

Explosion och brand på en fabrik för produktion av farmaceutika.

930806 MARS 1993_18

Olyckan inträffade i en satsvis reaktor på en fabrik i den farmaceutiska industrin. Reaktorn användes för att återvinna isopropylalkohol från avfallsvätskor. I lokalen fanns också ett antal tankar med andra kemikalier. En oförutsedd skenande reaktion resulterade i att tanken brast i en explosion då trycket steg. Bitar som slungades från reaktorn slog hål på andra tankar i utrymmet vilket ledde till en andra explosion och påföljande brand. Fabriken nödstoppades och brandlarmet gavs. Fabriken utrymdes. Företagets interna brandkår mobiliserades och räddningstjänsten tillkallades. Branden var släckt efter 6 timmar.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
isopropylalkohol	67-63-1	16 000 kg
N-methyl-1-methyl Thio-2-nitro Ethenanamine	61832-41-5	340 kg
1,1 Bis (Methyl-thio)-2-nitroethene	13623-94-4	1,000 Kg.
Potassium Carbonate	584-08-7	6,000 Kg.
Polypropylene Glycol	25322-69-4	60 Kg.
Carbon Disulphide	75-15-0	700 Kg.
Methyl Ethyl Ketone	78-93-3	10,000 Kg.
Methanol	67-56-1	6,000 Kg.
Methylene Dichloride	75-09-2	130 Kg.
Monochlorobenzene	108-90-7	110 Kg.
Potassium Hydroxide	1301-58-3	100 Kg.
Sodium Hydroxide	1310-73-2	200 Kg.
Sodium Hypochlorite	7681-52-9	800 Kg.
Dipotassium Salt 1,1 Dithio-2-Nitroethene		1,100 Kg.

Skador:

Människor:	2 personer fick lindriga skador.
Materiella:	Ospecificerade skador på anläggningen.
Miljö/ekologi:	Hamnvattnet och det omedelbart närliggande kustområdet förorenades av släckningsvattnet. Mätningar av halterna indikerade dock att halterna var såpass låga att någon större fara förelåg för långvariga effekter.
Infrastruktur:	Polisen spärrade av trafik i området och dirigerade om trafiken. Vattenförsörjningen till hushåll i området avbröts i 24 timmar.

Erfarenheter redovisade (Ja/Nej): Ja

Kortfattat anges förebyggande åtgärder.

Report Profile

Identification of Report:

country: FA ident key: 1993_018_01

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

Date of Major Occurrence: Time of Major Occurrence

start: 1993-08-06 start: 07:10:00

finish: 1993-08-06 finish: 13:30:00

Establishment:**name:****address:****industry:** 2004 pesticides, pharmaceuticals, other fine chemicals

Pharmaceutical

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_018_01**Accident Types:****release:** Yes **explosion:** Yes**water contamination:** Yes **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:** Yes **other:** Yes**flammable:** Yes**description:**

- Isopropyl Alcohol (C.A.S. CODE: 67-63-01, E.E.C. CODE: 603-003-00-0): amount involved = 16,000 Kg.... see

Appendix Short Report / description of substances involved

Immediate Sources of Accident:

storage: Yes **transfer:** No

process: Yes **other:** No

description:

The Chemical Reactor was used to store a mixture of Isopropyl Alcohol, 1,1 bis (Methyl Thio)-2-Nitroethene and N-Methyl-1-Methyl Thio-2-Nitro Ethenamine. The chemicals were in the reactor approximately 6 days prior to the explosion. The bat... see Appendix Short Report / description of immediate sources

Suspected Causes:

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

human: Yes **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:** No

other: No

ecological harm: Yes

national heritage loss: No

description:

EFFECTS ON PEOPLE:... see Appendix Short Report / description of immediate effects

Emergency Measures taken:

on-site systems: Yes **decontamination:** Yes

external services: Yes **restoration:** Yes

sheltering: No **other:** No

evacuation: Yes

description:

