

# Vätgasutsläpp och explosion på en kemikaliefabrik för framställning av alkoholer ur naturprodukter

890814 MARS 1800\_30

Vätgas släpptes ut då en ventillationsventil skulle öppnas för inspektion. Den utsläppta vätgasen exploderade och resulterade i en jetlåga som dödade fyra arbetare, skadade tre andra och förstörde delar av anläggningen. Det förefaller som om det inte var första gången en sådan olycka inträffade.

## Inblandade ämnen och mängder

	CAS Nr.	Mängd
väte	1333-74-0	okänt

## Skador:

**Människor:** Fyra arbetare omkom vid explosionen, medan tre skadades av jet-flamman.

**Materiella:** Produktionsanläggningen skadades.

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

**Infrastruktur:** Inga.

**Erfarenheter redovisade (Ja/Nej): Nej**

## Report Profile

### Identification of Report:

country: FA ident key: 1800\_030\_01

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

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

start: 1989-08-14 start:

finish: finish:

### Establishment:

name:

address:

industry: 2001 general chemicals manufacture

Organic Chemical (Raw Hydrogenated Alcohols Production from Vegetable/Animal Raw Materials)

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\_030\_01**Accident Types:****release:** No **explosion:** No**water contamination:** No **other:** No**fire:** Yes**description:**

ACCIDENT CASE HISTORY DESCRIPTION:... see Appendix Short Report / description of accident types

**Substance(s) Directly Involved:****toxic:** No **explosive:** Yes**ecotoxic:** No **other:** No**flammable:** Yes**description:**

- Hydrogen (C.A.S. CODE: 1333-74-0, E.E.C. CODE: 001-001-00-9); amount involved = not known.

**Immediate Sources of Accident:****storage:** No **transfer:** No**process:** Yes **other:** No**description:**

The accident occurred during normal operation of a hydrogenation system in an organic chemical industry for the production of raw hydrogenated alcohols from vegetable and animal raw materials. The operating pressure in the hydrogenation sys... see Appendix Short Report / description of immediate sources

**Suspected Causes:****plant or equipment:** No **environmental:** No**human:** No **other:** Yes**description:**

CAUSES:... see Appendix Short Report / description of suspected causes

**Immediate Effects:****material loss:** Yes

**human deaths:** Yes

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

**other:** No

**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:

The isolation valves were shut-off and the Internal Emergency Plan was activated.

### **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:** 1800\_030\_01

### **1 Type of Accident**

**remarks:** Hydrogen escaped when a venting valve was opened for the inspection of a cap. The escaped hydrogen caught fire (code 1203) resulting in the death of 4 people, injuries to others 3 and damages to the plant.

### **2 Dangerous Substances**

**remarks:** No data are available about the amount of hydrogen involved in the accident.

### **3 Source of Accident**

**illustration:** - not applicable -

**remarks:** The accident occurred during normal operation of a hydrogenation system (code 3102) in an organic chemical industry for the production of raw hydrogenated alcohols from vegetable and animal raw materials (code 2001). The operating pressure ... 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** 5501 other: not identified

- not applicable -

- not applicable -

- not applicable -

- not applicable -

**human / organizational** - not applicable -

- not applicable -

- not applicable -

- not applicable -

- not applicable -

**remarks:** The causes have not been identified (code 5501) even if a general test of the equipments involved in the fire and/or suspected to have caused the accident was carried out.

## 6 Discussion about the Occurrence

- not applicable -

**Type of Accident** country: FA ident key: 1800\_030\_01

**event:**

**major occurrence** 1203 fire: jet flame (burning jet of fluid from orifice)

**initiating event** 1203 fire: jet flame (burning jet of fluid from orifice)

**associated event** - not applicable -

## Dangerous substances

country: FA ident key: 1800\_030\_01

### a) total establishment inventory

**CAS number:** 1333-74-0 **identity:** Hydrogen

**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

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

actual quantity: -1 indir\_pot\_quant: -1

**Source of Accident - Situation** country: FA ident key: 1800\_030\_01

### **situation**

#### **industry**

initiating event 2001 general chemicals manufacture

associated event - not applicable -

#### **activity/unit**

major occurrence 3102 process: chemical continuous reaction

initiating event 3102 process: chemical continuous reaction

associated event - not applicable -

#### **component**

major occurrence 4010 valves/controls/monitoring devices/drain cocks

initiating event 4010 valves/controls/monitoring devices/drain cocks

associated event - not applicable -

## **B Consequences Full Report**

country: FA ident key: 1800\_030\_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 7

immediate fatalities 4

subsequent fatalities

hospitalizing injuries 3

other serious injuries

health monitoring

remarks Inside the establishment 4 people were killed and 3 injured by the jet-fire.... 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** The reactor and other installations were damaged by the jet-fire. No data are av... 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: 1800\_030\_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

When the Original Report was p... 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 / 1800\_030\_01 report

### Appendix Short Report / description of accident types:

#### ACCIDENT CASE HISTORY DESCRIPTION:

Hydrogen escaped when a venting valve was opened for the inspection of a cap. The escaped hydrogen caught fire, resulting in the death of 4 people, injuries to others 3 and damages to the plant. A similar accident seems to have taken place in the same installation 5 years previously (in 1984).

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

The accident occurred during normal operation of a hydrogenation system in an organic chemical industry for the production of raw hydrogenated alcohols from vegetable and animal raw materials. The operating pressure in the hydrogenation system was between 200 and 300 bar.

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

#### CAUSES:

The causes have not been identified even if a general test of the equipments involved in the fire and/or suspected to have caused the accident was carried out.

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

#### EFFECTS ON PEOPLE:

Inside the establishment 4 people were killed and 3 injured by the jet-fire.

#### MATERIAL LOSS:

The reactor and other installations were damaged by the jet-fire. No data are available about the cost of the damages.

### Appendix Short Report / description of immediate lessons learned:

#### MEASURES TO PREVENT ANY RECURRENCE OF SIMILAR ACCIDENTS:

When the Original Report was prepared a judiciary enquire was in course. A safety study for the installation was required by the administrative authority before the start-up of the plant.

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

The accident occurred during normal operation of a hydrogenation system (code 3102) in an organic chemical industry for the production of raw hydrogenated alcohols from vegetable and animal raw materials (code 2001). The operating pressure in the hydrogenation system was between 200 and 300 bar. The component involved was a

venting valve (code 4010) opened for the inspection of a cap.

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

In the Original Report there is no evidence of significant effects outside the establishment.

**Appendix Full Report B / people:**

Inside the establishment 4 people were killed and 3 injured by the jet-fire.

**Appendix Full Report B / ecological harm:**

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

**Appendix Full Report B / material loss:**

The reactor and other installations were damaged by the jet-fire. No data are available about the cost of the damages.

**Appendix Full Report B / disruption of community life:**

In the Original Report there is no evidence of significant effects outside the establishment.

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

When the Original Report was prepared a judiciary enquire was in course. A safety study for the installation was required by the administrative authority before the start-up of the plant.