

Ammonia import facility — Kwinana

Report of the Environmental Protection Authority

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Summary

In 1989 Kwinana Nitrogen Company Pty Ltd proposed to import ammonia by ship over the bulk cargo jetty in the Kwinana industrial area. This proposal was considered by the Environmental Protection Authority to be part of an earlier proposal to build an ammonia-urea plant which was approved by the Minister for the Environment in 1988. As such, the Authority agreed that the importation of ammonia could proceed on the basis of compliance with the relevant conditions for the ammonia-urea plant (the construction of which due to economic reasons has been delayed).

The approval was subject to several conditions relating to a plant emergency response plan, a regional emergency response plan and a plan to restrict public access to areas next to the ammonia unloading facility during unloading. The plant emergency response plan has been implemented and the regional plan, which is the Kwinana Integrated Emergency Management System (KIEMS), is being developed.

The plan to restrict public access to areas next to the unloading facility was to be devised and implemented by the nominee of the Minister for Economic Development, to the satisfaction of the Environmental Protection Authority. The Authority required a relatively large public restriction zone, which included the recreational area, Wells Park, during the first two ammonia shipments in 1989. The Authority's requirement was based on concern at the predicted level of risk during the operation, and a belief that emergency response capabilities were inadequate to deal with evacuation of members of the public in the unlikely event of a major incident. As well, the Authority was cognisant of a potential conflict between any spillages or releases of ammonia and use of the nearby Wells Park area for recreation, especially swimming — even of low concentrations of gaseous ammonia.

The exclusion zone raised public concern about the importation, so the Environmental Protection Authority and Kwinana Nitrogen Company Pty Ltd jointly employed a company with expertise in risk assessment, Technica Ltd, to review the risks to the public of ammonia importation. The Authority was to use the results to assess the risk levels to answer the question: "Is public safety adequately protected?"

Subsequent to Technica's report the Authority published, for public comment, Bulletin 502, "Preliminary interpretation of report by Technica Ltd on 'Risk assessment of ammonia import facility, Kwinana'", in March, 1991.

This report by the Authority takes into consideration Technica's advice, public comment received and the Authority's "Criteria for the assessment of risk from industry", Bulletin 611 February, 1992 and finalises its position on the importation of ammonia. The Authority considers that the main issue connected with the ammonia importation is a plan to restrict the public from areas adjacent to the ammonia unloading facility during unloading operations.

The plan for restricting public access has evolved since the first shipment, from that of requiring a relatively large exclusion zone to the present plan of a reduced exclusion zone which includes the Fremantle Port Authority land and the beach area to the west of that land but does not include the Wells Park area. The Authority's acceptance of a change in the exclusion zone requirements is based on the following:

- Technica's advice that the background risk levels (expressed on an annual basis), while relatively high as a consequence of existing industry, are not significantly increased by the ammonia importation;
- Kwinana Nitrogen Company has, within the limitations of the International Maritime Organisation regulations regarding ships, effectively implemented Technica's recommendations; and

- the present plan has additional requirements that in the event of an ammonia spill occurring there is a method to alert people in the Wells Park area of the spill and there is a method of informing people of action that they should take if they are alerted that a spill has occurred.

Whilst the Authority considers that the present plan is effective in maintaining public safety in the Wells Park area, it maintains its position that any development which is likely to attract substantial numbers of people into the buffer zone, including the Wells Park recreational area, is inappropriate. Such developments increase the total number of people potentially affected by an industrial accident and whilst not a major concern with the present numbers of people involved, if the numbers increase further, safety measures may need to be implemented. Additionally, as with Wells Park, there is a need for an increased emergency response capability which is directly proportional to the number who may be affected in an accident.

The Authority's requirements for the plan are summarised below.

A public access restriction plan shall be implemented by the Department of State Development (as the nominee of the Minister for State Development) for future ammonia unloading operations. The plan shall include:

- a method to exclude the public from the Fremantle Port Authority land between CSBP and Wells Park, including the beach to the west of that land, during the unloading of ammonia;
- a method to warn the public should a spill occur; and
- a method to inform people within the Wells Park area of action that they should take in the event of a spill.

The plan shall be in place until the Kwinana Integrated Emergency Management System is operational.

The Authority considers that due to the background risk levels (without the additional risk from ammonia importation) the public should be permanently excluded from the Fremantle Port Authority land between CSBP and Wells Park, including the beach to the west of that land.

The preparation and implementation of the Kwinana Integrated Emergency Management System is in the process of being fulfilled, with the Minister for Emergency Services undertaking the development of the system. The Environmental Protection Authority considers that the Kwinana Integrated Emergency Management System should be implemented as soon as practicable.

1. Introduction

1.1 General

Ammonia is used as a raw material by several industries operating on the Kwinana strip. It is used by CSBP & Farmers Ltd to make fertilisers for the farming community, and ammonium nitrate (an ingredient to make explosives) for the mining industry. It is used by Australian Gold Reagents Pty Ltd to make sodium cyanide used by the gold processing industry and is used by Western Mining Corporation Ltd to refine nickel.

