

Explosion och brand på en alkoholdepå.

880824 MARS 1988_20

Ett moln av etanolångor antändes av en elektrostatisk gnista. Explosionen följdes av en brand där totalt 15 000 hektoliter etanol berördes. Då olyckan inträffade under semestertider var bemanningen på anläggningen ganska liten. Branden bekämpades av företagets interna brandkår tillsammans med räddningstjänsten. Även polis och sjukvårdare fanns på plats.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
etanol	64-17-5	1185 ton

Skador:

Människor:	Åtta människor omkom och fyra skadades av explosionen.
Materiella:	Byggnader på området skadades.
Miljö/ekologi:	25 hektar med tall och undervegetation brann upp. Hög fiskdödlighet (22 ton) noterades i den närliggande Guadaletefloden.
Infrastruktur:	Området spärrades av och befolkningen i närområdet evakuerades.

Erfarenheter redovisade (Ja/Nej): Nej

Report Profile

Identification of Report:

country: FA ident key: 1988_020_01

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

Date of Major Occurrence: Time of Major Occurrence

start: 1988-08-24 start: 14:00:00

finish: finish:

Establishment:

name:

address:

industry: - not applicable -

Organic Chemical (Alcohol Storage and Distillation)

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_020_01

Accident Types:

release: No **explosion:** Yes

water contamination: No **other:** No

fire: Yes

description:

Together with the ethyl alcohol storage tanks, other facilities (mainly the Refining Pan, the Foreman's House and the Office building) were damaged during the accident.... see Appendix Short Report / description of accident types

Substance(s) Directly Involved:

toxic: No **explosive:** Yes

ecotoxic: No **other:** No

flammable: Yes

description:

- Ethyl Alcohol (C.A.S. CODE: 64-17-5): amount involved = 1,185,000 Kg (about 1,500,000 litres).

Immediate Sources of Accident:

storage: Yes **transfer:** No

process: Yes **other:** No

description:

The accident occurred in an alcohol storage of an organic chemical industry for the alcohol distillation. The components involved were the ethyl alcohol storage tanks.

Suspected Causes:

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

human: No **other:** No

description:

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

Immediate Effects:

material loss: Yes

human deaths: Yes

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

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:** No

external services: Yes **restoration:** No

sheltering: No **other:** No

evacuation: Yes

description:

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

Immediate Lessons Learned:

prevention: No **other:** Yes

mitigation: No

description:

As, when the Original Report was prepared, the causes had not fully identified, no measures had been already established.

A Occurrence Full Report

country: FA **ident key:** 1988_020_01

1 Type of Accident

remarks: An initial, large explosion (code 1307) was followed by a fire (code 1202)

that involved the storage tanks containing about 1,500,000 litres of ethyl alcohol. When the accident occurred, no activities were carrying out due to summer holiday... see Appendix Full Report A / type of accident

2 Dangerous Substances

remarks: The total establishment and the potential directly involved inventories of ethyl alcohol refer to the amount contained in the storage tanks when the accident occurred (about 1,500,000 litres).

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 5109 operation: electrostatic accumulation

- not applicable -

- not applicable -

- not applicable -

- not applicable -

human / organizational - not applicable -

- not applicable -

- not applicable -

- not applicable -

- not applicable -

remarks: After a detailed analysis of the possible sources of ignition, it has been established that the explosive mixture ethyl alcohol vapours/air was ignited by a spark of static electricity (code 5109).

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA ident key: 1988_020_01

event:

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

initiating event - not applicable -

associated event - not applicable -

event:

major occurrence 1102 release: fluid release to ground

initiating event 1307 explosion: VCE (vapour cloud explosion; supersonic wave front)

associated event - not applicable -

Dangerous substances

country: FA ident key: 1988_020_01

a) total establishment inventory

CAS number: 64-17-5 **identity:** Ethyl 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): 1185

use of substance as: NORMAL FINISHED PRODUCT

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 1185 potential quantity: 1185

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir_pot_quant: -1

B Consequences Full Report

country: FA ident key: 1988_020_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 People living nearby were evacuated. 25 hectares of pines and underbush were burn... see Appendix

Full Report B / area concerned - remarks

2 People

establishment popul. emergency personnel off-site population

total at risk 27

immediate fatalities 8

subsequent fatalities

hospitalizing injuries 4

other serious injuries

health monitoring

remarks Inside the establishment 8 people were killed and 4 injured by the explosion.... 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) not applicable

