

# Ammoniakutsläpp från ett oljeraffinaderi

960924

I ett mycket trångt utrymme var tre operatörer verksamma med att lossa skruvar till en fläns. I det trånga utrymmet förefaller det vara som om man oavsiktligt kommit åt att öppna en ventil varvid ammoniak släppts ut. 3,8 ton ammoniak släpptes ut under 5,5 timmar. Då utsläppet upptäckts tillkallas räddningstjänsten och ammoniakångorna förhindras sprida sig ytterligare med hjälp av vattengardiner.

## Inblandade ämnen och mängder

	CAS Nr.	Mängd
ammoniak	7664-41-7	okänt

## Skador:

**Människor:** Elva personer blev förgiftade, varav 8 var anställda och tre från räddningstjänsten. Två av de anställda blev allvarligt skadade.

**Materiella:** Inga skador.

**Miljö/ekologi:** Inga effekter rapporterade.

**Infrastruktur:** Inga effekter.

## Erfarenheter redovisade (Ja/Nej): Ja

Kortfattat anges förebyggande åtgärder

## Report Profile

### Identification of Report:

country: FA ident key: 1800\_079\_01

reported under Seveso I directive as major accident reports: SHORT+FULL

### Date of Major Occurrence: Time of Major Occurrence

start: 24/09/1996 start: 08:30:00

finish: 24/09/1996 finish:

### Establishment:

name:

address:

industry: 2002 petrochemical, refining, processing

refinery

Seveso II status: not applicable: Yes art. 6 (notification): No

art. 7 (MAPP): No

art. 9 (safety report): No

### Date of Report:

short: full:

### Authority Reporting:

name:

address:

### Authority Contact:

**rep\_cont\_name:**

**rep\_cont\_phone:**

**rep\_cont\_fax:**

**Additional Comments:**

a) - not applicable -

b) - not applicable -

c) - not applicable -

d) - not applicable -

e) - not applicable -

## Short Report

**country:** FA **ident key:** 1800\_079\_01

**Accident Types:**

**release:** Yes **explosion:** No

**water contamination:** No **other:** No

**fire:** No

**description:**

release of ammonia which intoxicated 11 persons (8 employees of which 2 were intoxicated (injured) seriously and 3 fire-fighters)

**Substance(s) Directly Involved:**

**toxic:** Yes **explosive:** No

**ecotoxic:** No **other:** No

**flammable:** No

**description:**

ammonia (CAS 7664-41-7)

**Immediate Sources of Accident:**

**storage:** No **transfer:** No

**process:** Yes **other:** No

**description:**

(anhydrous) ammonia dissolving (dilution) column employed to prepare the (10%) ammonia (solution) employed for its corrosion inhibiting characteristics during the (crude) oil refining process. The release occurred in correspondence of two ... see Appendix Short Report / description of immediate sources

**Suspected Causes:**

**plant or equipment:** Yes **environmental:** No

**human:** Yes **other:** No

**description:**

probably the bad ergonomics of the place: during the unscrewing (loosening) of the bolts fixing the flanges, in a very cramped (small) space, one of the operators (workers) may have untimely (wrongly) opened one of the 1/4 turn valves isola... see Appendix Short Report / description of suspected causes

## **Immediate Effects:**

**material loss:** No

**human deaths:** No

**human injuries:** Yes **community disruption:** No

**other:** No

**ecological harm:** No

**national heritage loss:** No

### **description:**

3,8 tonnes ammonia were released during 5 and a half hours (5,5 hours, 5,5h). The cloud stays (is confined) inside the establishment. 11 persons are affected or intoxicated (8 employees of which 2 were intoxicated (injured) seriously and 3 ... see Appendix Short Report / description of immediate effects

## **Emergency Measures taken:**

**on-site systems:** Yes **decontamination:** No

**external services:** No **restoration:** No

**sheltering:** No **other:** No

**evacuation:** No

### **description:**

Use of water and specifically for water curtains in order to abate the pollution (polluting substances - ammonia)

## **Immediate Lessons Learned:**

**prevention:** Yes **other:** No

**mitigation:** No

### **description:**

interruption of the use of liquefied (anhydrous) ammonia: the site (establishment) is directly supplied with a 30% ammonia solution produced externally (ofsite)

# **A Occurrence Full Report**

**country:** FA **ident key:** 1800\_079\_01

## **1 Type of Accident**

**remarks:** the release occurred due to a valve opened by error

## **2 Dangerous Substances**

**remarks:** - not applicable -

## **3 Source of Accident**

**illustration:** a short written report on the accident is annexed

**remarks:** the release occurred in an installation for the dilution of anhydrous ammonia into a 10% ammonia solution employed in order to limit (reduce) the corrosion during the distillation of petrol (crude oil). This release occurred on one (or two ... see Appendix Full Report A / source of accident

