

Mining and Industry Projects
Dept. of Planning and Infrastructure
GPO Box 39
SYDNEY 2001
Attention: Nicholas Hall – Planner

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Reference: SSD-4986. Proposal for **Incitec Pivot Ammonium Nitrate Manufacturing Facility**

8th October 2012

Dear Nicholas,

This is a submission objecting to the proposed Incitec Pivot Ammonium Nitrate manufacturing facility on Kooragang Island in Newcastle.

I have many concerns about this proposed project. Those concerns include:

1. the health to nearby residents from industrial activities near their homes,
2. the noise levels to those residents,
3. the increased traffic congestion,
4. the impact on resident's financial losses due to lowering house values because of the industrial environment near their homes,
5. the potential for pollution to the Hunter river and,
6. the lack of sustainable fact on the risk from an accidental blast in their plant.

Although I share all the concerns you will receive from residents of the surrounding suburbs, I am not an expert on health, noise, traffic, real estate or, environmental science. I do however take those first 5 points as serious issues requiring the full attention of all government bodies.

I am an expert on Ammonium Nitrate (AN) as an explosive, and it is my concerns at point 6 where I will devote the bulk of my objections to the Incitec proposal.

I have, at different times, held the record for the biggest open-cut blast, and the biggest underground mining blasts in Australia. Indeed I have managed hundreds of million tonne rock blasts over my time in the mining industry as a Manager and Designer of blasting operations for Goldsworthy Mining, MIM Holdings, BHP, Thiess Bros and Orica.

AN, without additives, is just an oxidising agent. However, a 25kg bag of AN can more easily be turned into an explosive (less than two litres of fuel oil, plus a detonator and booster) than a fertiliser (about 400 litres of water, well mixed), which is its other main purpose.

I commence with that fact to dispel any fallacies about how inert AN may be as a product.

Apart from the nuclear tests carried out at Maralinga the biggest blast in Australia's history was at the South Humphrey Iron Ore mine in WA in July 09 where 2.1 ktonnes of emulsion was used to blast 4 million tonnes of solid iron ore from the ground. The AN equivalent to that emulsion would require 2,560 tonnes. The important point from that fact is the much smaller quantity of AN required to create the biggest non-nuclear blast in Australia's history than is expected to be stored by Incitec (12,000 tonnes) in their plant.

I have a real concern that Incitec have been less than genuine with the information in their EIS statement about the risk zone to persons and property from any accidental, or deliberate, blast from within their plant.

Indeed, if I was preparing to blast 12,000 tonnes of properly prepared ANFO (AN mixed with fuel oil) in an industrial area, I would have an evacuation area greater than 10km's. I take pride in having never injured a person or animal in any blast I was responsible for.

Putting that in some perspective, the worst industrial accident in US history only involved 2,300 tonnes of Ammonium Nitrate.

It happened on April 16 in 1947 when a shipload of AN caught fire, apparently by spontaneous combustion, in a Texas port and exploded.

Deaths and injuries from the blast were counted in the thousands. Planes were knocked out of the sky, people were thrown to the ground 16km away in Galveston and windows were broken 60 km away in the main city of Houston.

A nearby ship, (moored 250m away) carrying ammonium nitrate, caught fire from the original blast and that AN cargo also exploded. The shock from the blast was felt 160km away in Louisiana.

Thousands of tonnes of ship's steel were hurled into the air at supersonic speeds. Ship's propellers and anchors that were thrown some km's inland are now on display as memorials at the entrance to Texas City. Residents of Newcastle do not covet industrial accident memorials. Just a reminder that Incitec's proposal is to store more than 5 times the AN volume involved in the Texas City incident.

Ammonium Nitrate, when properly turned into an explosive, has a TNT equivalency of around 82%. The bomb that devastated Hiroshima at the end of WW2 was a 15kt blast, which makes it equivalent to 15,000 tonnes of TNT. That means to cause a blast of Hiroshima intensity an amount of around 18,000 tonnes of ANFO is sufficient.

