

Brand på ett lagerområde på en petrokemisk anläggning.

910614 MARS 1800_34

Branden startade i en manlucka under pågående underhållsarbete på underjordiska rörledningar. Manluckan kan ha varit otillräckligt tillsluten efter inspektion. Rörledningarna var anslutna till elva tankar i olika tillstånd, från full, till halvfull, och tom och avgasad. När larmet gick ca klockan 11:15 stängdes alla ventiler automatiskt och strömtilförseln ströps. Trots detta flammade nya bränder upp med jämna mellanrum under ett par timmars tid. Ett försök att släcka branden genom att täcka manluckan med sand misslyckades. Företagets interna brandkår samarbetade med räddningstjänsten i brandbekämpningen. Klockan 15:20 exploderade två acetylengastuber som använts i underhållsarbetet. Kort därefter upptäcktes att ventilerna till en av de elva tankarna av okänd anledning inte var stängd: flödet ut ur tanken uppskattades till 150m³/h. Branden släcktes slutgiltigt klockan 15:40 med hjälp av skumkanoner. Släckningsvatten samlades upp och skickades till företagets reningsanläggning.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
ospecificerade kolväten		okänt

Skador:

Människor:	Femton brandmän brännskadades; två mycket svårt, fem allvarligt, och 8 lindrigt. Utanför anläggningen skadades en fotograf som föll ned från ett tak, och en journalist som skadades på annat sätt.
Materiella:	Förutom en del brandbekämpningsutrustning skadades även järnvägen och några järnvägsvagnar. Stora delar av anläggningen skadades.
Miljö/ekologi:	Sot och partiklar släpptes ut i fyra timmar men inga bestående effekter på miljö rapporterades.
Infrastruktur:	Trafiken stängdes av och närbelägna kontor och byggnader utrymdes, något som berörde ca 900 människor.

Erfarenheter redovisade (Ja/Nej): Ja

Mycket kort redogörs för några förebyggande åtgärder.

Report Profile

Identification of Report:

country: FA ident key: 1800_034_01

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

Date of Major Occurrence: Time of Major Occurrence

start: 1991-06-14 start: 11:24:00

finish: finish:

Establishment:

name:

address:

industry: 2008 wholesale and retail storage and distribution (incl. LPG bottling & bulk distrib., more: F1!)

Petroleum Products Storage Depot

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_034_01

Accident Types:

release: Yes explosion: Yes

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:

- Gasoline (C.A.S. CODE: 8008-61-9): amount involved = (about 670 m³ [liquid escaped at a rate of 150 m³/h for about 4 hours]).

Immediate Sources of Accident:

storage: Yes transfer: No

process: No other: No

description:

The accident occurred in a petroleum storage depot during maintenance works on underground pipings. The depot, built in 1926, was used for the storage of flammable liquids in 27 tanks (subdivided in 12 containment basins) with a whole volum... see Appendix Short Report / description of immediate sources

Suspected Causes:

plant or equipment: No **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:** Yes

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:** Yes

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:** No

mitigation: Yes

description:

MEASURES TO MITIGATE THE EFFECTS OF THE ACCIDENT:... see Appendix Short Report / description of immediate lessons learned

A Occurrence Full Report

country: FA **ident key:** 1800_034_01

1 Type of Accident

remarks: A fire started at the man-hole of an inspection pit of underground pipes of a petroleum storage depot (code 1202). The fire caused also the explosion of two acetylene bottles used in the maintenance work (code 1306). Soot and particulate we... see Appendix Full Report A / type of accident

2 Dangerous Substances

remarks: The total establishment inventory of gasoline refers to the whole volumetric capacity of tanks N° 1, 2, 3 and 91. The potential directly involved inventory of gasoline refers to the whole amount in the tanks above when the accident occurred... see Appendix Full Report A / dangerous substances

3 Source of Accident

illustration: - not applicable -

remarks: The accident occurred in a petroleum storage depot (code 2008) during maintenance works on underground pipings (code 4011). The depot, built in 1926, was used for the storage of flammable liquids (codes 3202 and 4003) in 27 tanks (subdivide... 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 - not applicable -

- not applicable -

- not applicable -

- not applicable -

- not applicable -

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

5304 organization: training/instruction (none, inadequate, inappropriate)