INTERNAL TO THE ESTABLISHMENT:... see Appendix Short Report / description of emergency measures taken

Immediate Lessons Learned:

prevention: Yes **other:** No

mitigation: Yes

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:** 1993_018_01

1 Type of Accident

remarks: An explosion, probably due to a runaway chemical reaction (code 1304),

occurred in a chemical reactor causing fragments from the reactor to puncture other vessels containing flammable liquids. The damages to the other vessels resulted in an... see Appendix Full Report A / type of accident

2 Dangerous Substances

remarks: The chemicals were stored in various chemical reactors and storage tanks in the production building involved (Chemical Building No.2 CB2) as well as in storage tanks in the bunded area adjacent to the building. All chemicals were stored at ... see Appendix Full Report A / dangerous substances

3 Source of Accident

illustration: - not applicable -

remarks: An explosion occurred in a batch chemical reactor (codes 3101 and 4001) that was used to store waste liquors containing pharmaceutical intermediates and by products in a pharmaceutical industry (code 2004). The reactor was used as a storage ... 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): 5

direction (from): South West

stability (Pasquill): D

ambient temperature (°C): 15

remarks: The wind was from a prevailing South Western direction and carried the cloud of smoke and vapours out over the waters of Cork Harbour as shown in two photos attached to the Original Report (see Appendix 2).

5 Causes of Major Occurrence

main causes

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

5106 operation: runaway reaction

- not applicable -

- not applicable -

- not applicable -

human / organizational 5107 operation: unexpected reaction/phase-transition

- not applicable -

- not applicable -

- not applicable -

- not applicable -

remarks: A runaway chemical reaction (code 5106) occurred in a chemical reactor which became overpressurised and ruptured (code 5101). Limited investigation undertaken by the company prior to the accident did not identify the potential for same to o... see Appendix Full

Report A / causes of major occurrence

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA ident key: 1993_018_01

event:

major occurrence 1201 fire: conflagration (a general engulfment fire)

initiating event 1304 explosion: runaway reaction explosion (usually exothermic)

associated event - not applicable -

Dangerous substances

country: FA ident key: 1993_018_01

a) total establishment inventory

CAS number: 78-93-3 **identity:** Methyl Ethyl Ketone

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): 10,2

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 10 **potential quantity:** 10,2

c) substance belongs to relevant inventory indirectly involved: No

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

a) total establishment inventory

CAS number: 13623-94-4 **identity:** Bis-methylthio-2-nitroethene

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): 1,3

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 1 **potential quantity:** 1,3

c) substance belongs to relevant inventory indirectly involved: No

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

a) total establishment inventory

CAS number: 75-15-0 identity: Carbon Disulphide

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): 0,7

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,7 potential quantity: 0,7

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: identity: Carbon Disulphide

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:

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: identity: Dithio-2-nitroethene K Salt

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): 1,1

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 1,1 potential quantity: 1,1

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: 67-63-1 identity: Isopropyl Alcohol

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): 29

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 16 potential quantity: 29

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: identity: ?blank?

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:

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: identity: Methanol

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): 6

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 6 potential quantity: 6

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: identity: Sodium Hypochloride

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): 0,8

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,8 potential quantity: 0,8

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: identity: Methylene Dichloride

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): 0,13

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,13 potential quantity: 1,3

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: 108-90-7 identity: Monochlorobenzene

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): 0,11

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,11 potential quantity: 0,11

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: 61832-41-5 identity: Nmsm

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): 0,34

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,34 potential quantity: 0,34

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: 25322-69-4 identity: Polypropylene Glycol

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): 0,06

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,06 potential quantity: 0,06

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: identity: Potassium Carbonate

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): 6

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 6 potential quantity: 6

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: 1301-58-3 identity: Potassium Hydroxide

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): 0,1

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,1 potential quantity: 0,1

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: identity: Sodium Hydroxide

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): 0,2

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,2 potential quantity: 0,2

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

a) total establishment inventory

CAS number: identity: Isopropyl Alcohol

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:

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: 1993_018_01

situation

industry

initiating event 2004 pesticides, pharmaceuticals, other fine chemicals

associated event 2004 pesticides, pharmaceuticals, other fine chemicals

activity/unit

major occurrence 3101 process: chemical batch reaction

initiating event 3101 process: chemical batch reaction

associated event 3101 process: chemical batch reaction

component

major occurrence 4003 container; non-pressurised (hopper, tank, drum, bag, etc.)

initiating event 4001 reaction vessel; non-pressurised

associated event 4003 container; non-pressurised (hopper, tank, drum, bag, etc.)

