

Gasexplosion och klorutsläpp i samband med lossning av klorgas vid en kemikaliefabrik.

950220 MARS 1800_010_04

Olyckan inträffade på förmiddagen 10:30. Då klorgas tappades från en tankvagn på räls uppstod en explosion och klorgas frigjordes. Gasen innehöll orenheter i form av mycket reaktivt klorkväve (NCl₃). Klockan 16:00 förklarades faran över. Ingen evakuering behövde tillgripas.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
Klor	7782-50-5	150 kg
Klorkväve (NCl ₃)		

Skador:

Människor:	Inga skador rapporterade.
Materiella:	Skador på tankvagnen och lossningsutrustningen.
Miljö/ekologi:	Inga skador rapporterade.
Infrastruktur:	Inga skador rapporterade.

Erfarenheter redovisade (Ja/Nej): Nej.

Report Profile

Identification of Report:

country: FA ident key: 1800_010_04

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

Date of Major Occurrence: Time of Major Occurrence

start: 1995-02-20 start:

finish: 1995-02-20 finish:

Establishment:

name:

address:

industry: 2001 general chemicals manufacture

Chemical

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_010_04

Accident Types:

release: Yes **explosion:** Yes

water contamination: No **other:** No

fire: No

description: not given

Substance(s) Directly Involved:

toxic: Yes **explosive:** No

ecotoxic: No **other:** No

flammable: No

description:

Chlorine C.A.S. Code 7782-50-5

About 150 kg escaped

Immediate Sources of Accident:

storage: No **transfer:** Yes

process: No **other:** No

description:

- At the end of the gaseous transferring process.

- Railcar: 50 tonnes, 7 bar abs. ambient temperature

The railcar is water tested till 22 bar abs.

Suspected Causes:

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

human: No **other:** Yes

description:

Reaction of impurities due to concentration in the liquid phase.

Immediate Effects:

material loss: No

human deaths: No

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

other: No

ecological harm: No

national heritage loss: No

description:

Only preventive measures, no effects.

Some streets were blocked by emergency services.

Emergency Measures taken:

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

external services: Yes **restoration:** No

sheltering: No **other:** No

evacuation: No

description:

From 10.30 till 13.04 phase 3 was declared... see Appendix Short Report / description of emergency measures taken

Immediate Lessons Learned:

prevention: Yes **other:** No

mitigation: No

description:

Actions to avoid concentration of impurities

A Occurrence Full Report

country: FA **ident key:** 1800_010_04

1 Type of Accident

remarks: Due to impurities (highly reactive NCl₃) that concentrate in liquid phase (more than 13% or > than 1.5 g/cm² wetted surface area) a detonation of the chlorine railcar took place. Gaseous chlorine escaped from a leak in the sump.

2 Dangerous Substances

remarks: No storage on site. Supply from maximum 2 rail cars (ambient temperature, 7 bar abs.)

3 Source of Accident

illustration: - not applicable -

remarks: It was the first time that this supplier delivered chlorine to the plant. The starting material and finished products and installations are owned by other company. No analytical results or specifications of chlorine. Direct take-away of ga... 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): 4

direction (from): 225-250

stability (Pasquill): D

ambient temperature (°C): 7

remarks: Good weather for the time of the year

5 Causes of Major Occurrence

main causes

technical / physical 5101 operation: vessel/container/containment-equipment failure

5107 operation: unexpected reaction/phase-transition

- not applicable -

- not applicable -

- not applicable -

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

5314 organization: testing/inspecting/recording (none, inadequate, inappropriate)

- not applicable -

- not applicable -

- not applicable -

remarks: 1) no specifications of testing results from chlorine (no procedure)-2)unusual process operation direct take away of gaseous chlorine to production. 3) not aware of impact of impurities (NCl3)

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA **ident key:** 1800_010_04

event:

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

initiating event 1306 explosion: explosive decomposition (of unstable material)

associated event - not applicable -

Dangerous substances

country: FA **ident key:** 1800_010_04

a) total establishment inventory

CAS number: (CODE 124 ANN **identity:** Flamable Gases

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): 1000

use of substance as: NORMAL FINISHED PRODUCT

b) substance belongs to relevant inventory directly involved: No

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: (75-21-8)> identity: Ethylenoxide

