

Utsläpp av kolväten på ett oljeraffinaderi till följd av en brusten tank.

881225 MARS 1800_27

Olyckan inträffade under påfyllning av en tank med halvfärdiga produkter (kolväten) på ett oljeraffinaderi. En tank med 15 000 m³ kapacitet sprack i en svetsfog i tankens nedre del. Sprickbildningen fortsatte först vertikalt uppåt och sedan horisontellt från sida till sida. Den direkta orsaken är inte klargjord men tillskrivs antingen överbelastning, eller möjligen skiktning av vätskor med olika densitet som resulterat i sned belastning av tanken. Den utströmmande vätskan förstörde tre intilliggande tankar helt eller delvis. Den utspillda vätskan spred sig över en yta på 8 hektar och resulterade i ett stort antal brustna rörledningar, dock utan att brand utbröt.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
ospecificerade kolväten		> 15 ton

Skador:

Människor:	Inga.
Materiella:	Endast vad som förlorats i utsläpp.
Miljö/ekologi:	Inga skador rapporterade.
Infrastruktur:	Inga.

Erfarenheter redovisade (Ja/Nej): Nej

Report Profile

Identification of Report:

country: FA ident key: 1800_027_01

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

Date of Major Occurrence: Time of Major Occurrence

start: 25/12/1988 start: 03:00:00

finish: finish:

Establishment:

name:

address:

industry: 2002 petrochemical, refining, processing

Petroleum Refining (Petrochemical and Refinery Complex)

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:** 1800_027_01

Accident Types:

release: Yes **explosion:** No

water contamination: No **other:** No

fire: No

description:

SAFETY SYSTEMS OR OPERATORS INTERVENTION:... see Appendix Short Report / description of accident types

Substance(s) Directly Involved:

toxic: No **explosive:** Yes

ecotoxic: No **other:** No

flammable: Yes

description:

- Atmospheric Residue: amount involved = 12,804,750 Kg (about 13,500 m³ at 127°C with a density of 948.5 Kg/m³).

Immediate Sources of Accident:

storage: Yes **transfer:** No

process: Yes **other:** No

description:

The accident occurred during the filling of a storage tank (15,000 m³ capacity) for semi-finished products (atmospheric residue) in a petroleum refinery. In the accident were involved the storage tanks T-837, T-827 and T-836, all with the s... see Appendix Short Report / description of immediate sources

Suspected Causes:

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

human: No **other:** Yes

description:

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

Immediate Effects:

material loss: Yes

human deaths: No

human injuries: No **community disruption:** No

other: No

ecological harm: No

national heritage loss: No

description:

MATERIAL LOSS:... see Appendix Short Report / description of immediate effects

Emergency Measures taken:

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

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: 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:** 1800_027_01

1 Type of Accident

remarks: An atmospheric tank, storing atmospheric residue, was completely destroyed

by a vertical fracture causing the release of the liquid (code 1102). The

wave of the escaping liquid destroyed two other tanks. Spilled hydrocarbons

overflowed the ... see Appendix Full Report A / type of accident

2 Dangerous Substances

remarks: The total establishment and the potential directly involved inventories of

atmospheric residue refer to the whole amount stored in the three 15,000m³

storage tanks (T-837, T-827 and T-836) involved in the accident and in the

10,000m³ tank T... see Appendix Full Report A / dangerous substances

3 Source of Accident

illustration: - not applicable -

remarks: The accident occurred during the filling of a storage tank (15,000 m³

capacity) for semi-finished products (atmospheric residue) in a petroleum

refinery (codes 2002 and 3201). In the accident were involved the storage

tanks T-837, T-827 and... 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):

direction (from):

stability (Pasquill):

ambient temperature (°C):

remarks: - not applicable -

5 Causes of Major Occurrence

main causes

technical / physical 5501 other: not identified

- not applicable -

- not applicable -

- not applicable -

- not applicable -

human / organizational - not applicable -

- not applicable -

- not applicable -

- not applicable -

- not applicable -

remarks: The causes of the accident have not yet been clarified (code 5501). Some hypotheses have been excluded the following remained under investigation: malfunction of the atmospheric distillation column causing the production of a residue with a... see Appendix Full Report