B Consequences Full Report

country: FA ident key: 1993_018_01

1 Area concerned

affected

extent of effects installation: Yes

establishment: Yes

off-site; local: Yes

off-site; regional: No

off-site; transboundary: No

illustration of effects - not applicable -

remarks Smoke and vapours were dispersed across Cork Harbour as shown in two photos atta... see Appendix

Full Report B / area concerned - remarks

2 People

establishment popul. emergency personnel off-site population

total at risk 25 30

immediate fatalities

subsequent fatalities

hospitalizing injuries 2

other serious injuries

health monitoring

remarks Slight injuries occurred to two people employed by Hickson Pharmachem Ltd. Some ... 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** Yes
- **areas of high conservation value or given special protection** Suspected

remarks Harbour waters and foreshore were contaminated by fire water run-off. Levels of ... see Appendix

Full Report B / ecological harm

4 National Heritage Loss

effects on:

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

remarks No apparent effect on National Heritage

5 Material Loss

establishment losses off site losses

costs (direct costs to operator) (social costs)

in ECU ECU ECU ECU

material losses 2E+07 -1

response, clean up, restoration 800000 -1

remarks The material losses, including the business interruption, has been estimated in ... 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 24 hours
- 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 Yes
- political interest No No Yes

remarks The emergency services did not consider it appropriate to evacuate any person ou... see Appendix

7 Discussion of Consequences

Ecological Components involved

country: FA ident key: 1993_018_01

type: 6402 offshore: estuary

threatened: not applicable affected: not applicable

type: 6304 shore: rocky shore

threatened: not applicable affected: not applicable

type: 6301 shore: salt-marsh/mud-flats

threatened: not applicable affected: not applicable

type: 6105 inland: grassland/pasture/meadow

threatened: not applicable affected: not applicable

C Response Full Report

country: FA ident key: 1993_018_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, the follow... see Appendix Full Report C / lesson learned - prevent

measures to mitigate consequences:

After the accident, the follow... see Appendix Full Report C / lesson learned - mitigate

useful references:

- not applicable -

5 Discussion about Response

- not applicable -

Appendices for the FA / 1993_018_01 report

Appendix Short Report / description of accident types:

ACCIDENT CASE HISTORY DESCRIPTION:

An explosion occurred in a batch chemical reactor (8 m³ nominal capacity) which contained 1.5 m³ of waste solvent. Debris from the chemical reactor punctured storage vessels in the Process Building and storage tanks in banded areas adjacent to the process building resulting in another explosion and subsequent fires. The chemicals involved were contained on site or discharged to the environment. Damages and associated costs estimated in about 20 millions ECU.

Appendix Short Report / description of substances involved:

- Isopropyl Alcohol (C.A.S. CODE: 67-63-01, E.E.C. CODE: 603-003-00-0): amount involved = 16,000 Kg.
- N-methyl-1-methyl Thio-2-nitro Ethenamine (C.A.S. CODE: 61832-41-5): amount involved = 340 Kg.
- 1,1 Bis (Methyl-thio)-2-nitroethene (C.A.S. CODE: 13623-94-4): amount involved = 1,000 Kg.
- Potassium Carbonate (C.A.S. CODE: 584-08-7): amount involved = 6,000 Kg.
- Polypropylene Glycol (C.A.S. CODE: 25322-69-4): amount involved = 60 Kg.
- Carbon Disulphide (C.A.S. CODE: 75-15-0, E.E.C. CODE: 006-003-00-3): amount involved = 700 Kg.
- Methyl Ethyl Ketone (C.A.S. CODE: 78-93-3): amount involved = 10,000 Kg.
- Methanol (C.A.S. CODE: 67-56-1, E.E.C. CODE: 603-001-00-X): amount involved = 6,000 Kg.
- Methylene Dichloride (C.A.S. CODE: 75-09-2): amount involved = 130 Kg.
- Monochlorobenzene (C.A.S. CODE: 108-90-7): amount involved = 110 Kg.
- Potassium Hydroxide (C.A.S. CODE: 1301-58-3): amount involved = 100 Kg.
- Sodium Hydroxide (C.A.S. CODE: 1310-73-2): amount involved = 200 Kg.
- Sodium Hypochlorite (C.A.S. CODE: 7681-52-9): amount involved = 800 Kg.
- Dipotassium Salt 1,1 Dithio-2-Nitroethene: amount involved = 1,100 Kg.

Appendix Short Report / description of immediate sources:

The Chemical Reactor was used to store a mixture of Isopropyl Alcohol, 1,1 bis (Methyl Thio)-2-Nitroethene and N-Methyl-1-Methyl Thio-2-Nitro Ethenamine. The chemicals were in the reactor approximately 6 days prior to the explosion. The batch reactor was designed specifically to recover the Isopropyl Alcohol from the waste liquors. The reactor was commissioned in 1991 and designed to British Standard B.S.5500, Category 2. The other chemicals were stored in various chemical reactors and storage tanks in the production building involved (Chemical Building N^o 2-CB2) as well as in storage tanks in the banded area adjacent to the building. All chemicals were stored at ambient conditions or at relatively low temperatures and pressures. The location of the industry is shown on a map attached to the Original Report.

Appendix Short Report / description of suspected causes:

CAUSES:

A runaway chemical reaction occurred in a chemical reactor which became overpressurised and ruptured. Limited investigation undertaken by the company prior to the accident did not identify the potential for same to occur. The post accident chemical reaction hazard analysis tests have established that the accident potential could have been anticipated.

Appendix Short Report / description of immediate effects:

EFFECTS ON PEOPLE:

Slight injuries occurred to two people employed by Hickson Pharmachem Ltd. Some people engaged in fighting the fire were sent to hospital as a precautionary measure. All were released from hospital the following day. The reason for so few injuries was that the relevant building was partitioned into two areas and all personnel in the building were in the area least affected by the major accident.

ECOLOGICAL HARM:

Harbour waters and foreshore were contaminated by the fire water run-off. Levels of solvent found in inshore pools and water were below the levels likely to give rise to acute toxicity. Biological inspection of the shore adjacent to the establishment did not provide any evidence of damage to invertebrate organisms. The dispersion of toxic cloud is shown on two photos attached to the Original Report.

MATERIAL LOSS:

The material losses, including the business interruption, has been estimated in about 20 MECU. The cost of off-site losses has not been determined.

COMMUNITY DISRUPTION:

Water distribution to the community was interrupted for 24 hours.

Appendix Short Report / description of emergency measures taken:

INTERNAL TO THE ESTABLISHMENT:

The plant emergency shut-down procedures were activated and the alarms sounded. The on-site emergency services and the off-site emergency services (approximately 50 people) were mobilised and the resulting fires were extinguished in 6 hours. Some people engaged in fighting the fire were sent to the hospital as a precautionary measure. No off-site evacuation was necessary. The process equipment were decontaminated and the building dismantled. The contaminated fire water was removed from the site in a safe manner.

EXTERNAL TO THE ESTABLISHMENT:

The police intervention was required and the traffic control necessary.

Appendix Short Report / description of immediate lessons learned:

MEASURES TO PREVENT ANY RECURRENCE OF SIMILAR ACCIDENTS:

After the accident, the following measures were established:

- 1- review of procedures for evaluating the potential of chemical reactions to create a major accident;
- 2- review of on-site emergency procedures;
- 3- review to effect a better liaison with the local community;
- 4- review of fire water retention capacity on site.

