensure that AN is stored and handled appropriately and in accordance with the *Safe Storage of Solid Ammonium Nitrate – Code of practice*. This code implements six safe-storage principles which must be adhered to at all times:

1. Prevent external fires from reaching the AN by isolating from all combustible materials.
2. Prevent incompatible material and contaminants from mixing with AN.
3. Construct and manage storage locations so that molten/decomposing AN is not confined.
4. Provide an effective emergency response by providing appropriate firefighting equipment, and practicing the evacuation of all persons in case of fire.
5. Separate the AN storage from built-up areas by minimum distances.
6. Ensure security to prevent theft and sabotage.

Additional information

Regulations

For safety and for handling in a port – Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007

For security only – Dangerous Goods Safety (Security Sensitive Ammonium Nitrate) Regulations 2007

Codes of practice

Safe storage of solid ammonium nitrate (2013)
http://www.dmp.wa.gov.au/Documents/Dangerous-Goods/DGS_COP_StorageSolidAmmoniumNitrate.pdf

National guidance notes regarding security requirements

Ammonium nitrate guidance note no. 1 – transport (2005)
http://www.dmp.wa.gov.au/Documents/Dangerous-Goods/DGS_SRS_AmmoniumNitrateGuidanceNoteTransport.pdf

Ammonium nitrate guidance note no. 2 – storage (2004)
http://www.dmp.wa.gov.au/Documents/Dangerous-Goods/DGS_SRS_AmmoniumNitrateGuidanceNoteStorage.pdf

Ammonium nitrate guidance note no. 3 – agricultural use (2005)
http://www.dmp.wa.gov.au/Documents/Dangerous-Goods/DGS_SRS_AmmoniumNitrateGuidanceNoteAgriculturalUse.pdf

Brochure

Safe storage and transport of ammonium nitrate (AN)

http://www.dmp.wa.gov.au/Documents/Dangerous-Goods/DGS_P_AmmoniumNitrate.pdf

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