However, Ammonium Nitrate, when not converted to a design explosive has a TNT equivalency of around 55%. That means 22,000 tonnes of AN would be required to produce a Hiroshima sized blast. The relevance of those facts goes to the Appendix at the conclusion of this submission.

For AN to detonate it does NOT need to be properly mixed as an explosive. The Appendix shows just some of the accidents involving AN, sometimes in its crudest form as a powdered fertilizer, and sometimes in its prilled state, as will be produced by Incitec. AN is more volatile in a prilled state as that configuration is designed to hold oxygen so that any explosion is more intense.

All of those accidents in the Appendix, causing thousands of deaths and injuries, billions of dollars in property damage, and destruction of entire communities are sober warnings of the dangers of AN being in close proximity to people. There is a further cautionary note relating to ALL of those accidents listed. NOT ONE of those accidents involved AN being properly mixed as an explosive. They all involved inadvertent contact between AN and some other catalyst, be it fire, fuel oil, impact or in some disturbing results, as in Toulouse France in 2001, from unknown sources.

Using the accidents listed, and my knowledge of the potential for ignition of AN, some of the areas of concern for any plant and stockpile of AN include:

- Fire in a conveyor or fixed equipment
- Fire in a piece of moving equipment, such as loaders or trucks
- Terrorist incursion
- Disgruntled employee or disturbed member of the public gaining access
- Lightning strike
- Sea flare from passing boat
- Fireworks from harbour side celebrations
- Collateral damage, creating ignition, from incidents at Orica or other nearby plants
- Any incident that causes a domino effect of destruction to any surrounding industrial plants
- Earthquake

That list is not all inclusive. The potential for a risk of explosion should not be limited by the thoughts of any one person.

At full capacity Incitec proposes 350,000 tonnes of AN produced annually. That requires 40 to 50 trucks per day, carrying around 20 tonnes each, to leave the plant. As required each truck would carry signs front and back showing the load to be classified as a Class 5.1 (Oxidising Agent).

However if any truck is involved in a serious accident (roll over or fire) the load converts to a classification of 1.5 Explosive because of contamination by fuel oil, combustible material on the truck such as timber, plastic in truck wiring, or even the seating in the truck cab.

The ERG (Emergency Response Guidelines) dictate that a fire in contaminated AN is NOT to be fought and that evacuation is the correct response. Any fire-fighter will confirm their concerns about the dangers involved with fire on any truck with an AN load. Indeed the truck accidents and consequent explosions listed in the Appendix confirm those dangers. The citizens of Newcastle, the surrounding suburbs, and the suburbs and towns that this product is transported through would need an evacuation plan for any potential accident in the plant, or on route to any mine or other storage facility. It is important to point out that whether accidental, or deliberate tampering with AN is performed, the intensity of any blast could have devastating consequences for the people of Newcastle. A worst case scenario of a 12,000 tonne blast at the front door of Newcastle is the destruction of the city and suburbs with countless deaths and injuries. However, any smaller accident that leads just to destruction of the plant has the potential to spread to the surrounding industrial plants. The city and suburbs of Newcastle would be exposed to clouds, extremely harmful to life, of Nitric Acid, Nitrogen Oxide, Ammonium gas, Nitrogen Dioxide and Hexavalent Chromium just to name a few. The potential for an accident spreading further is easily demonstrated by going to the links in the Appendix. The link to the Texas City (1947) accident confirms the destruction of the nearby Monsanto and Union Carbide industrial complexes. Many of those links confirm that small fires, impact, and contamination, can easily lead to extreme explosions and loss of life in large numbers. The two most common threads involving ALL the accidents listed in the Appendix are:

1. They did not consist of a properly mixed explosive use of AN. They happened unexpectedly without consideration of the often claimed need to turn the AN in to an explosive.
2. They all consisted of relatively small quantities of AN in comparison to what is expected to be manufactured and stored in close proximity to already dangerous levels of storage and manufacture of AN and other hazardous materials on Kooragang Island.

Indeed this proposed project should NOT be allowed.

As a submission maker, I can confirm that I have not made a political donation in the past two years.

