

Utsläpp av ammoniak och fosgen på en kemikaliefabrik.

910728 MARS 1991_07

En alifatisk syra fosgenerades vid 110°C och atmosfärstryck i en satsvis reaktor. Doseringsanordningen fallerade och fosgen tillfördes snabbare än tillrådligt. Reaktorn svämmade över och spillet spreds i byggnaden. Larmet utlöstes och de föreskrivna nödåtgärderna genomfördes. En vägg restes för att separera reaktorn från den övriga byggnaden. Luften i byggnaden drogs ut genom luftsugget och tvättades i en ammoniaklösning för att neutralisera fosgenen. En vattengardin användes för att späda ut det bildade molnet av fosgen och ammoniak.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
ammoniak	7664-41-7	25 kg
fosgen	75-44-5	okänt

Skador:

Människor: 4 personer skadades av giftutsläppet.
Materiella: Inga.
Miljö/ekologi: Inga effekter rapporterade.
Infrastruktur: Inga.

Erfarenheter redovisade (Ja/Nej): Ja

Kortfattat anges förebyggande åtgärder.

Report Profile

Identification of Report:

country: FA ident key: 1991_007_01

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

Date of Major Occurrence: Time of Major Occurrence

start: 1991-07-28 start: 13:00:00

finish: finish:

Establishment:

name:

address:

industry: 2001 general chemicals manufacture

Organic Chemical (Batch Processes)

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: 1991_007_01

Accident Types:

release: Yes explosion: No

water contamination: No other: No

fire: No

description:

SYSTEM ORIGINATING AND OPERATING CONDITIONS:... see Appendix Short Report / description of accident types

Substance(s) Directly Involved:

toxic: Yes explosive: Yes

ecotoxic: No other: No

flammable: Yes

description:

- Ammonia (C.A.S. CODE: 7664-41-7, E.E.C. CODE: 007-001-00-5); amount involved = 25 Kg... see Appendix Short

Report / description of substances involved

Immediate Sources of Accident:

storage: No transfer: No

process: Yes other: No

description:

The accident occurred during phosgenization of an aliphatic acid at about 110°C in a batch reactor operating at atmospheric pressure in an organic chemical industry.

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: Yes **community disruption:** No

other: Yes

ecological harm: No

national heritage loss: No

description:

EFFECTS ON PEOPLE:... 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:

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:

After the accident it was established to improve the handling of liquid phosgene by use of more recent control devices.

A Occurrence Full Report

country: FA **ident key:** 1991_007_01

1 Type of Accident

remarks: An aliphatic acid was being phosgenated at about 110°C and atmospheric pressure in a batch reactor. Due to a malfunction of the dosing device, phosgene was fed too fast to the reactor and the amount in excess escaped into the building (code... see Appendix Full Report A / type of accident

2 Dangerous Substances

remarks: The total establishment and the potential directly involved inventories of ammonia refer to the amount involved in the accident. No data are available about the amount of phosgene released during the accident. From the Original Report it is... see Appendix Full Report A / dangerous substances

3 Source of Accident

illustration: - not applicable -

remarks: The accident occurred during phosgenization of an aliphatic acid at about 110°C in a batch reactor operating at atmospheric pressure (codes 3101 and 4001) in an organic chemical industry (code 2001).

4 Meteorological Conditions

precipitation none: fog: rain: hail: snow:

Yes No No No No

wind speed (m/s):

direction (from): NorthEast

stability (Pasquill):

ambient temperature (°C): 30

remarks: Sunny (about 30°C). Wind from NorthEast.

5 Causes of Major Occurrence

main causes

technical / physical 5105 operation: instrument/control/monitoring-device failure

- not applicable -

- not applicable -

- not applicable -

- not applicable -

human / organizational - not applicable -

- not applicable -

- not applicable -

- not applicable -

- not applicable -

remarks: The accident was caused by the failure of the dosing device of phosgene to the reactor

(code 5105).