5401 person: operator error

5501 other: not identified

- not applicable -

remarks: The most probable hypothesis is that, during the maintenance work, the man-hole of the inspection pit was put again in place but only one bolt was tightened (codes 5303, 5304 and 5401). On June 14, the inlet valve of tank N° 1 was opened fo... see Appendix Full Report A / causes of major occurrence

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA ident key: 1800_034_01

event:

major occurrence 1306 explosion: explosive decomposition (of unstable material)

initiating event - not applicable -

associated event - not applicable -

event:

major occurrence 1202 fire: pool fire (burning pool of liquid, contained or uncontained)

initiating event 1202 fire: pool fire (burning pool of liquid, contained or uncontained)

associated event - not applicable -

Dangerous substances

country: FA **ident key:** 1800_034_01

a) total establishment inventory

CAS number: 8006-61-9 **identity:** Gasoline

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: 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:** G O

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: 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:** Fod

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: 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: 1800_034_01

situation

industry

initiating event - not applicable -

associated event - not applicable -

activity/unit

major occurrence - not applicable -

initiating event - not applicable -

associated event - not applicable -

component

major occurrence 4011 general pipework/flanges

initiating event - not applicable -

associated event - not applicable -

situation

industry

initiating event 2008 wholesale and retail storage and distribution (incl. LPG bottling & bulk distrib., more: F1!)

associated event - not applicable -

activity/unit

major occurrence 3202 storage: distribution-associated (not on-site of manufacture)

initiating event 3202 storage: distribution-associated (not on-site of manufacture)

associated event - not applicable -

component

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

initiating event 4011 general pipework/flanges

associated event - not applicable -

B Consequences Full Report

country: FA ident key: 1800_034_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 e... see Appendix

Full Report B / area concerned - remarks

2 People

establishment popul. emergency personnel off-site population

total at risk 900

immediate fatalities

subsequent fatalities

hospitalizing injuries 7

other serious injuries 8 2

health monitoring

remarks Inside the establishment 15 firemen were burned during the accident: 2 of them w... 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 Soot and particulates were emitted for about 4 hours but no toxic gas emission o... 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 Damages of some equipments of the fire brigade, destruction of the railways and ... see Appendix

Full Report B / material loss

6 Disruption of Community Life

establishment/plant evacuated disabled/unoccupiable destroyed

- nearby residences/hotels Yes No No

- nearby factories/offices/small shops Yes No No

- schools, hospitals, institutions Yes No No

- other places of public assembly Yes 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 The traffic was interrupted. Evacuation of the closer buildings (less than 200 p... see Appendix

7 Discussion of Consequences

C Response Full Report

country: FA ident key: 1800_034_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

- not applicable -

measures to mitigate consequences:

As a such kind of fire never h... see Appendix Full Report C / lesson learned - mitigate

useful references:

- not applicable -

5 Discussion about Response

- not applicable -

Appendices for the FA / 1800_034_01 report

Appendix Short Report / description of accident types:

ACCIDENT CASE HISTORY DESCRIPTION:

A fire started at the man-hole of an inspection pit for underground pipes of a petroleum storage depot during maintenance work on the piping supplying the tank N° 2. The underground pipes were feeding eleven tanks in different conditions (empty but not degassed, half empty, full, empty and degassed, empty). Maintenance work started on June 11 (hot work-permit had been ordinarily issued on June 10 and the pipes were empty). When the fire started, the water emulsion in the tank basins became yellow and ignited resulting in fire. The alarm was sounded and all valves were automatically closed (it required about 14 minutes). Soon after, the power supply was also interrupted. After inspection, all accessible valves were found to be closed and therefore rapid extinguishing of the fire was to be expected. Instead, the phenomenon repeated various times that afternoon and the flames were extinguished by the personnel quickly. There was an unsuccessful attempt to extinguish the fire by covering the inspection pit with sand. The fire escalated but the personnel in collaboration with the fire brigade managed to confine it within the tank dike by applying foam using foam monitors. At about 15:20 an explosion occurred and, even if all people thought it was tank N° 76, the explosion was caused by two acetylene bottles used in the maintenance works. Finally, it was found that a valve of tank N° 1 (full of gasoline) had been opened (for reasons not clarified) and it was releasing gasoline with a rate of 150 m³/h. The fire was extinguished at 15:40 (about 4.5 hours after it started). To extinguish the fire, about 43,000 litres of foam (from storage depot, local fire brigade, ecc.), that is about 717 m³ of water, were used. The whole amount of water used in extinguish the fire and cooling the nearby tanks (about 1,500 m³) was collected and treated according to the degree of pollution established after the analysis for BOD₅, COD and hydrocarbons. Monitoring of the underground channels revealed no pollution.