A / causes of major occurrence

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA ident key: 1800_027_01

event:

major occurrence 1102 release: fluid release to ground

initiating event 1102 release: fluid release to ground

associated event - not applicable -

Dangerous substances

country: FA ident key: 1800_027_01

a) total establishment inventory

CAS number: identity: Atmospheric Residue

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): 52167,5

use of substance as: NORMAL FINISHED PRODUCT

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 12805 **potential quantity:** 52167,5

c) substance belongs to relevant inventory indirectly involved: No

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

Source of Accident - Situation **country:** FA **ident key:** 1800_027_01

situation

industry

initiating event 2002 petrochemical, refining, processing

associated event - not applicable -

activity/unit

major occurrence 3201 storage: process-associated (stockholding, etc. on-site of manufacture)

initiating event 3201 storage: process-associated (stockholding, etc. on-site of manufacture)

associated event - not applicable -

component

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

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

associated event - not applicable -

B Consequences Full Report

country: FA **ident key:** 1800_027_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 A floating barrier was put up outside the establishment in order to prevent the ... 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 people were injured during the accident.

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 preventing human access or activities) Suspected

- marine or fresh water habitat Suspected

- areas of high conservation value or given special protection Suspected

remarks A floating barrier was put up in order to prevent the pollution of the pond of t... 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 Two storage tanks were destroyed and one damaged by the wave of the escaping liq... 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:** 1800_027_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

A similar accident happened on... see Appendix Full Report C / lesson learned - prevent

measures to mitigate consequences:

This accident had been taken i... see Appendix Full Report C / lesson learned - mitigate

useful references:

- not applicable -

5 Discussion about Response

- not applicable -

Appendices for the FA / 1800_027_01 report

Appendix Short Report / description of accident types:

SAFETY SYSTEMS OR OPERATORS INTERVENTION:

The high level alarm (set at 21.5m) did not intervene.

ACCIDENT CASE HISTORY DESCRIPTION:

The atmospheric tank T-837, storing atmospheric residue, was completely destroyed by a vertical fracture on 6 (out of the 10) plates of the shell. The fracture was from the lower side of the shell towards its higher and then continued horizontally from a side to the other. The bottom ruptured in the transition zone of the welding to the shell. The wave of the escaping liquid from storage tank T-837 destroyed the nearby tanks T-827 and T-836 (with the same capacity of tank T-837 but filled with atmospheric residue only at a level of 1m [about 600 m³]). Besides, the tank T-826, storing 10,000 m³ of liquid and located in the same basin with the three others, was seriously damaged. Spilled hydrocarbons overflowed the tanks dike and spread over an area of 8 hectares (80,000 m²) causing the rupture of many pipes (in heavy residue, steam and gasoil service) and the displacement without rupture of pipes in gas service (two of ethylene, one of vinyl chloride), but no fire developed.

Appendix Short Report / description of immediate sources:

The accident occurred during the filling of a storage tank (15,000 m³ capacity) for semi-finished products (atmospheric residue) in a petroleum refinery. In the accident were involved the storage tanks T-837, T-827 and T-836, all with the same volumetric capacity and containing atmospheric residue. The roof of tank T-837 had been damaged in 1978 and in 1981 by the explosion due to water vapours at the top of a tank.

Appendix Short Report / description of suspected causes:

CAUSES:

The causes of the accident have not yet been clarified. The hypotheses that have been excluded during the investigations were:

- operator error (taking into account the examination of the instrument registrations);
- massive evaporation of water that could have been used erroneously instead of the cooling oil in the tank;
- explosion even if nobody inside or outside the establishment heard the noise of an explosion;

- terroristic attack.

The hypotheses remained under investigation were:

- malfunction of the atmospheric distillation column causing the production of an atmospheric residue with a density different from that of the product already stored, causing stratification and subsequent roll-over;
- rupture of the shell due to an excessive hydrostatic pressure caused by overfilling (by about 2m above the normal high operating level [19.6m]).