Kwinana Nitrogen Company Pty Ltd manufactures ammonia at Kwinana. Kwinana Nitrogen Company Pty Ltd also imports ammonia. Kwinana Nitrogen Company Pty Ltd estimated that the current demand requires importation of about 150,000 tonnes per year of ammonia (nine shipments per year).

Ammonia is a gas at normal temperatures, but is shipped, transferred and stored at the Kwinana Nitrogen Company Pty Ltd plant as a refrigerated liquid. Kwinana Nitrogen Company Pty Ltd stores most of the ammonia in two storage tanks (of 10,000 and 30,000 tonnes capacity). At high concentrations ammonia can be lethal if inhaled. Because of this, the shipping of ammonia and storage of ammonia create hazards.

To reduce the risks imposed upon the surrounding land by these hazards, the shipping procedures and storage requirements for ammonia have been subjected to a number of checks and balances. These checks and balances included an assessment of the risks for the proposed ammonia-urea plant, for which only the shipping and storage facilities have been built. The risk levels were found to comply with the Environmental Protection Authority's criteria published in Bulletin 278, "Risks and hazards of industrial developments on residential areas in Western Australia".

The checks and balances also included a hazard and operability study (HAZOP) whereby the design of the installation was systematically analysed to minimise the possibility of a leak of ammonia. The HAZOP forms part of a "Hazards Control Plan", developed by Kwinana Nitrogen Company Pty Ltd for the Department of Mines. Ammonia unloading is also controlled by the Fremantle Port Authority.

1.2 Background

In August 1988, CSBP and Norsk Hydro received environmental approval from the Minister for the Environment to develop an ammonia-urea plant at Kwinana. The project involved, in part, the manufacture of ammonia and its export to the world market.

Due to changes in the economics of ammonia, the ammonia-urea project has not commenced. Kwinana Nitrogen Company Pty Ltd subsequently applied to the Authority to activate those parts of the proposal related to ammonia storage and shipping, and to use these facilities to import rather than export ammonia. The Minister agreed that this could proceed on the basis of the conditions set for the ammonia-urea plant.

The Minister for the Environment set three conditions of approval relating to the emergency response plans required to cater for the residual risks from the operation, namely:

- "5. Prior to commissioning the plant, the proponent shall prepare a Plant Emergency Plan to the satisfaction of the Environmental Protection Authority, taking into account all appropriate contingencies. This Plan should conform with requirements of the Kwinana Emergency Plan and the Port Safety Plan.

6. The Government shall prepare and implement, by a date to be determined by the Minister for the Environment, an overall and integrated Kwinana Emergency Plan and an integrated Fremantle Port Safety Management Plan incorporating the Kwinana industrial area and its surrounds. The Port Safety Plan should be compatible and integrated with the Kwinana Emergency Plan.
7. Prior to commissioning the plant, the Government, coordinated by the nominee of the Minister for Economic Development and Trade, shall devise and implement a plan to the satisfaction of the Environmental Protection Authority, restricting access (except to people with adequate protective clothing) within proximity of the proposed loading and off-loading facilities."

Environmental condition 5 requires a plant emergency plan. The company has prepared the plan which has been incorporated into its hazards control plan required by the Department of Mines.

Environmental condition 6 requires an integrated emergency response plan for the Kwinana industrial area and surrounds. The Kwinana Integrated Emergency Management System (KIEMS) is being developed by the Minister for Emergency Services. The Authority has referred to the need for KIEMS in the assessment for every proposed major hazardous industry since 1986, up to and including the proposed Du Pont sodium cyanide plant (1990).

Environmental condition 7 requires a plan to restrict public access to areas next to the ammonia unloading facility during unloading operations. The plan to restrict public access to areas next to the unloading facility was to be devised and implemented by the nominee of the Minister for Economic Development, to the satisfaction of the Environmental Protection Authority. The Authority required a relatively large public restriction zone, which included the recreational area, Wells Park, during the first two ammonia shipments in 1989. The Authority's requirement was motivated by concern at the perceived high level of risk during the operation, and a belief that emergency response capabilities were inadequate to deal with evacuation of members of the public in the unlikely event of a major incident.

The exclusion zone raised public concern about the importation, so the Environmental Protection Authority and Kwinana Nitrogen Company Pty Ltd jointly employed a company with expertise in risk assessment, Technica Ltd, to review the risks to the public of ammonia importation. The Authority was to use the results to assess the risk levels to answer the question "is public safety adequately protected?"

Subsequent to Technica's report the Authority published, for public comment, Bulletin 502, "Preliminary interpretation of report by Technica Ltd on 'Risk assessment of ammonia import facility, Kwinana'", March, 1991 (which included a copy of Technica's report).

