

Brand i en fabrik för produktion av oorganiska kemikalier.

920408 MARS 1992_02

Olyckan inträffade i en fabrik för produktion av oorganiska kemikalier. I ett kärl blandades litium med dietyleter innan det skulle blandas med metylklorid i en satsvis reaktor. Rörledningen mellan dessa kärl var tilltäppt av metalliskt litium i en ventil. Man sökte avlägsna metallklumpen med en träpinne inlindad i en trasa dränkt i fotogen. Man sökte undvika att skrapa insidan av kärl och rör, dels för att undvika gnistor, dels för att inte skada ytbeläggningen. Det var svårt att avlägsna klumpen. Vid arbetet flödade plötsligt blandningen av finfördelat litium i dietyleter ut och antändes vid kontakt med luft. Uppskattningsvis 700 liter strömmade ut. Arbetaren som petade med pinnen fick brännskador i ansiktet och på händerna. Han och en kollega som undvek lågorna tog sig snabbt bort från plasten och slog larm. Den direkta orsaken till olyckan var att man inte stängt alla lämpliga ventiler. Strömförsörjningen slogs av. Företagets interna brandkår och räddningstjänsten larmades. Elden släcktes med pulver. Angränsande byggnader skyddades med hjälp av vattengardiner.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
litium	7439-93-2	75 kg
dietyleter	123-91-1	500 kg

Skador:

Människor:	1 person skadade av branden.
Materiella:	Anläggningen skadades.
Miljö/ekologi:	Inga effekter rapporterade.
Infrastruktur:	Inga.

Erfarenheter redovisade (Ja/Nej): Ja

Mycket kortfattat anges förebyggande åtgärder.

Report Profile

Identification of Report:

country: FA ident key: 1992_002_01

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

Date of Major Occurrence: Time of Major Occurrence

start: 1992-04-08 start: 23:00:00

finish: finish:

Establishment:

name:

address:

industry: 2001 general chemicals manufacture

General 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:** 1992_002_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:

- Lithium (C.A.S. CODE: 7439-93-2): amount involved = 75 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 in a general chemical industry for inorganic chemical substances production. The component involved was the lithium/diethylether dispersion feeding line to the batch reactor.

Suspected Causes:

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

human: Yes **other:** No

description:

INITIATING EVENT AND CONSEQUENCES:... see Appendix Short Report / description of suspected causes

Immediate Effects:

material loss: Yes

human deaths: No

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: Yes **restoration:** No

sheltering: No **other:** Yes

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 modify the design of pipings and vessel assembly.

A Occurrence Full Report

country: FA **ident key:** 1992_002_01

1 Type of Accident

remarks: During the attempt to remove a plug of solidified lithium in a pipe, a lithium/diethylether dispersion was released through the ring slot between the wooden stick and the cleaning valve and seeped under the paraffinated piece of cloth on th... see Appendix Full Report A / type of accident

2 Dangerous Substances

remarks: The total establishment and the potential directly involved inventories of lithium metallic refer to the amount released during the accident. The total establishment and the potential directly involved inventories of diethylether refer to t... see Appendix Full Report A / dangerous substances

3 Source of Accident

illustration: - not applicable -

remarks: The accident occurred in a general chemical industry for inorganic chemical

substances production (code 2001). The component involved was the lithium/diethylether dispersion feeding line (code 4011) to the batch reactor (code 3101).

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 - not applicable -

- not applicable -

- not applicable -

- not applicable -

- not applicable -

human / organizational 5303 organization: organized procedures (none, inadequate, inappropriate, unclear)

5401 person: operator error

- not applicable -

- not applicable -

- not applicable -

remarks: The accident was caused by an operator error (codes 5303 and 5401) during the attempt to remove the plug: the inlet valve in the reactor as well as the lateral outlet valve from the dispersion tank were not closed from the beginning of this... see Appendix Full Report

A / causes of major occurrence

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA ident key: 1992_002_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: 1992_002_01

a) total establishment inventory

CAS number: 7439-93-2 **identity:** Lithium

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): 0,075

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,075 **potential quantity:** 0,075

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 **indir_pot_quant:** -1

a) total establishment inventory

CAS number: 123-91-1 **identity:** Diethylether

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): 1,204

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,5 **potential quantity:** 1,204

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 **indir_pot_quant:** -1

Source of Accident - Situation country: FA **ident key:** 1992_002_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 4011 general pipework/flanges

initiating event 4011 general pipework/flanges

associated event - not applicable -

B Consequences Full Report

country: FA ident key: 1992_002_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 i... 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 1

other serious injuries

health monitoring

remarks Inside the establishment 1 person was injured by 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 DM ECU DM

material losses 1000000

response, clean up, restoration

remarks The fire caused damages to the installation. The cost of these damages has been ... 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: 1992_002_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 / 1992_002_01 report