Appendix Short Report / description of immediate effects:

MATERIAL LOSS:

Two storage tanks were destroyed and one damaged by the wave of the escaping liquid from the tank fractured. Besides, spilled hydrocarbons overflowed the tanks dike and spread over an area of 8 hectares (80,000 m²) causing the rupture of many pipes (in heavy residue, steam and gasoil service) and the displacement without rupture of pipes in gas service (two of ethylene, one of vinyl chloride). No data are available about the cost of the material losses.

Appendix Short Report / description of emergency measures taken:

INTERNAL TO THE ESTABLISHMENT:

Activation of the Internal Emergency Plan and diversion of the released atmospheric residue to the storm water basin.

EXTERNAL TO THE ESTABLISHMENT:

A floating barrier was put up in order to prevent the pollution of the pond of the locality of Berre (not occurred).

Appendix Short Report / description of immediate lessons learned:

MEASURES TO PREVENT ANY RECURRENCE OF SIMILAR ACCIDENTS:

A similar accident happened on January 2, 1988 in the oil storage plant of Ashland, Florette Pennsylvania in the United States of America. The conclusions of these two accidents should be examined together.

MEASURES TO MITIGATE THE EFFECTS OF THE ACCIDENT:

This accident had been taken into account in the Emergency Plan.

Appendix Full Report A / type of accident:

An atmospheric tank, storing atmospheric residue, was completely destroyed by a vertical fracture causing the release of the liquid (code 1102). The wave of the escaping liquid destroyed two other tanks. Spilled hydrocarbons overflowed the tanks dike and spread (code 1102) over an area of 8 hectares (80,000m²) causing the rupture of many pipes (in heavy residue, steam and gasoil service) and the displacement without rupture of pipes in gas service, but no fire developed.

Appendix Full Report A / dangerous substances:

The total establishment and the potential directly involved inventories of atmospheric residue refer to the whole amount stored in the three 15,000m³ storage tanks (T-837, T-827 and T-836) involved in the accident and in the 10,000m³ tank T-826 damaged, but not destroyed, by the spilled liquid. The atmospheric residue was stored at 127 °C with a density of 948.5 Kg/m³. When the accident occurred, tanks T-827 and T-836 were filled only at a level of 1m (about 600m³).

Appendix Full Report A / source of accident - remarks:

The accident occurred during the filling of a storage tank (15,000 m³ capacity) for semi-finished products (atmospheric residue) in a petroleum refinery (codes 2002 and 3201). In the accident were involved the storage tanks T-837, T-827 and T-836, all with the same volumetric capacity and containing atmospheric residue (code 4003).

Appendix Full Report A / causes of major occurrence:

The causes of the accident have not yet been clarified (code 5501). Some hypotheses have been excluded the following remained under investigation: malfunction of the atmospheric distillation column causing the production of a residue with a density different from that of the product already stored, causing stratification and subsequent roll-over; rupture of the shell due to an excessive hydrostatic pressure caused by overfilling (by about 2m above the normal high operating level [19.6m]).

Appendix Full Report B / area concerned - remarks:

A floating barrier was put up outside the establishment in order to prevent the pollution of the pond of the locality of Berre. No significant effects outside the establishment occurred.

Appendix Full Report B / ecological harm:

A floating barrier was put up in order to prevent the pollution of the pond of the locality of Berre and therefore no significant ecological harms occurred.

Appendix Full Report B / material loss:

Two storage tanks were destroyed and one damaged by the wave of the escaping liquid from the tank fractured. Besides, spilled hydrocarbons overflowed the tanks dike and spread over an area of 8 hectares (80,000 m²) causing the rupture of many pipes (in heavy residue, steam and gasoil service) and the displacement without rupture of pipes in gas service (two of ethylene, one of vinyl chloride). No data are available about the cost of the material losses.

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:

A similar accident happened on January 2, 1988 in the oil storage plant of Ashland, Florette Pennsylvania in the United States of America. The conclusions of these two

accidents should be examined together.

Appendix Full Report C / lesson learned - mitigate:

This accident had been taken into account in the Emergency Plan.