- remarks

## 4 Meteorological Conditions

**precipitation none: fog: rain: hail: snow:**

Yes No No No No

**wind speed (m/s):**

**direction (from):**

**stability (Pasquill):**

**ambient temperature (°C):**

**remarks:** - not applicable -

## 5 Causes of Major Occurrence

**main causes**

**technical / physical** - not applicable -

- not applicable -

- not applicable -

- not applicable -

- not applicable -

**human / organizational** 5309 organization: user-unfriendliness (apparatus, system, etc.)

- not applicable -

- not applicable -

- not applicable -

- not applicable -

**remarks:** the space were the workers (operators) were working was very reduced (3 cubic metres -

3m<sup>3</sup>). During the effort (attempt) to unscrew the bolts of a flange, they may have

unfortunately (accidentally) opened the valves isolating the unit (equ... see Appendix

Full Report A / causes of major occurrence

## 6 Discussion about the Occurrence

- not applicable -

**Type of Accident** country: FA ident key: 1800\_079\_01

**event:**

**major occurrence** 1101 release: gas/vapour/mist/etc release to air

**initiating event** - not applicable -

**associated event** - not applicable -

## Dangerous substances

country: FA ident key: 1800\_079\_01

### a) total establishment inventory

**CAS number:** 7664-41-7 **identity:** anhydrous ammonia

**name from Seveso I Directive:** - not applicable -

**name from Seveso II Directive:** - not applicable -

**category from Seveso II:** toxic

**other hazards (1):** flammable liquids

other hazards (2): - not applicable -

maximum quantity (tonnes): -1

use of substance as: - not applicable -

**b) substance belongs to relevant inventory directly involved:** Yes

actual quantity: 38 potential quantity: -1

**c) substance belongs to relevant inventory indirectly involved:** No

actual quantity: 0 indir\_pot\_quant: 0

**Source of Accident - Situation** country: FA ident key: 1800\_079\_01

### situation

industry

initiating event - not applicable -

associated event - not applicable -

activity/unit

major occurrence 3102 process: chemical continuous reaction

initiating event - not applicable -

associated event - not applicable -

component

major occurrence 4004 container; pressurised (bullet, sphere, cylinder, etc.)

initiating event - not applicable -

associated event - not applicable -

## B Consequences Full Report

country: FA ident key: 1800\_079\_01

### 1 Area concerned

affected

extent of effects installation: Yes

establishment: Yes

off-site; local: No

off-site; regional: No

off-site; transboundary: No

illustration of effects - not applicable -

remarks the ammonia cloud remained onsite the establishment, a computer model allowed to... see Appendix

Full Report B / area concerned - remarks

### 2 People

establishment popul. emergency personnel off-site population

total at risk 8 -1 -1

immediate fatalities -1 -1 -1

subsequent fatalities 0 0 0

hospitalizing injuries 2 0 0

other serious injuries 0 0 0

health monitoring 6 3 0

remarks - not applicable -

### 3 Ecological Harm

**pollution/contamination/damage of:**

- residential area (covered by toxic cloud) No
- common wild flora/fauna (death or elimination) No
- rare or protected flora/fauna (death or elimination) No
- water catchment areas and supplies for consumption or recreation No
- land (with known potential for long term ecological harm or preventing human access or activities) No
- marine or fresh water habitat No
- areas of high conservation value or given special protection No

remarks - not applicable -

### 4 National Heritage Loss

**effects on:**

- historical sites None - historic monuments None
- historic buildings None - art treasures None

remarks - not applicable -

### 5 Material Loss

**establishment losses off site losses**

**costs (direct costs to operator) (social costs)**

**in ECU FFR ECU FFR**

**material losses -1 -1 -1 -1**

**response, clean up, restoration -1 -1 -1 -1**

remarks - not applicable -

### 6 Disruption of Community Life

**establishment/plant evacuated disabled/unoccupiable destroyed**

- nearby residences/hotels No No No
- nearby factories/offices/small shops No No No
- schools, hospitals, institutions No No No
- other places of public assembly No No No