Yours Sincerely,

A. A. Richards.

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APPENDIX

AMMONIUM NITRATE EXPLOSIONS

Bryan, TX, United States 2009

A plant in Bryan, TX (El Dorado Chemical Company) which processes ammonium nitrate into fertilizer caught fire at about 11:40 am on July 30, 2009. Over 80,000 residents in the Bryan/College Station area were asked to evacuate south of town due to the toxic fumes this fire generated. Texas A&M University provided shelter at Reed Arena, a local venue on campus. Only minor injuries were reported.

Monclova, Coahuila, Mexico 2007

A trailer loaded with 22 tons of ammonium nitrate crashed into a truck leaving three dead in the crash. A fire then started in the trailer's cabin. About 40 minutes later a huge explosion occurred, resulting in around 150 people injured and 37 more dead. A crater 9.1 m wide and 1.8 deep was created due to the explosion.

Estaca de Bares, Spain 2007

The NPK fertilizer cargo of the ship Ostedijk sustained a self sustained decomposition (SSD) fire for 11 days. The fire plume reached 10 m in diameter and several hundred meters in length. Special water spears were inserted inside the cargo to extinguish the fire.

Ryongchŏn, North Korea, 2004

A freight train carrying ammonium nitrate exploded, killing 162 people and injuring over 3,000 others. The train station was destroyed, as were most buildings within 500 metres, and nearly 8,000 homes were destroyed or damaged. It left two craters of about ten metres in depth.

Mihăilești, Buzău, Romania, 2004

A truck carrying 20 tonnes of ammonium nitrate tipped over on the E85 road at 4.57AM. A fire started in the cabin. Around 5.50 AM the truck exploded, killing 18 and wounding 13 people. The explosion was heard 10km away and formed a crater 6.5 meters deep and 42 meters in diameter.

Barracas, Spain 2004

A truck carrying 25 tonnes of ammonium nitrate fertilizer exploded after a traffic accident, killing two people and injuring three others. The explosion was heard 10 km away, and created a crater five metres deep.

Cartagena, Murcia, Spain 2003

The fertilizer storage facility of Fertiberia held a self sustained decomposition (SSD) fire in January 2003. The fire was controlled after most of the material was removed by mechanical means.

Toulouse, France 2001

On September 21, 2001, at 10:15 AM, in the AZF (factory) (Azote de France) fertiliser factory in Toulouse, France, an explosion occurred in a warehouse where the off-specification granular AN was stored flat, separated by partitions. About 200–300 tons is said to be involved in the explosion, resulting in 31 people dead and 2,442 injured, 34 of them seriously. The blast wave shattered windows up to 3 kilometres away and the resulting crater was 10 metres deep and 50 metres wide. The exact cause remains unknown. The material damage was estimated at 2.3 billion euros.

Port Neal, Iowa 1994

Two explosions at the Iowa ammonium nitrate processing plant killed four people and injured 18 others. Approximately 5,700 tons of anhydrous ammonia was released. The releases of ammonia continued for six days after the explosions. Groundwater under the processing plant was contaminated by chemicals released as a result of the blast.

Papua New Guinea 1994

11 workers were killed when the sensitised AN emulsion plant exploded at the Porgera Gold Mine. The fatal explosion involved at most a few tonnes of explosive. A larger explosion of about 80 tonnes Ammonium Nitrate Emulsion was caused by fires under storage facilities at the site. There were no fatalities in the second explosion as the site had been evacuated. A mushroom cloud was seen to rise. ANE is an emulsion of ammonium nitrate, fuel and water.

Kansas City, Missouri 1988

Two trailers containing approximately 23,000 kg of ammonium nitrate exploded at a construction site. At 4:07 AM one of the "magazines" of explosives caught fire and a catastrophic explosion occurred, killing six firemen instantly — only sparing remains were found. A second blast occurred 40 minutes later. The blasts created two craters, each approximately 30 m wide and 2.4 m deep. The explosions shattered windows within a 16 km area and could be heard 64 km away.