The public safety plan, together with public comment have been reviewed by the Environmental Protection Authority. The Authority has finalised its position with regard to ammonia importation.

2. Environmental Protection Authority's position on ammonia importation

The Authority's review identified that the main issue surrounding ammonia importation is a plan to restrict the public from areas next to the ammonia unloading facility during unloading operations. In addition, the Authority identified the further issue of the need for an emergency response plan for the Kwinana industrial area and environs.

2.1 Plan to restrict the public from areas next to the ammonia unloading facility during unloading operations

The plan for restricting public access has evolved since the first shipment, from that of requiring a relatively large exclusion zone to the present plan of a reduced exclusion zone which includes the Fremantle Port Authority land and the beach area to the west of that land but does not include the Wells Park area. The Authority's acceptance of a change in the buffer zone requirements is based on the following:

- Technica's advice that the background risk levels are not significantly affected by the ammonia importation;
- Kwinana Nitrogen Company has, within the limitations of the International Maritime Organisation regulations regarding ships, effectively implemented Technica's recommendations; and
- the present plan has additional requirements that in the event of an ammonia spill occurring there is a method to alert people in the Wells Park area of the spill and there is a method of informing people of action that they should take if they are alerted that a spill has occurred.

Whilst the Authority considers that the present plan is effective in maintaining public safety in the Wells Park area, it maintains its position that any development, which is likely to attract substantial numbers of people into the buffer zone, including the Wells Park recreational area, is inappropriate. Such developments increase the total number of people potentially affected by an industrial accident and whilst not a major concern with the present numbers of people involved, if the numbers increase, further safety measures may need to be implemented. Additionally, as with Wells Park, there is a need for an increased emergency response capability which is directly proportional to the number who may be affected in an accident.

The Authority's requirements for that plan are:

- **a method to exclude the public from the Fremantle Port Authority land between CSBP and Wells Park, including the beach to the west of that land;**
- **a method to warn the public that a spill has occurred; and**
- **a method to inform people within the Wells Park area of action they should take in the event of a spill.**

Implementation of these requirements by Department of State Development has been achieved by:

- the use of a barricade on the beach preventing access;
- the use of the ship's siren as a warning system; and
- the erection of three warning signs on-site together with emergency services personnel handing out pamphlets to people using Wells Park.

The Authority considers that due to the background risk levels (without the additional risk from ammonia importation) the public should be permanently excluded from the Fremantle Port Authority land between CSBP and Wells Park, including the beach to the west of that land.

The Authority is concerned with unloading operations which may occur on a weekend during that period of the year when hot weather can normally be expected (ie November to April inclusive). On the weekends during this period of time greater numbers of people can be expected to use the Wells Park area. The Environmental Protection Authority is liaising with the Department of State Development with regard to the ability of the existing plan to cater for

larger numbers of people. In addition this matter should be addressed in the Kwinana Industrial Emergency Management System (KIEMS).

The Authority considers that it is likely that the key elements of the plan restricting public access will be incorporated in the Kwinana Industrial Emergency Management System, and therefore a separate restriction plan should not be required when KIEMS is operational.

2.2 Emergency response planning for the Kwinana industrial area and environs

While the environmental impact process for hazardous industry proposals ensures that they are built and operated as safely as possible, there is nevertheless an element of residual risk. This can be managed by appropriate on-site emergency plans, and a regional emergency plan. For this reason the Environmental Protection Authority has consistently promoted the concept of a regional emergency plan and a port safety plan. Both of these concepts would be subsumed in the proposed Kwinana Integrated Emergency Management System.

Although the Authority recognises the amount of work that has already been done by government agencies and by Kwinana industry it is of considerable concern to the Authority that KIEMS has not yet become operational. Consequently the Environmental Protection Authority considers that the implementation of KIEMS should be accelerated.

The condition relating to the preparation and implementation of the Kwinana Integrated Emergency Management System (KIEMS) is in the process of being fulfilled with the Minister for Emergency Services undertaking the development of the system.

A list of those people and organisations which made submissions on Bulletin 502 are given in Appendix 1.

Appendix 1

List of those who made written submissions on Bulletin 502

Department of State Development
Town of Kwinana
City of Rockingham
CSBP
Conservation Council
Conservation of Rockingham's Environment (25 signatories)
Brown, S
Corman, K
Cottrell, R & G
Cull, K
Dellow, H W
Dellow, J
Dowd, Y
Dunston, M
Easman
Evans, K
Ferreira, S
Hannah, C
Hare, W
Johnston, H B
Johnston, K
Johnston, P
Julian, B
Lawrence, C
Lawrence, G
Mansfield, L
O'Dwyer, C
O'Dwyer, R L
Oakes, A
Pennell, D
Roy, E
Slade, M & D
Snow, E
Snow, R & S
Snow, S
Sofield, D & A
Thompson, E D
Trolio, B
Veal, A
Veal, M
Vogel, T
Webb, C
Winchester, J
Yeo, C