# Ammonium nitrate importation through the Port of Esperance

ICI Australia Operations Pty Ltd

Report and recommendation of the Environmental Protection Authority

Environmental Protection Authority
Bulletin 443
July 1990

Ammonium nitrate importation through the Port of Esperance

ICI Australia Operations Pty Ltd

Report and recommendation of the Environmental Protection Authority

## **Contents**

		Page
1.	Description of proposal	1
2.	Identification of issues	1
3.	Assessment of impact	1
4.	Conclusions and recommendation	2
Fig	ure	
1.	Locality plan and risk contours	3
App	pendix	
1.	Advice from Department of Mines	

## 1. DESCRIPTION OF PROPOSAL

ICI Australia Operations Pty Ltd has submitted a proposal to the Esperance Port Authority to import a dense grade of ammonium nitrate (known as "NITRAM") from the UK in quantities of 2000 tonnes at a frequency of three times per year. The product would be transported in 1 ton bulka bags. Two ships, each with 2000 tonnes of NITRAM, have left their ports of loading already: one is delayed in Africa, the other is proceeding to Australia.

The ammonium nitrate is needed to fill an Australia-wide shortfall. Esperance is the port preferred by the proponent for imports to service the Kalgoorlie area. Esperance does not have facilities for handling shipping containers (although some ships have container unloading equipment). Thus, it is necessary for the ammonium nitrate to be handled in bulka bags. These bags are made of high strength woven plastic.

The location of the Port to the town of Esperance is shown on Figure 1. The nearest residences are along Williamson Road.

Esperance Port Authority has carried out, through consultants Bureau Veritas, a number of studies on the risks associated with this proposal and earlier proposals to import smaller quantities with different packaging arrangements. Those considered in this assessment are:

- Report No. 904232, June 1990, "Quantitative Assessment of the Risks Associated with the Shipping and Handling of Ammonium Nitrate through the Port of Esperance (1 Ton Bulka Bags Packaging)"
- b) Report No. 887112 (2 volumes), December 1988, "Quantitative Assessment of the Risks Associated with the Shipping and Handling of Ammonium Nitrate through the Port of Esperance"

Additional technical information was supplied by ICI Australia Operations Pty Ltd to the Environmental Protection Authority and the Department of Mines. The proponent has challenged some of the assumptions made in the risk assessment for this proposal. However, the company has not, through discussions and evidence, caused changes to be made by international risk consultants in modelling the risks and hazards associated with handling ammonium nitrate. Nor has the proponent presented the Environmental Protection Authority and the Department of Mines with a revised quantified risk assessment incorporating any revised and agreed assumptions. Accordingly, the Authority has based its report and recommendations on the evidence to hand.

## 2. IDENTIFICATION OF ISSUES

Following discussions among the Government agencies involved and the proponent, it was determined by the Environmental Protection Authority that the proposal has the potential to generate significant levels of risk in residential areas of Esperance. Therefore it was considered appropriate to assess the proposal under Part IV of the Environmental Protection Act at the level of Consultative Environmental Review. The level of risks and hazards associated with importing into Esperance the proposed quantities of ammonium nitrate, in the proposed packaging, and at the proposed frequency, is the only issue of environmental significance associated with the proposal.

#### 3. ASSESSMENT OF IMPACT

In carrying out the assessment, the EPA has sought the advice of the Department of Mines, Explosives and Dangerous Goods Division, which has considerable expertise and experience

in this field. The explosives authority in each State also has a direct role in providing advice to port authorities on the safety aspects of handling hazardous materials in port areas.

The advice sought from and given by the Department of Mines is reproduced as Appendix 1 of this report.

The Environmental Protection Authority raised some specific questions with the Department of Mines, related to the details of the process used by the Authority in assessing the risks from handling of hazardous materials. The first question covered compliance with the risk criteria used by the Authority. These criteria have been published in EPA Bulletin 278, and are as follows:

An individual risk level in residential areas of less than 1-in-a-million deaths per year is so small as to be acceptable to the Authority;

An individual risk level in residential areas exceeding 10-in-a-million deaths per year is so high as to be unacceptable to the Authority;

Where the preliminary risk level in residential areas has been calculated to be in the range of 1 to 10-in-a-million deaths per year, the Authority will call for further evaluation of the risks associated with project. The Authority then may be prepared to recommend that the project is acceptable subject to certain planning and technical requirements.

It is the opinion of the Department of Mines that the proposal does not comply with the individual risk criteria as being "acceptable", nor can it be made acceptable without substantial changes to the quantities being imported and the packaging method.