Appendix Short Report / description of immediate sources:

The accident occurred in a petroleum storage depot during maintenance works on underground pipings. The depot, built in 1926, was used for the storage of flammable liquids in 27 tanks (subdivided in 12 containment basins) with a whole volumetric capacity of 66,513 m³. The fire started at the man-hole of an inspection pit of underground pipes feeding the storage tanks. The inspection pit was located in three different basins containing, respectively, tanks N° 90, 91, 92 and 93; 76, 77 and 78; 1, 2, 3 and 4.

When the accident occurred, tank:

- N° 76 (14,000 m³ of FOD) was empty but not degassed;
- N° 77 (1,400 m³ of FOD) was quite full;
- N° 78 (1,400 m³ of FOD) was full;
- N° 1 (14,480 m³ of gasoline) was full;
- N° 2 (12,700 m³ of gasoline) was empty and degassed;
- N° 3 (4,300 m³ of gasoline) was full;
- N° 4 (10,000 m³ of FOD) was full;
- N° 90 (1,423 m³) was full;
- N° 91 (2,695 m³ of gasoline) was empty;
- N° 92 (4,525 m³ of GO) was full;
- N° 93 (4,525 m³ of FOD) was full.

Appendix Short Report / description of suspected causes:

CAUSES:

The most probable hypothesis is that, during the maintenance work, the man-hole of the inspection pit was put again in place but only one bolt was tightened. On June 14, the inlet valve of tank N° 1 was opened for an unknown reason and the gasoline contained in the tank escaped with a flow of 150 m³/h. The flow could have lifted the cover of the man-hole allowing the release of gasoline.

Appendix Short Report / description of immediate effects:

EFFECTS ON PEOPLE:

Inside the establishment 15 firemen were burned during the accident: 2 of them were badly hurt, 5 seriously and 8 slightly. The firemen were burned due to a gust of wind and for the cylinders' explosion. Outside the establishment two people (a photo reporter and a journalist) were injured but not for the effects of the fire or of the explosion. The photo reporter fell down by a roof and the journalist was injured by a fire fighting piping.

MATERIAL LOSS:

Damages of some fire fighting equipment of the fire brigade, destruction of the railways and of three wagons of the SNCF. As far as it concerns the depot: tank N° 2 was deformed; tanks N° 1 and 3 had traces of burning in the upper side; tank N° 76 was damaged at the heat insulator; tanks N° 76 and 78 had slight damages at the heat insulator; tank N° 93 had traces of burning in the upper side and shows some point of impact due to the fragments of the acetylene cylinders (without perforation).

The joints of the pipings placed on the left side were burned.

ECOLOGICAL HARM:

Soot and particulates were emitted for about 4 hours but no toxic gas emission occurred. Floating barriers have been precautionally employed but the fire water used was collected and treated according to the degree of pollution established after the analysis for BOD₅, COD and hydrocarbons. Monitoring of the underground channels revealed no pollution.

COMMUNITY DISRUPTION:

The traffic was interrupted. Evacuation of the closer buildings (less than 200 people) and of the offices and factories (about 700 people) located back to the storage depot on the Seine river.

Appendix Short Report / description of emergency measures taken:

INTERNAL TO THE ESTABLISHMENT:

When the fire started, the alarm was sounded and all valves were automatically closed (it required about 14 minutes). Soon after, the power supply was also interrupted.

The activation of the cooling of nearby tanks was activated. There was an unsuccessful attempt to extinguish the fire by covering the inspection pit with sand. The fire escalated but the personnel in collaboration with the fire brigade managed to confine it within the tank dike by applying foam using foam monitors. The fire water used was collected and treated according to the degree of pollution established after the analysis for BOD5, COD and hydrocarbons. Monitoring of the underground channels revealed no pollution.

