

Ammoniakutsläpp från en kemikaliefabrik.

880823 MARS 1988_17

En ventil stod felaktigt öppen av okänt skäl och ledde till att en tank med ammoniaklösning svämmade över. Ammoniaklösningen rann via avloppssystemet ut i en flod där halter på 25mg ammoniak per liter vatten uppmättes. Tillåten nivå var 15 mg/l. Man misstänker att de aftiska halterna kan ha varit ännu högre.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
ammoniaklösning (3%)	7664-41-7	30 ton

Skador:

Människor:	Inga.
Materiella:	Inga.
Miljö/ekologi:	Ammoniaklösningen rann ut i den närliggande Bormidafloden. Inga närmare studier företogs på effekterna av föroreningen.
Infrastruktur:	Inga.

Erfarenheter redovisade (Ja/Nej): Ja

Kortfattat anges förebyggande åtgärder.

Report Profile

Identification of Report:

country: FA ident key: 1988_017_01

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

Date of Major Occurrence: Time of Major Occurrence

start: 1988-08-23 start: 04:00:00

finish: finish:

Establishment:

name:

address:

industry: 2001 general chemicals manufacture

Organic Chemical (Chemical Intermediates and Dyes Production)

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:** 1988_017_01

Accident Types:

release: No **explosion:** No

water contamination: Yes **other:** No

fire: No

description:

On August 23, 1988 during a period in which the plant was out of operation as requested by the authority the 23/07/88, a certain quantity of an aqueous ammonia solution flowed in the water drain network of the establishment and through it ... see Appendix Short Report / description of accident types

Substance(s) Directly Involved:

toxic: Yes **explosive:** No

ecotoxic: Yes **other:** No

flammable: No

description:

- Ammonia Solution [3%] (C.A.S. CODE: 7664-41-7, E.E.C. CODE: 007-001-00-5): amount involved = 30,000 kg.

Immediate Sources of Accident:

storage: Yes **transfer:** No

process: Yes **other:** No

description:

The accident occurred in the amination plant of an organic chemical industry (for intermediate and dyes production) during a period in which the plant was out of operation upon the request of the authority. The amination plant was put out ... see Appendix Short Report / description of immediate sources

Suspected Causes:

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

human: No **other:** No

description:

INITIATING EVENT AND CONSEQUENCES:... see Appendix Short Report / description of suspected causes

Immediate Effects:

material loss: No

human deaths: No

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

other: Yes

ecological harm: Yes

national heritage loss: No

description:

ECOLOGICAL HARM:... see Appendix Short Report / description of immediate effects

Emergency Measures taken:

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

external services: Yes **restoration:** No

sheltering: No **other:** No

evacuation: No

description:

INTERNAL TO THE ESTABLISHMENT:... see Appendix Short Report / description of emergency measures taken

Immediate Lessons Learned:

prevention: Yes **other:** No

mitigation: No

description:

MEASURES TO PREVENT ANY RECURRENCE OF SIMILAR ACCIDENTS:... see Appendix Short Report / description of

immediate lessons learned

A Occurrence Full Report

country: FA **ident key:** 1988_017_01

1 Type of Accident

remarks: The accidental opening of the pneumatic valve (air-open type) with immission of water in the scrubber tower which collected the releases of the safety valves of the amination autoclaves, led to the release of an ammonia solution from tank S... see Appendix Full Report A / type of accident

2 Dangerous Substances

remarks: The total establishment and the potential directly involved inventories of the ammonia solution 3% refer to the amount released during the accident. It was not possible to evaluate the concentration of ammonia released into the Bormida riv... see Appendix Full Report A / dangerous substances

3 Source of Accident

illustration: - not applicable -

remarks: The accident occurred in the amination plant of an organic chemical industry (for intermediate and dyes production) during a period in which the plant was out of operation upon the request of the authority (code 2001). The amination plant ... see Appendix Full Report A / source of accident -
remarks

4 Meteorological Conditions

precipitation none: fog: rain: hail: snow:

No 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 5102 operation: component/machinery failure/malfunction

- not applicable -

- not applicable -

- not applicable -

- not applicable -

human / organizational 5307 organization: process analysis (inadequate, incorrect)

5308 organization: design of plant/equipment/system (inadequate, inappropriate)

- not applicable -

- not applicable -

- not applicable -

remarks: The accidental opening (code 5102) of the pneumatic valve (air-open type) with immission

of water in the scrubber tower which collected the releases of the safety valves of the

amination autoclaves, led to the release of an ammonia solution... see Appendix Full

Report A / causes of major occurrence

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA ident key: 1988_017_01

event:

major occurrence 1103 release: fluid release to water

initiating event 1103 release: fluid release to water

associated event - not applicable -

Dangerous substances

country: FA ident key: 1988_017_01

a) total establishment inventory

CAS number: 7664-41-7 **identity:** Ammonia Solution 3%

name from Seveso I Directive: - not applicable -

name from Seveso II Directive: - not applicable -

category from Seveso II: - not applicable -

other hazards (1): - not applicable -

other hazards (2): - not applicable -

maximum quantity (tonnes): 30

use of substance as: NORMAL FINISHED PRODUCT

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 30 **potential quantity:** 30

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 **indir_pot_quant:** -1

Source of Accident - Situation **country:** FA **ident key:** 1988_017_01

situation

industry

initiating event 2001 general chemicals manufacture

associated event - not applicable -

activity/unit

major occurrence 3201 storage: process-associated (stockholding, etc. on-site of manufacture)

initiating event 3201 storage: process-associated (stockholding, etc. on-site of manufacture)

associated event - not applicable -

component

major occurrence 4003 container; non-pressurised (hopper, tank, drum, bag, etc.)

initiating event 4003 container; non-pressurised (hopper, tank, drum, bag, etc.)

associated event - not applicable -

B Consequences Full Report

country: FA **ident key:** 1988_017_01

1 Area concerned

affected

extent of effects installation: Yes

establishment: Yes

off-site; local: Yes

off-site; regional: No

off-site; transboundary: No

illustration of effects - not applicable -

remarks Ammonia levels of 25 mg/l (maximum allowable value was 15 mg/l) were measured by... see Appendix

Full Report B / area concerned - remarks

2 People

establishment popul. emergency personnel off-site population

total at risk

immediate fatalities

subsequent fatalities

hospitalizing injuries

other serious injuries

health monitoring

remarks No people were injured because the leakage of the ammonia solution did not occur... see Appendix

Full Report B / people

3 Ecological Harm

pollution/contamination/damage of:

- **residential area (covered by toxic cloud)** Suspected

- **common wild flora/fauna (death or elimination)** Yes

- **rare or protected flora/fauna (death or elimination)** Suspected

- **water catchment areas and supplies for consumption or recreation** Yes

- **land (with known potential for long term ecological harm or** Suspected

preventing human access or activities)

- **marine or fresh water habitat** Suspected

- **areas of high conservation value or given special protection** Suspected

remarks Ammonia levels of 25 mg/l (maximum allowable value was 15 mg/l) were measured by... see Appendix

Full Report B / ecological harm

4 National Heritage Loss

effects on:

- **historical sites** not applicable - **historic monuments** not applicable

- **historic buildings** not applicable - **art treasures** not applicable

remarks No data available.