Appendix Short Report / description of accident types:

ACCIDENT CASE HISTORY DESCRIPTION:

The reactor B-6706 was filled with about 1,200 litres of diethylether. 800 litres of diethyl ether with 75 kg of dispersed metallic lithium would then be added from dispersion tank B-6716 and the reaction should be started with addition of methyl chloride. On the day of the accident the dispersion feeding pipe was blocked by solidified lithium metal. To unblock the pipe, a wooden stick was used to push (to avoid sparks and any damage to the reactor's enamel). After removal of a blind flange, the valve on the cleaning nipple was filled with paraffin (prior the reactor and the connected piping were depressurized). The wooden stick used for pushing was wrapped with a piece of cloth soaked in paraffin and the piece of cloth was put over the opened valve in such a way that the reactor should be protected against air entry. As the blockage was unusually solid, it could not be removed by pushing. During the attempt to remove the solidified lithium, the lithium dispersion was released through the ring slot between the wooden stick and the cleaning valve and seeped under the paraffinated piece of cloth on the reactor and ignited spontaneously. The worker on the operation platform above the reactor was burned on nose and neck by the jet-fire; the worker in front of the reactor was not hurt. Both workers run quickly to the control room and activated the alarm as they were no able to avoid the spreading fire on a second platform. The first fire was fed by the continuing release of lithium/diethylether dispersion (it has been estimated that about 700 litres of lithium/diethylether were released). Due to the strong evolution of heat, synthetic materials caught fire: cables, lamp covers, a light globe and finally the tar board cover of the beton roof. The sudden unexpected release of the lithium dispersion from the cleaning valve can be explained as a manipulation error. The inlet valve in the reactor as well as the lateral outlet valve from the dispersion tank were not closed from the beginning of this otherwise routine executed cleaning operation. As the wooden stick was in the cleaning valve it was impossible to close this valve.

Appendix Short Report / description of substances involved:

- Lithium (C.A.S. CODE: 7439-93-2): amount involved = 75 Kg.
- Diethylether (C.A.S. CODE: 123-91-1): amount involved = 500 Kg (about 700 litres).

Appendix Short Report / description of suspected causes:

INITIATING EVENT AND CONSEQUENCES:

During the attempt to remove a plug of solidified metallic lithium in the feeding line to the reactor, the lithium dispersion in diethyl ether was released and ignited spontaneously.

CAUSES:

The accident was caused by an operator error during the attempt to remove the plug: the inlet valve in the reactor as well as the lateral outlet valve from the dispersion tank were not closed from the beginning of this otherwise routine executed cleaning operation. As the wooden stick was in the cleaning valve it was impossible to close this valve.

Appendix Short Report / description of immediate effects:

EFFECTS ON PEOPLE:

Inside the establishment 1 person was injured by fire.

MATERIAL LOSS:

The fire caused damages to the installation. The cost of the damages has been evaluated in about 1 million Deutch Marcs.

Appendix Short Report / description of emergency measures taken:

INTERNAL TO THE ESTABLISHMENT:

Power supply to the plant was shut-off. Company and town fire brigades were activated and extinguished fire with powder. Adjacent buildings were protected by means of water curtain. Hermetic sealing of the reactor and dispersion solution. The affected part of the building was closed for unauthorised entry. Provisional sealing of roof and walls.

Appendix Full Report A / type of accident:

During the attempt to remove a plug of solidified lithium in a pipe, a lithium/diethylether dispersion was released through the ring slot between the wooden stick and the cleaning valve and seeped under the paraffinated piece of cloth on the reactor and ignited spontaneously resulting in a jet-fire (code 1203).

Appendix Full Report A / dangerous substances:

The total establishment and the potential directly involved inventories of lithium metallic refer to the amount released during the accident. The total establishment and the potential directly involved inventories of diethylether refer to the amount released during the accident (700 litres) plus the amount already fed to the B-6706 reactor (1,200 litres).

Appendix Full Report A / causes of major occurrence:

The accident was caused by an operator error (codes 5303 and 5401) during the attempt to remove the plug: the inlet valve in the reactor as well as the lateral outlet valve from the dispersion tank were not closed from the beginning of this otherwise routine executed cleaning operation.

Appendix Full Report B / area concerned - remarks:

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

Appendix Full Report B / people:

Inside the establishment 1 person was injured by 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 fire caused damages to the installation. The cost of these damages has been evaluated in about 1 million Deutch Marcs.

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:

After the accident it was established to modify the design of pipings and vessel assembly.