**interruption of utilities etc. no / yes duration**

- gas No
- electricity No
- water No
- sewage treatment works No

- telecommunications No

- main roads No

- railways No

- waterways No

- air transport No

significant public concern none local level national level

- off site populations Yes No No

- media interest Yes No No

- political interest Yes No No

remarks - not applicable -

## 7 Discussion of Consequences

- not applicable -

# C Response Full Report

country: FA ident key: 1800\_079\_01

## 1 Emergency Measures

taken - on site - not applicable - - not applicable -

- not applicable - - not applicable -

- not applicable - - not applicable -

- off site - not applicable - - not applicable -

- not applicable - - not applicable -

- not applicable - - not applicable -

still - on site - not applicable - - not applicable -

required

- not applicable - - not applicable -

- not applicable - - not applicable -

- off site - not applicable - - not applicable -

- not applicable - - not applicable -

- not applicable - - not applicable -

continuing contamination or danger

-on site not applicable

-off site not applicable

remarks - not applicable -

## 2 Seveso II Duties

pre-accident evaluation

Article item not due yet not done done/submitted evaluated

6 notification No No No No

7 policy (MAPP) No No No No

9 safety report No No No No

9, 10, 11 update No No No No

11 internal plan No No No No

11 external plan No No No No

13 informing public No No No No

9, 12 siting policy No No No No

post-accident evaluation

Seveso II duty was actual were actual compared with actual

contingency consequences consequences, the

addressed? addressed? predicted extent was?

Article item

7 policy (MAPP) not applicable not applicable not applicable

9 current safety report not applicable not applicable not applicable

11 internal plan not applicable not applicable not applicable

11 external plan not applicable not applicable not applicable

13 informing public not applicable not applicable not applicable

9, 12 siting policy not applicable not applicable not applicable

evaluation of safety organisation

organisational element element existed did element relate to actual circumstances of

yes / no no / partly / yes adequate?

- written policy objectives No

- specified management No

structure

- specified responsibilities No

- specified working procedures No

- specified procedures for No

assessment/auditing of

management system

- specified procedures for No

review and update of

management policy

- specified general training No

procedures

- specified emergency No

training procedures

evaluation of ecological impact control

organisational element element existed did element relate to actual circumstances of

yes / no no / partly / yes adequate?

- ecological status review No

before incident



- potential ecological No

consequences assessment

- ecological impact review No

after incident

- ecological restoration No

procedures

- subsequent review of No

restoration success

remarks - not applicable -

### **3 Official Action Taken**

legal action

- not applicable -

other official action

- not applicable -

### **4 Lessons Learned**

measures to prevent recurrence

use of less hazardous techniqu... see Appendix Full Report C / lesson learned - prevent

measures to mitigate consequences:

no information is given

useful references:

no information is given

### **5 Discussion about Response**

- not applicable -

## **Appendices for the FA / 1800\_079\_01 report**

### **Appendix Short Report / description of immediate sources:**

(anhydrous) ammonia dissolving (dilution) column employed to prepare the (10%) ammonia (solution) employed for its corrosion inhibiting characteristics during the (crude) oil refining process. The release occurred in correspondence of two flanges which were being made loose.

### **Appendix Short Report / description of suspected causes:**

probably the bad ergonomics of the place: during the unscrewing (loosening) of the bolts fixing the flanges, in a very cramped (small) space, one of the operators (workers) may have untimely (wrongly) opened one of the 1/4 turn valves isolating the unit (equipment) under maintenance from the units located upstream and containing the ammonia

### **Appendix Short Report / description of immediate effects:**

3,8 tonnes ammonia were released during 5 and a half hours (5,5 hours, 5,5h). The cloud stays (is confined) inside the establishment. 11 persons are affected or intoxicated (8 employees of which 2 were intoxicated (injured) seriously and 3 fire-fighters)

### **Appendix Full Report A / source of accident - remarks:**

the release occurred in an installation for the dilution of anhydrous ammonia into a 10% ammonia solution employed in order to limit (reduce) the corrosion during the distillation of petrol (crude oil). This release occurred on one (or two ) 1/4 turn valves isolating the dissolving column from a tank of 7 cubic metres (m3) of capacity (containing 3,8 tonnes of liquefied ammonia under 8 bars of pressure at the time of the accident)

### **Appendix Full Report A / causes of major occurrence:**

the space where the workers (operators) were working was very reduced (3 cubic metres - 3m3). During the effort (attempt) to unscrew the bolts of a flange, they may have unfortunately (accidentally) opened the valves isolating the unit (equipment) on which they were working from the tank containing the liquefied ammonia.

### **Appendix Full Report B / area concerned - remarks:**

the ammonia cloud remained onsite the establishment, a computer model allowed to estimate the length (size) of the cloud: approx. 60 metres

**Appendix Full Report C / lesson learned - prevent:**

use of less hazardous techniques (processes, systems), in this case the use of an ammonia solution (ready for use) instead of liquefied (anhydrous) ammonia

IN MY OPINION THE AMMONIA SOLUTION IS NOT READY FOR USE BEING A 30% SOLUTION AND NOT A 10% SOLUTION AS USED IN THE PETROL REFINING PROCESS