Taroom Qld 1974

In 1974 in Taroom, Queensland, 2 tonnes of ammonium nitrate on a truck caught fire and exploded, killing three people.

Traskwood, Arkansas 1960

On December 17, 1960, a 96 freightcar train suffered partial derailment in which the last 23 cars were derailed. The derailed cars included cars containing oil, liquid fertilizer, fuming nitric acid and fertilizer grade ammonium nitrate. The nitric acid reacted with the fuel oil, creating [ANFO](#) to feed the conflagration, resulting in the spread of the ammonium nitrate around the incident site.

Roseburg, Oregon 1959

A truck carrying dynamite and ammonium nitrate caught fire early in the morning of August 7, 1959. When it exploded it killed 14 people and injured 125 more. Several blocks of downtown Roseburg were destroyed. The accident is locally referred to as "The Blast."

Red Sea 1954

A fire was detected on the cargo ship [Tirrenia](#) while it was carrying 4000 tonnes of ammonium nitrate. Attempts to extinguish the fire were unsuccessful. The ship was abandoned and exploded later in the night.

Brest, France 1947

The cargo ship [Ocean Liberty](#) was loaded with 3300 tonnes of ammonium nitrate and various inflammable products when it caught fire at 12:30 July 28, 1947. The vessel was towed out of the harbour at 14:00, and exploded at 17:00. The explosion caused 29 deaths and serious damage to the port of Brest.

Texas City, United States 1947

The cargo ship [Grandcamp](#) was being loaded on April 16, 1947 when a fire was detected in the hold. 600 tonnes of ammonium nitrate in sacks were already aboard. The ship exploded, killing several hundred people and setting fire to another vessel, the [High Flyer](#), which was moored 250 metres away and which contained 1050 tonnes of [sulfur](#) and 960 tons of ammonium nitrate. The [Grandcamp](#) explosion also created a powerful earthshock and knocked two small planes flying at 460 m out of the sky. The High Flyer exploded the next day, after having burned for sixteen hours. About 500 tonnes of ammonium nitrate on the quayside burned without exploding, probably because it was less tightly packed.

Tessenderlo, Belgium 1942

Another attempt to disaggregate a pile of 150 tonnes of ammonium nitrate with industrial explosives ended tragically on April 29, 1942: several hundred people were killed.

Miramas, France 1940

240 tonnes of ammonium nitrate in sacks exploded after being hit by a shell from fire in a munitions train.

Rouen, France 1940

During a bombing raid on June 5, 1940, a bomb exploded in a warehouse containing ammonium nitrate: the fertilizer was dispersed around the crater, but did not explode.

Muscle Shoals, Alabama 1925

Two carloads, each containing 220 barrels of ammonium nitrate, caught fire in transportation. The barrels had been stored in a warehouse with varying humidity for 6 years. It is believed that they were ignited by friction with their nitrate-impregnated manila paper lining.

Nixon, New Jersey 1924 (Now [Edison Township](#))

On March 1, 1924, a fire and several large explosions destroyed a warehouse containing ammonium nitrate at the Nixon Nitration Works.

Oppau, Germany 1921

An attempt at disaggregation of a fertilizer mix with industrial explosives caused the death of 450 people and the destruction of 700 houses. The fertilizer was a 50:50 mixture of ammonium nitrate and ammonium sulfate. The factory had used this method of disaggregation over 20,000 times without incident. Only 450 tonnes exploded. There were 4,500 tonnes of fertilizer stored at the warehouse.

Kriewald, Germany 1921

Workers tried to dislodge 30 tonnes of ammonium nitrate which had aggregated (solidified into one mass) in two wagons. When explosives were used on this solid mass the wagons exploded and killed nineteen people.

Morgan, New Jersey 1918 (Now Sayreville)

An explosion at the Morgan Depot occurred leading to many artillery shells being launched into the air, some of which landed on a neighbouring warehouse where 4000 tonnes of ammonium nitrate were stored in barrels. One of the shells caused a large explosion, but the majority of the ammonium nitrate did not detonate.