The Environmental Protection Authority notes that as part of its advice:

"The Department of Mines now reiterates its opinion that the proposed import of ammonium nitrate through the Port of Esperance is not in the interests of public safety "

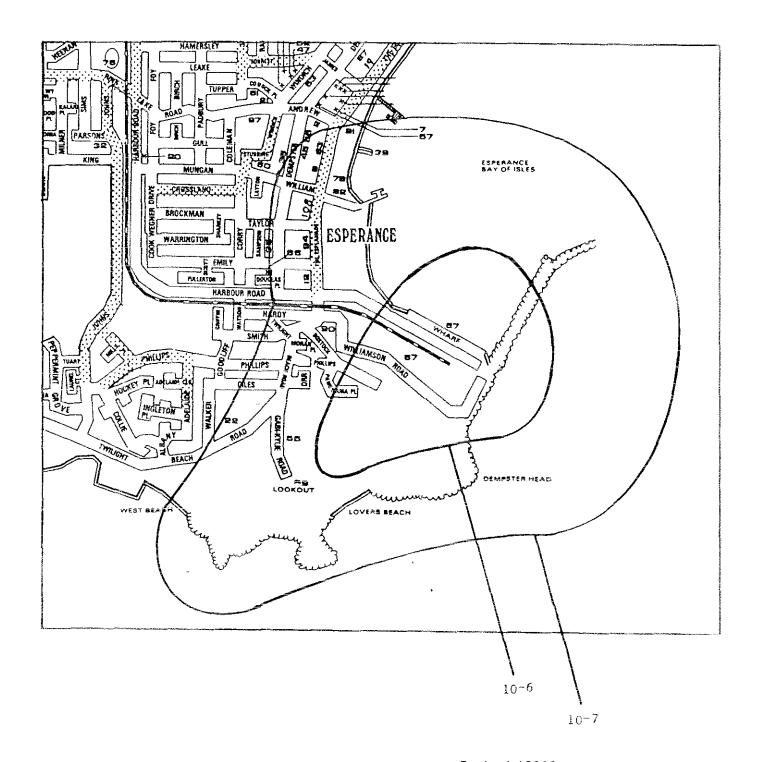
The Authority on the basis of its assessment of the risk consultant's reports also finds that the proposal does not meet the Authority's risk criteria.

The Authority had concerns that the emergency procedures in Esperance would be incapable of effectively dealing with the consequences of a "worst-case" failure. The Authority considers that there is insufficient capability demonstrated to be available in the Esperance area to meet the response scenario indicated by the Department of Mines.

The Authority notes the advice of the Department of Mines that there are alternative ports in Western Australia, such as Broome or Cape Lambert, where an acceptable risk to the public can be maintained and where such similar shipments of ammonium nitrate are currently being imported to Western Australia.

### 4. CONCLUSION AND RECOMMENDATION

The Environmental Protection Authority has concluded that this proposal to import ammonium nitrate through the Port of Esperance is environmentally unacceptable on grounds of unacceptable public risk to urban areas of Esperance and recommends that it not proceed.



Scale 1:18000

Figure 1: Locality Plan and Risk Contours

(Source: Bureau Veritas)

## Appendix 1

Advice from Department of Mines



## DIRECTOR GENERAL OF MINES DEPARTMENT OF MINES

Attention: Chief Inspector

Explosives and Dangerous Goods Division

Your ref: 36/90 DY

Our ref: Enquiries:

#### AMMONIUM NITRATE IMPORTS ESPERANCE

As you have been advised, the Environmental Protection Authority is assessing the above proposal at Consultative Environmental Review level.

I am writing to seek your urgent advice on the following matters:

- In your opinion, does the proposal comply with the individual risk criteria as used by the Environmental Protection Authority? If the proposal falls in the zone 10<sup>-5</sup> to 10<sup>-6</sup> deaths per year at residential areas is it likely that the proposal could be modified sufficiently to reduce the risk to below 10<sup>-6</sup> deaths per year?
- 2. What are the implications of a "worst-case" analysis, particularly in terms of emergency response requirements?
- 3. Can you advise whether, in your opinion, there are other ports in Western Australia which could receive the proposed quantity, as packaged, without unacceptable risk.

You are welcome to raise other matters of relevance to this proposal, should they be pertinent to the Authority's assessment or to your position on the proposal.

I would appreciate that your advice being in a form suitable for publication as an appendix to the Authority's assessment report.

Please contact the undersigned should you wish to discuss this matter further.

