

Dammexplosion på en fabrik för produktion av farmaceutika.

880329 MARS 1988_12

Efter en testsekvens med en torkare utförd av en tekniker stängdes manluckan om torkaren men fästes inte fullgott. Efter några få minuters drift inträffade en explosion. Ingen skadades. Luft hade troligen kommit in i torkaren genom manluckan. En blandningen av luft och acetonångor hade antänts av en elektrostatisk gnista.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
aceton	67-64-1	10 kg

Skador:

Människor: Inga.
Materiella: Inga.
Miljö/ekologi: Inga effekter rapporterade.
Infrastruktur: Inga.

Erfarenheter redovisade (Ja/Nej): Ja

Kortfattat anges förebyggande åtgärder.

Report Profile

Identification of Report:

country: FA ident key: 1988_012_01

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

Date of Major Occurrence: Time of Major Occurrence

start: 1988-03-29 start:

finish: finish:

Establishment:

name:

address:

industry: 2004 pesticides, pharmaceuticals, other fine chemicals

Pharmaceutical (Process Plant)

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: 1988_012_01

Accident Types:

release: No explosion: Yes

water contamination: No other: No

fire: No

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:

- Acetone (C.A.S. CODE: 67-64-1, E.E.C. CODE: 606-001-02-8): amount involved = less than 10 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 powder dryer of a pharmaceutical industry. The explosion occurred during a testing operation.

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: No

human deaths: No

human injuries: No community disruption: No

other: No

ecological harm: No

national heritage loss: No

description:

In the Original Report there is no evidence of damages due to the dust explosion.... see Appendix Short Report

/ description of immediate effects

Emergency Measures taken:

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

external services: No **restoration:** No

sheltering: No **other:** No

evacuation: No

description:

No emergency measures were necessary, neither on-site nor off-site. Flash fire that resulted from the explosion was self-extinguished.

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:** 1988_012_01

1 Type of Accident

remarks: During a testing operation of a powder dryer, a technician closed the man-hole cover, put the dryer under vacuum and started the rotation. A few minutes later a dust explosion occurred (code 1305).

2 Dangerous Substances

remarks: The total establishment and the potential directly involved inventories of toluene refer to the amount involved in the accident. From the Original Report is not fully clear if acetone was a starting material or a finished product. No data a... see Appendix Full Report A / dangerous substances

3 Source of Accident

illustration: - not applicable -

remarks: The accident occurred in a powder dryer (codes 4007 and 3104) of a pharmaceutical industry (code 2004). The explosion occurred during a testing operation of the powder dryer.

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 5109 operation: electrostatic accumulation

- not applicable -

- not applicable -

- not applicable -

- not applicable -

human / organizational 5302 organization: management attitude problem

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

5401 person: operator error

- not applicable -

- not applicable -

remarks: Investigations carried out after the accident revealed that after the last testing, the dryer man-hole cover had not been fully fastened (code 5401) and air must have entered the rotating dryer at the man-hole cover gasket. Since a nitrogen... see Appendix Full Report

A / causes of major occurrence

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA **ident key:** 1988_012_01

event:

major occurrence 1305 explosion: dust explosion

initiating event 1305 explosion: dust explosion

associated event - not applicable -

Dangerous substances

country: FA **ident key:** 1988_012_01

a) total establishment inventory

CAS number: identity: Powder

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: 67-64-1 identity: Acetone

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): 0,01

use of substance as: STARTING MATERIAL

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 0,01 potential quantity: 0,01

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

Source of Accident - Situation country: FA ident key: 1988_012_01

situation

industry

initiating event 2004 pesticides, pharmaceuticals, other fine chemicals

associated event - not applicable -

activity/unit

major occurrence 3104 process: physical operations (mixing, melting crystallizing, etc.)

initiating event 3104 process: physical operations (mixing, melting crystallizing, etc.)

associated event - not applicable -

component

major occurrence 4007 machinery/equipment (pump, filter, column separator, mixer, etc.)

initiating event 4007 machinery/equipment (pump, filter, column separator, mixer, etc.)

associated event - not applicable -

B Consequences Full Report

country: FA ident key: 1988_012_01

1 Area concerned

affected

extent of effects installation: Yes

establishment: No

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

other serious injuries

health monitoring

remarks No one was injured by the explosion.

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 In the Original Report there is no evidence of damages due to the dust explosion... see Appendix

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 i... see Appendix

7 Discussion of Consequences

C Response Full Report

country: FA **ident key:** 1988_012_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:

- not applicable -

useful references:

- not applicable -

5 Discussion about Response

- not applicable -

Appendices for the FA / 1988_012_01 report

Appendix Short Report / description of accident types:

ACCIDENT CASE HISTORY DESCRIPTION:

A technician had tested a dryer on a number of occasions. He closed the man-hole cover, put the dryer under vacuum and started rotation. A few minutes later, an explosion occurred. No one was injured. Investigations revealed that after the last testing the dryer man-hole cover was not fully fastened. Air must have entered the rotating dryer at the man-hole cover gasket after sampling. The ignition source was probably by an electrostatic discharge. No nitrogen inerting was used.

Appendix Short Report / description of substances involved:

- Acetone (C.A.S. CODE: 67-64-1, E.E.C. CODE: 606-001-02-8): amount involved = less than 10 Kg.

- Powder: composition and amount involved = not known.

Appendix Short Report / description of suspected causes:

CAUSES:

The investigations revealed that, after the last testing, the dryer man-hole cover was not fully fastened. Air must have entered the rotating dryer at the man-hole cover gasket after sampling. It was known that the powders being dried could explode, some residual acetone vapours were present and the Teflon coating on the internal lining of the dryer could have built up a charge. Thus an electrostatic discharge may have caused the explosion. Nitrogen inerting was not used.

Appendix Short Report / description of immediate effects:

In the Original Report there is no evidence of damages due to the dust explosion.

Appendix Short Report / description of immediate lessons learned:

MEASURES TO PREVENT ANY RECURRENCE OF SIMILAR ACCIDENTS:

After the accident, the following measures were adopted:

- 1- nitrogen purging must be carried out before charging/testing the dryer;
- 2- if the vacuum falls to -0.7 bar, rotation must stop and a nitrogen purge must automatically start. An audible alarm must ring;
- 3- when the Original Report was prepared, the company was compiling a computer program for the drying process to ensure that these functions are carried out.

Appendix Full Report A / dangerous substances:

The total establishment and the potential directly involved inventories of toluene refer to the amount involved in the accident. From the Original Report is not fully clear if acetone was a starting material or a finished product. No data are available about the kind and the amount of the powder involved in the accident.

Appendix Full Report A / causes of major occurrence:

Investigations carried out after the accident revealed that after the last testing, the dryer man-hole cover had not been fully fastened (code 5401) and air must have entered the rotating dryer at the man-hole cover gasket. Since a nitrogen inerting was not used, due to a lack in safety culture (code 5302) and insufficient operational procedures (code 5303), an explosive mixture formed. The ignition source was probably by an electrostatic discharge (code 5109).

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 / ecological harm:

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

Appendix Full Report B / material loss:

In the Original Report there is no evidence of damages due to the dust explosion.

Appendix Full Report B / disruption of community life:

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

Appendix Full Report C / lesson learned - prevent:

After the accident, the following measures were adopted:

- 1- nitrogen purging must be carried out before charging/testing the dryer;
- 2- if the vacuum fails to -0.7 bar, rotation must stop and a nitrogen purge must automatically start. An audible alarm must ring;
- 3- when the Original Report was prepared the company was compiling a computer program for the drying process to ensure that these functions are carried out.