

## Explosion och brand på en kemikaliefabrik.

960518

Oklar och ofullständig.

Under ett våldsamt åskväder inträffade tre på varandra följande explosioner varvid en brand uppstod. Den process som drabbades var syntes av glyoxal, genom oxidation av acetaldehyd med salpetersyra. Det är oklart varför explosionerna uppstod.

### Inblandade ämnen och mängder

	CAS Nr.	Mängd
glyoxal	107-22-2	10 ton
acetaldehyd	75-07-0	23 ton
salpetersyra	7697-37-2	13 ton
kväveoxider		okänt

### Skador:

Människor:	Inga personskador.
Materiella:	Omfattande skador på anläggningen.
Miljö/ekologi:	Inga effekter rapporterade.
Infrastruktur:	Inga effekter.

### Erfarenheter redovisade (Ja/Nej):

Kortfattat anges förebyggande åtgärder

## Report Profile

### Identification of Report:

country: FA ident key: 1800\_063\_01

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

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

start: 18/05/1996 start: 05:34:00

finish: 18/05/1996 finish: 18:00:00

### Establishment:

name:

address:

industry: 2001 general chemicals manufacture

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\_063\_01

**Accident Types:**

release: Yes explosion: No

water contamination: No other: No

fire: No

**description:**

High cost of the accident (relevant economic damages). Didactic interest (lessons learned).

**Substance(s) Directly Involved:**

toxic: Yes explosive: Yes

ecotoxic: Yes other: Yes

flammable: Yes

**description:**

ethanedial (glyoxal, oxalaldehyde)

**Immediate Sources of Accident:**

storage: No transfer: No

process: Yes other: No

**description:**

ethanedial production unit

**Suspected Causes:**

plant or equipment: No environmental: Yes

human: No other: No

**description:**

lightning strike or electrical disturbance of atmospheric origin (St. Elmos fire). Possible inadequacy of the safety systems.

**Immediate Effects:**

material loss: Yes

human deaths: No

human injuries: No community disruption: No

other: No

**ecological harm:** No

**national heritage loss:** No

**description:**

Destruction of the unity (equipment) with projection of a tank at 200 metres. 15000000 to 20000000 FFR damages.

**Emergency Measures taken:**

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

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

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

**evacuation:** No

**description:**

Emergency shut down of the installation (plant). Call (Intervention request) to the fire fighters. Activation of the Internal Operation Plan (Onsite Emergency Plan). Setting up (establishment) of a safety zone.

**Immediate Lessons Learned:**

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

**mitigation:** No

**description:**

no information is given

## A Occurrence Full Report

**country:** FA **ident key:** 1800\_063\_01

### 1 Type of Accident

**remarks:** Release of nitrous vapours through the chimney. Three consecutive explosions. Fire in the unit. The relation between this three types of occurrence has still not been established.

### 2 Dangerous Substances

**remarks:** - not applicable -

### 3 Source of Accident

**illustration:** a simplified glyoxal production scheme, and a functioning scheme of the safety devices and mechanisms in the production unit

**remarks:** the unit concerned is an apparatus system and in particular of (batch)reactors for the synthesis of ethanedial (glyoxal) through oxidation of acetaldehyde with nitric acid. The reaction is performed at a temperature of 40 degrees Celsius (... see Appendix Full Report A / source of accident  
- remarks

### 4 Meteorological Conditions

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

No No Yes No No

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

**direction (from):**

**stability (Pasquill):**

**ambient temperature (°C):**

**remarks:** when the accident occurred there was a violent thunderstorm in the region

## 5 Causes of Major Occurrence

**main causes**

**technical / physical** 5201 environment: natural event (weather, temperature, earthquake, etc.)

- not applicable -

- not applicable -

- not applicable -

- not applicable -

**human / organizational** - not applicable -

- not applicable -

- not applicable -

- not applicable -

- not applicable -

**remarks:** The accident occurred during a violent thunderstorm. The role of lightning or other electrical events is under investigation

## 6 Discussion about the Occurrence

- not applicable -

## Dangerous substances

**country:** FA **ident key:** 1800\_063\_01

### a) total establishment inventory

**CAS number:** 107-22-2 **identity:** ethanedial (glyoxal, oxalaldehyde)

**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:** normal finished product

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

**actual quantity:** 10 **potential quantity:** -1

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

**actual quantity:** 0 **indir\_pot\_quant:** 0

### a) total establishment inventory

**CAS number:** 7697-37-2 **identity:** nitric acid

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

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

category from Seveso II: oxidising

other hazards (1): - not applicable -

other hazards (2): - not applicable -

maximum quantity (tonnes): 1350

use of substance as: starting material

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

actual quantity: 13 potential quantity: -1

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

actual quantity: 0 indir\_pot\_quant: 0

**a) total establishment inventory**

CAS number: 75-07-0 identity: acetaldehyde

name from Seveso I Directive: - not applicable -

name from Seveso II Directive: - not applicable -

category from Seveso II: highly flammable liquids R17, R10

other hazards (1): - not applicable -

other hazards (2): - not applicable -

maximum quantity (tonnes): 1600

use of substance as: starting material

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

actual quantity: 23 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\_063\_01

**situation**

**industry**

initiating event - not applicable -

associated event - not applicable -

**activity/unit**

major occurrence 3101 process: chemical batch reaction

initiating event - not applicable -

associated event - not applicable -

**component**

major occurrence 4002 reaction vessel; pressurised

initiating event - not applicable -

associated event - not applicable -

## **B Consequences Full Report**

country: FA ident key: 1800\_063\_01

## 1 Area concerned

affected

extent of effects installation: Yes

establishment: Yes

off-site; local: Suspected

off-site; regional: No

off-site; transboundary: No

illustration of effects - not applicable -

remarks The production unit has been destroyed. (Explosion of 1 reactor and of 1 separat... see Appendix

Full Report B / area concerned - remarks

## 2 People

establishment popul. emergency personnel off-site population

total at risk 0 -1 -1

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 - 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 No

preventing human access or activities)

- marine or fresh water habitat Suspected

- 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 3000000 2E+07 -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 No No No

- media interest No No No

- political interest No No No

remarks - not applicable -

## 7 Discussion of Consequences

- not applicable -

## Ecological Components involved

country: FA ident key: 1800\_063\_01

type: 6204 freshwater: river

threatened: Yes affected: Yes

## C Response Full Report

country: FA ident key: 1800\_063\_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

page 9 missing

measures to mitigate consequences:

page 9 missing

**useful references:**

page 9 missing

**5 Discussion about Response**

- not applicable -

**Appendices for the FA / 1800\_063\_01 report**

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

the unit concerned is an apparatus system and in particular of (batch)reactors for the synthesis of ethanedial (glyoxal) through oxidation of acetaldehyde with nitric acid. The reaction is performed at a temperature of 40 degrees Celsius (40°C) and at a pressure of 2 bar.

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

The production unit has been destroyed. (Explosion of 1 reactor and of 1 separator, the projection of a drainage basin 200 metres (200 m) away,...). The (containment) retention basin for the extinguishing water could not retain (contain) all the water polluted (contaminated) during the accident, a part was released (flowed) into the river.