R A D Sippe DIRECTOR

**EVALUATION DIVISION** 

Annae

26 July 1990

207AMMONMT:dc

DEPARTMENT OF MINES WESTERN AUSTRALIA

and the second s

# EXPLOSIVES AND DANGEROUS GOODS DIVISION

MINERAL HOUSE

100 PLAIN STREET (CNR ADELAIDE TCE EAST PERTH WA 6004

TELEPHONE

(09) 222 333

TELEGRAMS TELEX "WAMINES" PERT: AA95791 MINEW

FACSIMILE

(09) 222 352

fax received 27.7.90

Chief Executive Officer
Environmental Protection Authority
1 Mount Street

PERTH 6000

36/90 HD:CF

H Douglas

222 3390

Your Ref:

Our Ref:

Enquiries to:

Telephone:

ATTENTION: Rob Sippe

#### AMMONIUM NITRATE IMPORTS, ESPERANCE

Further to your memo of 26 July 1990, concerning the above, the following information and sequence of events are considered pertinent, viz:

- On 22 June 1990, the Esperance Port Authority advised the Department of Mines of its intention to import and off-load through the port 2000 tonne lots of ammonium nitrate (viz Dangerous Goods of Class 5.1 Oxidising Substances, UN No. 2067) from shipments of 4000 tonnes in plastic bulka bags of 1 tonne capacity.
- The Port Authority's intention to import ammonium nitrate is based upon an assessment of hazards and risks associated with the operation prepared by their consultant Bureau Veritas.
- The Department of Mines was given a copy of the consultant's report on 26 June and undertook to have the assessment studied and to report to Esperance Port authority its findings.
- Advice was given to the Port Authority on 29 June 1990 that:-
- (i) a preliminary examination shows the Bureau Veritas report to be based on failure frequency data and a number of assumptions which may underestimate the risks to the public. Even with the failure frequencies used in the report levels of risk still exceed the EPA guidelines (Bulletin 278) of acceptable risk to the public; and

3810

.../2

- (ii) that erroneous assumptions have been made by Bureau Veritas that the proposed operations would be carried out in accordance with the national code of practice i.e. the Association of Australian Port and Marine Authorities for the Safe Transport, Handling and Storage of Dangerous Substances in Port Areas, July 1988, and that adequate preventative measures, including emergency planning, had been implemented in accordance with the rules.
- On 2 July, the Esperance Port Authority responded to the Department of Mines advising that the proposed shipment of ammonium nitrate was already en route to Australia and that the Port Authority has decided to accept the shipment as planned.

The Department of Mines now reiterates its opinion that the proposed import of ammonium nitrate through the Port of Esperance is not in the interest of public safety and that the proposed shipment should be diverted and imported through an alternative port, such as Broome or Cape Lambert, where acceptable risk to the public can be maintained and where such similar shipments of ammonium nitrate are currently being imported to Western Australia.

The same criteria has been applied by the Department of Mines at Esperance as has been used to assess the importation of ammonium nitrate through other Western Australian ports e.g. Bunbury, Geraldton and Kwinana and it is on the basis of compliance with the national code of practice and advice from the Department of Mines that those ports are safely importing their various quantities of ammonium nitrate. It is of concern that should a special case be made for the import of ammonium nitrate through the Port of Esperance then there would be a flow on to the other ports and a resulting decrease in safety standards.

Accordingly, in response to the specific questions raised in your memo, I can advise as follows:

1. In my opinion the proposal does not comply with the individual risk criteria as being "acceptable". The risk to residential areas falls in the zone 10<sup>-5</sup> to 10<sup>-6</sup>. From detailed discussion with the consultants who prepared the risk report, Bureau Veritas have advised that they do not believe that engineering changes are available that will significantly reduce the risks to the public. Only reduction of quantity and packaging, to steel freight containers, is likely to achieve a reduction to below 10<sup>-6</sup> deaths per year;

- 2. The worst case simulation of failures shows a plume of toxic gas, 11.3 km long, in contact with the ground causing a 65% fatality rate for any members of the public who are in that plume. The plume could affect the whole of Esperance. For emergency planning criteria it would be appropriate to have in place plans for the complete evacuation of Esperance in less than 30 minutes. Also because of the latency in response to exposure to NO<sub>X</sub>, hospital standard monitoring is recommended for all evacuees for a period of 48 hours after evacuation. Even with such plans for evacuation in place adequate numbers of BA equipped response personnel should be in place for assistance to the public.
- 3. Yes, it is believed that such shipments can be received (and are currently being received) in other ports of Western Australia, for example Broome and at Cape Lambert, without unacceptable risk to public safety.

H Douglas

danny Danylas

27 July 1990

EX549WAP326