MEASURES TO MITIGATE THE CONSEQUENCES OF THE ACCIDENT:

After the accident, the following measures were established:

- 1- removal of contaminated fire water from the site in a safe manner;
- 2- removal of any chemicals remaining in process equipment in the affected building;
- 3- decontamination of process equipment and dismantle building;
- 4- institute action to control and ameliorate ground water contamination.

Appendix Full Report A / type of accident:

An explosion, probably due to a runaway chemical reaction (code 1304), occurred in a chemical reactor causing fragments from the reactor to puncture other vessels containing flammable liquids. The damages to the other vessels resulted in another explosion and various fires (code 1201) which consumed some chemicals while the remaining chemicals involved were contained on site or discharged to the environment (codes 1401, 1402, 1403, 1404 and 1405).

Appendix Full Report A / dangerous substances:

The chemicals were stored in various chemical reactors and storage tanks in the production building involved (Chemical Building No.2 CB2) as well as in storage tanks in the banded area adjacent to the building. All chemicals were stored at ambient conditions or at relatively low temperatures and pressures. No substances required to be notified under article 5 of Directive N^o EEC/501/82.

Appendix Full Report A / source of accident - remarks:

An explosion occurred in a batch chemical reactor (codes 3101 and 4001) that was used to store waste liquors containing pharmaceutical intermediates and by products in a pharmaceutical industry (code 2004). The reactor was used as a storage vessel for approximately 6 days prior to the explosion. The batch reactor was designed specifically to recover the Isopropyl Alcohol from the waste liquors. The fires following the explosion involved other vessels containing flammable liquids (code 4003).

Appendix Full Report A / causes of major occurrence:

A runaway chemical reaction (code 5106) occurred in a chemical reactor which became overpressurised and ruptured (code 5101). Limited investigation undertaken by the company prior to the accident did not identify the potential for same to occur. The post accident chemical reaction hazard analysis tests have established that the accident potential could have been anticipated (code 5307).

Appendix Full Report B / area concerned - remarks:

Smoke and vapours were dispersed across Cork Harbour as shown in two photos attached to the Original Report. Air samples taken downwind of the Hickson plant by the Local Authority indicated low levels of organic solvent on the other side of Cork Harbour. Ground water, which is not potable because of saline intrusion, was also contaminated. Remedial action is being taken to remove contaminated ground water.

Appendix Full Report B / people:

Slight injuries occurred to two people employed by Hickson Pharmachem Ltd. Some people engaged in fighting the fire were sent to hospital as a precautionary measure. All were released from hospital the following day. The reason for so few injuries was that the relevant building was partitioned into two areas and all personnel in the building were in the area least affected by the major accident.

Appendix Full Report B / ecological harm:

Harbour waters and foreshore were contaminated by fire water run-off. Levels of solvent found in inshore pools and waters were below the levels likely to give rise to acute toxicity. Biological inspection of the shore adjacent to the establishment did not provide any evidence of damage to invertebrate organisms.

Appendix Full Report B / material loss:

The material losses, including the business interruption, has been estimated in about 20 MECU. The cost of off-site losses has not been determined.

Appendix Full Report B / disruption of community life:

The emergency services did not consider it appropriate to evacuate any person outside the establishment.

Appendix Full Report C / lesson learned - prevent:

After the accident, the following measures were established:

- review of procedures for evaluating the potential of chemical reactions to create a major accident;
- review of on-site emergency procedures;
- review to effect a better liaison with the local community;
- review of fire water retention capacity on site.

Appendix Full Report C / lesson learned - mitigate:

After the accident, the following measures were established:

- removal of contaminated fire water from the site in a safe manner;
- removal of any chemicals remaining in process equipment in the affected building;
- decontamination of process equipment and dismantle building;
- institute action to control and ameliorate ground water contamination.