5 Material Loss

establishment losses off site losses

costs (direct costs to operator) (social costs)

in ECU ECU

material losses

response, clean up, restoration

remarks No material losses occurred except the released ammonia solution.... see Appendix Full Report B

/ material loss

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** No Yes No

- **media interest** No No No

- **political interest** No No No

remarks In the Original Report there is no evidence of significant effects outside the e... see Appendix

7 Discussion of Consequences

Ecological Components involved

country: FA **ident key:** 1988_017_01

type: 6204 freshwater: river

threatened: not applicable **affected:** Yes

C Response Full Report

country: FA **ident key:** 1988_017_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

After the accident, the follow... see Appendix Full Report C / lesson learned - prevent

measures to mitigate consequences:

- not applicable -

useful references:

- not applicable -

5 Discussion about Response

- not applicable -

Appendices for the FA / 1988_017_01 report

Appendix Short Report / description of accident types:

On August 23, 1988 during a period in which the plant was out of operation as requested by the authority the 23/07/88, a certain quantity of an aqueous ammonia solution flowed in the water drain network of the establishment and through it to the Bormida's river. The overflow occurred in the storage tank SR-41 collecting a 3% aqueous ammonia solution from the amination plant. At 04:30 a.m. the high level alarm of tank SR-41 sounded. The operators intervened and identified the cause of the malfunction, eliminating it at about 06:30 a.m. The overflow of ammonia was caused by the opening (it is not yet fully clear how it could have happened) of the pneumatic valve FV-1 that was feeding with water the scrubber tower which treats releases from the safety valves of the amination autoclaves. During the event neither gaseous release nor damage to people and properties occurred. Ammonia levels of 25 mg/l (maximum allowable value was 15 mg/l) were measured by U.S.L. N° 7 in the effluent of the plant. Probably, these levels should have been higher because in the Bormida's river (where the effluent of the plant was diluted in a 1:1 ratio) have been measured concentrations of ammonia up to 70 mg/l. The effects on the aquatic life and on the use of contaminated water have not been evaluated because a continuous monitoring has not been carried out.

Appendix Short Report / description of immediate sources:

The accident occurred in the amination plant of an organic chemical industry (for intermediate and dyes production) during a period in which the plant was out of operation upon the request of the authority. The amination plant was put out of operation on July 5 and the plant shut-down was completed on July 11. The component involved was the 50 m3 storage tank SR-41 for the ammonia solution (3%) of the amination plant.

Appendix Short Report / description of suspected causes:

INITIATING EVENT AND CONSEQUENCES:

The accidental opening of the pneumatic valve (air-open type) with immission of water in the scrubber tower which collected the releases of the safety valves of the amination autoclaves, led to the release of an ammonia solution from tank SR-41.

CAUSES:

The water feeding to the scrubber tower was controlled by the pneumatic valve FV-1 that received the opening signal by the flow and pressure sensors positioned on the draining pipes to the tower. As the water gathered on the bottom of the scrubber tower reached a pre-fixed level, the electrical pump PC-2 started sending water into the tank SR-41 via the intermediate tank SA-11b. When the accident occurred, the valve FV-1 was positioned on "AUTO" and the autoclaves were opened and empty. A flow meter set-point was wrongly positioned to the maximum sensitivity and it could have caused, for a not clear reason, the opening of the valve with immission of water in the scrubber tower. Due to an inadequate process analysis and plant design, the overflow piping from tank SR-41 was connected to drain network of the establishment and the ammonia solution, through it, was released into the Bormida's river. About 30 m³ of ammonia solution overflowed during two hours. It was not possible to evaluate the concentration of ammonia released into the river because it was unknown the quantity of 3% solution diluted with water initially contained in the tank.

Appendix Short Report / description of immediate effects:

ECOLOGICAL HARM:

Ammonia levels of 25 mg/l (maximum allowable value was 15 mg/l) were measured by U.S.L. N° 7 in the effluent of the plant. Probably, these levels should had been higher because in the Bormida's river (where the effluent of the plant was diluted in a 1:1 ratio) have been measured concentrations of ammonia up to 70 mg/l.

The effects on the aquatic life and on the use of contaminated water have not been evaluated because a continuous monitoring has not been carried out.

OTHER:

No material losses occurred except the released ammonia solution.

Appendix Short Report / description of emergency measures taken:

INTERNAL TO THE ESTABLISHMENT:

When the high level alarm in tank SR-41 sounded (about two hours after the release had started), the operators intervened and the ammonia solution released was stopped.