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): 50

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: No

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: (782-50-5) identity: Chlorine

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): 80

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,15 potential quantity: 50

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): 170

use of substance as:

b) substance belongs to relevant inventory directly involved: No

actual quantity: -1 potential quantity: -1

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

Source of Accident - Situation country: FA ident key: 1800_010_04

situation

industry

initiating event 2001 general chemicals manufacture

associated event - not applicable -

activity/unit

major occurrence 3304 transfer: loading/unloading activities (transfer interfaces)

initiating event 3304 transfer: loading/unloading activities (transfer interfaces)

associated event - not applicable -

component

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

initiating event 4004 container; pressurised (bullet, sphere, cylinder, etc.)

associated event - not applicable -

B Consequences Full Report

country: FA ident key: 1800_010_04

1 Area concerned

affected

extent of effects installation: Suspected

establishment: No

off-site; local: No

off-site; regional: No

off-site; transboundary: No

illustration of effects - not applicable -

remarks 1) First they thought that there was still 10 tonnes of liquid chlorine in it. M... see Appendix Full Report B / area concerned - remarks

2 People

establishment popul. emergency personnel off-site population

total at risk 0 0 0

immediate fatalities 0 0 0

subsequent fatalities 0 0 0

hospitalizing injuries 0 0 0

other serious injuries 0 0 0

health monitoring 0 0 0

remarks Water curtain was effective

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 preventing human access or activities)** Suspected
- **marine or fresh water habitat** Suspected
- **areas of high conservation value or given special protection** Suspected

remarks - not applicable -

4 National Heritage Loss

effects on:

- **historical sites** Suspected - **historic monuments** Suspected
- **historic buildings** Suspected - **art treasures** Suspected

remarks - not applicable -

5 Material Loss

establishment losses off site losses

costs (direct costs to operator) (social costs)

in ECU BF ECU BF

material losses -1 -1 0 0

response, clean up, restoration -1 -1 0 0

remarks No cost figures available

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 1,5 hour
- **railways** No
- **waterways** No +1,5 hour
- **air transport** No

significant public concern none local level national level

- **off site populations** No No Yes
- **media interest** No No Yes
- **political interest** No No Yes

remarks (1) There was no evacuation but everything was foreseen to evacuate if the situa... see Appendix

7 Discussion of Consequences

- not applicable -

Ecological Components involved

country: FA **ident key:** 1800_010_04

type: 6102 inland: urban development

threatened: Suspected **affected:** not applicable

type: 6101 inland: metropolitan development

threatened: Suspected **affected:** not applicable

C Response Full Report

country: FA **ident key:** 1800_010_04

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

Improvement of procedures: ass... see Appendix Full Report C / lesson learned - prevent

measures to mitigate consequences:

Evaluation of external plan

useful references:

Computer models have been used

5 Discussion about Response

- not applicable -

Appendices for the FA / 1800_010_04 report

Appendix Short Report / description of emergency measures taken:

From 10.30 till 13.04 phase 3 was declared

" 13.04 " 16.00 phase 2

" 16.00 phase 0

Every phase has specific tasks and organisations

Appendix Full Report A / source of accident - remarks:

It was the first time that this supplier delivered chlorine to the plant. The starting material and finished products and installations are owned by other company. No analytical results or specifications of chlorine. Direct take-away of gaseous chlorine to production. (Annex 1: Map of surroundings, Annex 2: Map of installations (with indication of unloading area rail car), Annex 3: detail unloading area, detail rail-car, Annex 4: Detail sump + cracks).

Appendix Full Report B / area concerned - remarks:

1) First they thought that there was still 10 tonnes of liquid chlorine in it. Measurements indicated max 0.2 ppm. (see annex (1)). Production was not stopped.

Appendix Full Report B / disruption of community life:

(1) There was no evacuation but everything was foreseen to evacuate if the situation aggravated. (2) Annex 5: copy of national newspaper.(was broadcasted in evening)

Appendix Full Report C / lesson learned - prevent:

Improvement of procedures: assessment of suppliers

analytical results

minimum liquid chlorine in rail car