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA ident key: 1991_007_01

event:

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

initiating event 1101 release: gas/vapour/mist/etc release to air

associated event - not applicable -

Dangerous substances

country: FA ident key: 1991_007_01

a) total establishment inventory

CAS number: 75-44-5 **identity:** Phosgene

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): -1

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: -1 potential quantity: -1

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: 7664-41-7 identity: Ammonia

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): 0,025

use of substance as: NORMAL FINISHED PRODUCT

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,025 potential quantity: 0,025

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

Source of Accident - Situation country: FA ident key: 1991_007_01

situation

industry

initiating event 2001 general chemicals manufacture

associated event - not applicable -

activity/unit

major occurrence 3101 process: chemical batch reaction

initiating event 3101 process: chemical batch reaction

associated event - not applicable -

component

major occurrence 4001 reaction vessel; non-pressurised

initiating event 4001 reaction vessel; non-pressurised

associated event - not applicable -

B Consequences Full Report

country: FA ident key: 1991_007_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 In the Original Report there is no evidence of significant effects outside the e... 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 4

other serious injuries

health monitoring

remarks Inside the establishment 4 people were injured by the toxic release.... 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)** Suspected

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

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

- **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 In the Original Report there is no evidence of significant ecological harms.... 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 amounts of ammonia and phosgene released ... 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** Yes No 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

C Response Full Report

country: FA **ident key:** 1991_007_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 it was esta... 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 / 1991_007_01 report

Appendix Short Report / description of accident types:

SYSTEM ORIGINATING AND OPERATING CONDITIONS:

Phosgenization of an aliphatic acid at about 110°C in a batch reactor at atmospheric pressure.

ENVIRONMENTAL AND ATMOSPHERIC CONDITIONS:

Sunny (about 30°C). Wind from NorthEast.

ACCIDENT CASE HISTORY DESCRIPTION:

An aliphatic acid was being phosgenated at about 110°C and atmospheric pressure in a batch reactor. Due to a malfunction of the dosing device, phosgene was fed too fast to the reactor and the amount in excess escaped into the building. This activated the alarm and, following the foreseen emergency procedure, were carried out these actions:

- 1- a wall was erected to separate the reactor from the rest of the building;
- 2- the air in the enclosure was sucked on and washed in an ammonia solution to neutralize phosgene;
- 3- a water curtain to dilute the ammonia/phosgene cloud was used to avoid its dispersion outside the establishment.

Appendix Short Report / description of substances involved:

- Ammonia (C.A.S. CODE: 7664-41-7, E.E.C. CODE: 007-001-00-5): amount involved = 25 Kg.
- Phosgene (C.A.S. CODE: 75-44-5, E.E.C. CODE: 006-002-00-8): amount involved = not known.

Appendix Short Report / description of suspected causes:

INITIATING EVENT AND CONSEQUENCES:

Too fast dosing of phosgene due to measurement error of a dosing device.

CAUSES:

The accident was caused by the failure of the dosing device of phosgene to the reactor.

Appendix Short Report / description of immediate effects:

EFFECTS ON PEOPLE:

Inside the establishment 4 people were injured by the toxic release.

OTHER:

No material losses occurred except the amounts of ammonia and phosgene released during the accident.

Appendix Short Report / description of emergency measures taken:

INTERNAL TO THE ESTABLISHMENT:

The escaped phosgene activated an alarm and, following the foreseen emergency procedure, operators carried out these actions:

- 1- a wall was erected to separate the reactor from the rest of the building;
- 2- the air in the enclosure was sucked on and washed in an ammonia solution to neutralize phosgene;
- 3- a water curtain to dilute the ammonia/phosgene cloud was used to avoid its dispersion outside the establishment.

Appendix Full Report A / type of accident:

An aliphatic acid was being phosgenated at about 110°C and atmospheric pressure in a batch reactor. Due to a malfunction of the dosing device, phosgene was fed too fast to the reactor and the amount in excess escaped into the building (code 1101).

Appendix Full Report A / dangerous substances:

The total establishment and the potential directly involved inventories of ammonia refer to the amount involved in the accident. No data are available about the amount of phosgene released during the accident. From the Original Report it is not fully clear if ammonia is a starting material or not.

Appendix Full Report B / area concerned - remarks:

In the Original Report there is no evidence of significant effects outside the establishment because a water curtain to dilute the ammonia/phosgene cloud was used to avoid its dispersion.

Appendix Full Report B / people:

Inside the establishment 4 people were injured by the toxic release.

Appendix Full Report B / ecological harm:

In the Original Report there is no evidence of significant ecological harms.

Appendix Full Report B / material loss:

No material losses occurred except the amounts of ammonia and phosgene released during the accident.

Appendix Full Report B / disruption of community life:

In the Original Report there is no evidence of significant effects outside the establishment because a water curtain to dilute the ammonia/phosgene cloud was used to avoid its dispersion.

Appendix Full Report C / lesson learned - prevent:

After the accident it was established to improve the handling of liquid phosgene by use of more recent control devices.