EXTERNAL TO THE ESTABLISHMENT:

The levels of ammonia were measured by U.S.L. N° 7 in the effluent of the plant.

Appendix Short Report / description of immediate lessons learned:

MEASURES TO PREVENT ANY RECURRENCE OF SIMILAR ACCIDENTS:

After the accident, the following measures were established:

- 1- to convey into a biological well the overflow piping from the tank SR-41;
- 2- to convey into a biological well the delivery side of the pump PC2B in case of intervention of the flow and pressure sensors installed on the discharge pipings of the safety valves.

The above mentioned modifications are shown on a map attached to the Original Report.

Appendix Full Report A / type of accident:

The accidental opening of the pneumatic valve (air-open type) with immission of water in the scrubber tower which collected the releases of the safety valves of the amination autoclaves, led to the release of an ammonia solution from tank SR-41. As the overflow piping from tank SR-41 was connected to drain network of the establishment, the ammonia solution, through it, was released into the Bormida's river (code 1103). No gaseous release occurred.

Appendix Full Report A / dangerous substances:

The total establishment and the potential directly involved inventories of the ammonia solution 3% refer to the amount released during the accident. It was not possible to evaluate the concentration of ammonia released into the Bormida river because it was unknown the quantity of 3% solution diluted with water initially contained in the tank.

Appendix Full Report A / source of accident - remarks:

The accident occurred in the amination plant of an organic chemical industry (for intermediate and dyes production) during a period in which the plant was out of operation upon the request of the authority (code 2001). The amination plant was put out of operation on July 5th and the plant shut-down was completed on July 11st. The component involved was the 50 m³ storage tank SR-41 for the ammonia solution (3%) of the amination plant (codes 3201 and 4003).

Appendix Full Report A / causes of major occurrence:

The accidental opening (code 5102) of the pneumatic valve (air-open type) with immission of water in the scrubber tower which collected the releases of the safety valves of the amination autoclaves, led to the release of an ammonia solution from tank SR-41. Due to an inadequate process analysis and plant design (codes 5307 and 5308), the overflow piping from tank SR-41 was connected to drain network of the establishment and the ammonia solution, through it, was released into the Bormida's river.

Appendix Full Report B / area concerned - remarks:

Ammonia levels of 25 mg/l (maximum allowable value was 15 mg/l) were measured by U.S.L. N° 7 in the effluent of the plant. Probably, these levels should had been higher because in the Bormida's river (where the effluent of the plant was diluted in a 1:1 ratio) have been measured concentrations of ammonia up to 70 mg/l. The effects on the aquatic life and on the use of contaminated water have not been evaluated because a continuous monitoring has not been carried out.

Appendix Full Report B / people:

No people were injured because the leakage of the ammonia solution did not occur in a gaseous release.

Appendix Full Report B / ecological harm:

Ammonia levels of 25 mg/l (maximum allowable value was 15 mg/l) were measured by U.S.L. N⁻ 7 in the effluent of the plant. Probably, these levels should had been higher because in the Bormida's river (where the effluent of the plant was diluted in a 1:1 ratio) have been measured concentrations of ammonia up to 70 mg/l. The effects on the aquatic life and on the use of contaminated water have not been evaluated because a continuous monitoring has not been carried out.

Appendix Full Report B / material loss:

No material losses occurred except the released ammonia solution.

Appendix Full Report B / disruption of community life:

In the Original Report there is no evidence of significant effects outside the establishment, except the release of the ammonia solution into the Bormida river. In any case the effects on the aquatic life and on the use of contaminated water had not been evaluated because a continuous monitoring had not been carried out.

Appendix Full Report C / lesson learned - prevent:

After the accident, the following measures were established:

1- to convey into a biological well the overflow piping from the tank SR-41;

2- to convey into a biological well the delivery side of the pump PC2B in case of intervention of the flow and pressure sensors installed on the discharge pipings of the safety valves.

The above mentioned modifications are shown on a map attached to the Original Report.