EXTERNAL TO THE ESTABLISHMENT:

Floating barriers were deployed in the Seine river as a precautionary measure. The traffic was interrupted. Evacuation of the closer buildings (less than 200 people) and of the offices and factories (about 700 people) located back to the storage depot on the Seine river.

Appendix Short Report / description of immediate lessons learned:

MEASURES TO MITIGATE THE EFFECTS OF THE ACCIDENT:

As a such kind of fire never happened previously, it has to be taken into account during the evaluation of the scenarios for possible future accidents.

The sand was not useful in extinguishing the fire and therefore it will not necessary to foresee its stockage on-site.

Appendix Full Report A / type of accident:

A fire started at the man-hole of an inspection pit of underground pipes of a petroleum storage depot (code 1202). The fire caused also the explosion of two acetylene bottles used in the maintenance work (code 1306). Soot and particulate were emitted for almost 4 hours but no toxic gas emission occurred. The water used in fire fighting operations was collected and no water pollution occurred.

Appendix Full Report A / dangerous substances:

The total establishment inventory of gasoline refers to the whole volumetric capacity of tanks N° 1, 2, 3 and 91. The potential directly involved inventory of gasoline refers to the whole amount in the tanks above when the accident occurred. The total establishment and the potential directly involved of FOD (in tanks N° 76, 77, 78, 4 and 93) and GO (in tanks N° 92) have been calculated with the same approach.

Appendix Full Report A / source of accident - remarks:

The accident occurred in a petroleum storage depot (code 2008) during maintenance works on underground pipings (code 4011). The depot, built in 1926, was used for the storage of flammable liquids (codes 3202 and 4003) in 27 tanks (subdivided in 12 containment basins) with a whole volumetric capacity of 66,513 m³. The inspection pit was located in three different basins containing, respectively, tanks N° 90, 91, 92 and 93; 76, 77 and 78; 1, 2, 3 and 4.

Appendix Full Report A / causes of major occurrence:

The most probable hypothesis is that, during the maintenance work, the man-hole of the inspection pit was put again in place but only one bolt was tightened (codes 5303, 5304 and 5401). On June 14, the inlet valve of tank N° 1 was opened for an unknown reason (code 5501) and the gasoline contained in the tank escaped with a flow of 150 m³/h. The flow could have lifted the cover of the man-hole allowing the release of gasoline.

Appendix Full Report B / area concerned - remarks:

In the Original Report there is no evidence of significant effects outside the establishment because soot and particulates were emitted for about 4 hours but no toxic gas emission occurred and, even if floating barriers have been precautionally employed, the whole amount of fire water used was collected. Monitoring of the underground channels revealed no pollution.

Appendix Full Report B / people:

Inside the establishment 15 firemen were burned during the accident: 2 of them were badly hurt, 5 seriously and 8 slightly. The firemen were burned due to a gust of wind and for the cylinders' explosion. Outside the establishment two people (a photo reporter and a journalist) were injured but not for the effects of the fire or of the explosion. The photo reporter fell down by a roof and the journalist was injured by a fire fighting piping.

Appendix Full Report B / ecological harm:

Soot and particulates were emitted for about 4 hours but no toxic gas emission occurred. Floating barriers had been precautionally employed but the fire water used had been collected and had treated according to the degree of pollution established after the analysis for BOD5, COD and hydrocarbons. Monitoring of the underground channels revealed no pollution.

Appendix Full Report B / material loss:

Damages of some equipments of the fire brigade, destruction of the railways and of three wagons of the SNCF. Tank N° 2 was deformed; tanks N° 1 and 3 had traces of burning in the upper side; tank N° 76 was damaged at the heat insulator; tanks N° 76 and 78 had slight damages at the heat insulator; tank N° 93 had traces of burning in the upper side and shows some point of impact due to the fragments of acetylene cylinders (no perforation). The joints of the pipings placed on the left side were burned.

Appendix Full Report B / disruption of community life:

The traffic was interrupted. Evacuation of the closer buildings (less than 200 people) and of the offices and factories (about 700 people) located back to the storage depot on the Seine river.

Appendix Full Report C / lesson learned - mitigate:

As a such kind of fire never happened previously, it has to be taken into account during the evaluation of the scenarios for possible future accidents.

The sand was not useful in extinguishing the fire and therefore it will not necessary to foresee its stockage on-site.