

# Utsläpp och brand på en PVC-fabrik till följd av ett utsläpp.

930922 MARS 1993\_21

Trycket steg i en reaktor där polymerisering av vinylklorid till PVC ägde rum. Till följd av det stigande trycket i reaktorn släpptes reaktionsblandningen ut då säkerhetsventilen fallerade. Orsaken till tryckstegringen är okänd. Reaktorn rymmer totalt 5-7 ton. De utsläppta gaserna antändes och exploderade. Den påföljande branden hotade två reaktorer i närheten. De automatisk katastrofsystemen aktiverades och ett räddningslag mobiliserades.

## Inblandade ämnen och mängder

	CAS Nr.	Mängd
vinylklorid	75-01-4	okänt
polyvinylklorid	9002-86-2	okänt
peroxider		okänt

## Skador:

Människor: En person skadades.  
Materiella: Anläggningen skadades.  
Miljö/ekologi: Inga effekter rapporterade.  
Infrastruktur: Inga.

Erfarenheter redovisade (Ja/Nej): Nej

## Report Profile

### Identification of Report:

country: FA ident key: 1993\_021\_01

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

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

start: 1993-09-22 start: 06:30:00

finish: finish:

### Establishment:

name:

address:

industry: - not applicable -

Organic Chemical (Polyvinylchloride [PVC] 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:** 1993\_021\_01**Accident Types:****release:** Yes **explosion:** Yes**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:** Yes **explosive:** Yes**ecotoxic:** No **other:** No**flammable:** Yes**description:**

When the accident occurred, the reactor was containing from 5 to 7 tonnes of vinylchloride, peroxides and polyvinylchloride but no data are available about the single amounts.... 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 the polymerization of vinylchloride in an organic chemical industry. The component involved was the polymerization reactor. When the accident occurred, the reactor was containing from 5 to 7 tonnes of vinylchlor... see Appendix Short Report / description of immediate sources

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

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

## Immediate Effects:

**material loss:** Yes

**human deaths:** No

**human injuries:** Yes **community disruption:** Yes

**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:... see Appendix Short Report / description of emergency measures taken

## Immediate Lessons Learned:

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

**mitigation:** No

**description:**

- not applicable -

# A Occurrence Full Report

**country:** FA **ident key:** 1993\_021\_01

## 1 Type of Accident

**remarks:** During the vinylchloride polymerization, the release of products (vinylchloride, polyvinylchloride and peroxides), due to overpressure in the reactor (5 to 7 tonnes) occurred (code 1101). The released gases were ignited resulting in an exp... see Appendix Full Report A / type of accident

## 2 Dangerous Substances

**remarks:** When the accident occurred, the reactor was containing from 5 to 7 tonnes of vinylchloride, peroxides and polyvinylchloride but no data are available about the single amounts.

## 3 Source of Accident

**illustration:** - not applicable -

**remarks:** - not applicable -

## 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

5501 other: not identified

- 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 overpressurization in the reactor during the vinylchloride

polymerization together with the failure of the safety valve (code 5102) to discharge the

gases avoiding to reach an internal pressure dangerous for t... see Appendix Full Report A

/ causes of major occurrence

## 6 Discussion about the Occurrence

- not applicable -

**Type of Accident** country: FA **ident key:** 1993\_021\_01

**event:**

**major occurrence** 1307 explosion: VCE (vapour cloud explosion; supersonic wave front)

**initiating event** - not applicable -

**associated event** - not applicable -

**event:**

**major occurrence** 1202 fire: pool fire (burning pool of liquid, contained or uncontained)

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

**associated event** - not applicable -

## Dangerous substances

country: FA **ident key:** 1993\_021\_01

### a) total establishment inventory

**CAS number:** 75-01-4 **identity:** Vinylchloride

**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: 9002-86-2 identity: Polyvinylchloride

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: -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: identity: Peroxides

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

## **B Consequences Full Report**

country: FA ident key: 1993\_021\_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** 26

**immediate fatalities**

**subsequent fatalities**

**hospitalizing injuries** 1

**other serious injuries**

**health monitoring**

**remarks** Inside the establishment 1 person (out of the 26 present when the accident 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) 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 accident caused damages to the plant but no data are available about the cos... 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 The accident had impact on public.

## 7 Discussion of Consequences

# C Response Full Report

country: FA ident key: 1993\_021\_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

- not applicable -

measures to mitigate consequences:

- not applicable -

useful references:

- not applicable -

### **5 Discussion about Response**

- not applicable -

# Appendices for the FA / 1993\_021\_01 report

## Appendix Short Report / description of accident types:

### ACCIDENT CASE HISTORY DESCRIPTION:

During the vinylchloride polymerization, the release of products (vinylchloride, polyvinylchloride and peroxides), due to overpressure in the reactor (5 to 7 tonnes), occurred. The released gases were ignited resulting in an explosion and a fire which affected two nearby reactors.

## Appendix Short Report / description of substances involved:

When the accident occurred, the reactor was containing from 5 to 7 tonnes of vinylchloride, peroxides and polyvinylchloride but no data are available about the single amounts.

- Vinylchloride Monomer (C.A.S. CODE: 75-01-4): amount involved = not known.
- Peroxides: amount involved = not known.
- Polyvinylchloride [PVC] (C.A.S. CODE: 9002-86-2): amount involved = not known.

## Appendix Short Report / description of immediate sources:

The accident occurred during the polymerization of vinylchloride in an organic chemical industry. The component involved was the polymerization reactor. When the accident occurred, the reactor was containing from 5 to 7 tonnes of vinylchloride, peroxides and polyvinylchloride.

## Appendix Short Report / description of suspected causes:

### CAUSES:

The accident was caused by the overpressurization in the reactor during the vinylchloride polymerization together with the failure of the safety valve to discharge the gases avoiding to reach an internal pressure dangerous for the vessel. The causes that led to the reactor's overpressurization have not fully identified.

## Appendix Short Report / description of immediate effects:

### EFFECTS ON PEOPLE:

Inside the establishment 1 person (out of the 26 present when the accident occurred) was injured.

### MATERIAL LOSS:

The accident caused damages to the plant but no data are available about the cost of the material losses.

### COMMUNITY DISRUPTION:

The accident had impact on public.

## Appendix Short Report / description of emergency measures taken:

### INTERNAL TO THE ESTABLISHMENT:

The rescue teams were activated. Controlled combustion in the pre-grinder. Nitrogen was fed into the autoclaves 1 and 2 in order to extinguish the fire originated inside them.

## Appendix Full Report A / type of accident:

During the vinylchloride polymerization, the release of products (vinylchloride, polyvinylchloride and peroxides), due to overpressure in the reactor (5 to 7 tonnes) occurred (code 1101). The released gases were ignited resulting in an explosion (code 1307) and a fire (code 1202) which affected two nearby reactors.

## Appendix Full Report A / causes of major occurrence:

The accident was caused by the overpressurization in the reactor during the vinylchloride polymerization together with the failure of the safety valve (code 5102) to discharge the gases avoiding to reach an internal pressure dangerous for the vessel. The causes that led to the reactor's overpressurization have not fully identified (code 5501).

## 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 1 person (out of the 26 present when the accident occurred) was injured.

## 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 accident caused damages to the plant but no data are available about the cost of the material losses.