- 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 25 hectares of pines and underbush were burnt (in the Original Report it is not c... see Appendix

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 Inside the establishment, together with the ethyl alcohol storage stanks, other ... see Appendix

6 Disruption of Community Life

establishment/plant evacuated disabled/unoccupiable destroyed

- **nearby residences/hotels** Yes 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 All accesses to the area were forbidden. People living nearby were evacuated.... see Appendix Ful

7 Discussion of Consequences

Ecological Components involved

type: 6204 freshwater: river

threatened: not applicable **affected:** not applicable

type: 6108 inland: woodland; predominantly or totally natural

threatened: not applicable **affected:** not applicable

type: 6107 inland: woodland; predominantly or totally plantation

threatened: not applicable **affected:** not applicable

C Response Full Report

country: FA **ident key:** 1988_020_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

As, when the Original Report w... see Appendix Full Report C / lesson learned - prevent

measures to mitigate consequences:

As, when the Original Report w... see Appendix Full Report C / lesson learned - mitigate

useful references:

- not applicable -

5 Discussion about Response

- not applicable -

Appendices for the FA / 1988_020_01 report

Appendix Short Report / description of accident types:

Together with the ethyl alcohol storage stanks, other facilities (mainly the Refining Pan, the Foreman's House and the Office building) were damaged during the accident.

An initial, large explosion was followed by a fire that involved the storage tanks containing about 1,500,000 litres of ethyl alcohol. When the accident occurred, no activities were carrying out due to summer holidays and only some maintenance works were being done at that moment.

Appendix Short Report / description of suspected causes:

INITIATING EVENT AND CONSEQUENCES:

A first large explosion was followed by a fire that reached the ethyl alcohol tanks storing 1,500,000 litres at that moment.

CAUSES:

After a detailed analysis of the possible sources of ignition, it has been established that the explosive mixture ethyl alcohol vapours/air was ignited by a spark of static electricity.

Appendix Short Report / description of immediate effects:

EFFECTS ON PEOPLE:

Inside the establishment 8 people were killed and 4 injured by the explosion.

MATERIAL LOSS:

Inside the establishment, together with the ethyl alcohol storage stanks, other facilities (mainly the Refining Pan, the Foreman's House and the Office building) were damaged during the accident. Moderate damages also occurred outside the establishment. No data are available about the cost of these material damages.

ECOLOGICAL HARM:

25 hectares of pines and underbush were burnt. High mortality of fishes (about 22 tonnes) in the nearby Guadalete river.

COMMUNITY DISRUPTION:

All accesses to the area were forbidden. People living nearby were evacuated.

Appendix Short Report / description of emergency measures taken:

INTERNAL TO THE ESTABLISHMENT:

Fire-fighting operations were carried out.

EXTERNAL TO THE ESTABLISHMENT:

The External Emergency Plan was partially activated. National Police, fire brigades, Civil Ward and medical services arrived on-site. The naval base of Rota and San Fernando were alerted. All accesses to the area were forbidden. Injured and dead people, together with those living nearby, were evacuated.

Appendix Full Report A / type of accident:

An initial, large explosion (code 1307) was followed by a fire (code 1202) that involved the storage tanks containing about 1,500,000 litres of ethyl alcohol. When the accident occurred, no activities were carrying out due to summer holidays and only some maintenance works were being done at that moment.

Appendix Full Report B / area concerned - remarks:

People living nearby were evacuated. 25 hectares of pines and underbush were burnt. High mortality of fishes (about 22 tonnes) in the nearby Guadalete river.

Appendix Full Report B / people:

Inside the establishment 8 people were killed and 4 injured by the explosion.

Appendix Full Report B / ecological harm:

25 hectares of pines and underbush were burnt (in the Original Report it is not clear whether the pines were planted or not). High mortality of fishes (about 22 tonnes) in the nearby Guadalete river.

Appendix Full Report B / material loss:

Inside the establishment, together with the ethyl alcohol storage tanks, other facilities (mainly the Refining Pan, the Foreman's House and the Office building) were damaged during the accident. Moderate damages also occurred outside the establishment. No data are available about the cost of these material damages.

Appendix Full Report B / disruption of community life:

All accesses to the area were forbidden. People living nearby were evacuated.

Appendix Full Report C / lesson learned - prevent:

As, when the Original Report was prepared, the causes had not fully identified, no measures had been already established.

Appendix Full Report C / lesson learned - mitigate:

As, when the Original Report was prepared, the causes had not fully identified, no emergency measures had been already established.