

Brand i en avloppsreningsanläggning för separation av vatten från oljor och kolväten.

900206 MARS 1990_11

Olyckan inträffade i anläggning för separation av vatten från avfallsolja och andra brandfarliga vätskor, som toluen och xylen. Vattnet skiljdes åt från de brandfarliga, lättare vätskorna i egenskap av att vara tyngre. Vatten tappades från botten av tanken och de brandfarliga substanserna tappades av och förbrändes. De ångor som uppstod passerades genom ett aktivt kolfiler. Dessa ångor självantändes på grund av överhettning och lågorna slog back och antände det flytande brandfarliga avfallet. Den explosion som uppstod skadade både tak och vägg på tanken. Den påföljande branden hotade att antända flera lagertankar. Företagets interna brandkår fick hjälp av grannföretagets brandkår och av räddningstjänsten att bekämpa branden. De utsatta tankarna kylades med vatten. Branden släcktes efter hand med skum.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
explosiv blandning av bränsleångor och luft		okänt
en flytande blandning av ämnen som toluen, xylen m.m.		40 000 kg

Skador:

Människor:	Inga.
Materiella:	Anläggningen skadades påtagligt.
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: 1990_011_01

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

Date of Major Occurrence: Time of Major Occurrence

start: 1990-02-06 start: 01:30:00

finish: finish:

Establishment:

name:

address:

industry: 2007 waste treatment, disposal

Waste Treatment & Disposal

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:** 1990_011_01

Accident Types:

release: No **explosion:** Yes

water contamination: No **other:** No

fire: Yes

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:

- Explosive mixture of fuel vapours/air inside the storage tank: amount involved = not known (it was estimated to be a few kg)... see Appendix Short Report / description of substances involved

Immediate Sources of Accident:

storage: Yes **transfer:** No

process: No **other:** No

description:

The accident occurred in a waste oil de-oiling tank of a waste treatment and disposal industry where waste oil and other contaminated flammable liquid wastes, like toluene and xylene, were separated out by gravity from the water contents. I... see Appendix Short Report / description of immediate sources

Suspected Causes:

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

human: No **other:** No

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:** No

external services: Yes **restoration:** Yes

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:** 1990_011_01

1 Type of Accident

remarks: Owing to self-heating in an absorption unit (active carbon filter), flammable vapours coming from a waste oil de-oiling tank during transfer operations were ignited. As no flame arrestors had been installed, a flashback occurred to the tank... see Appendix Full Report A / type of accident

2 Dangerous Substances

remarks: In the waste oil de-oiling tank was stored waste oil and other contaminated flammable liquid wastes, like toluene and xylene. The total establishment and the potential directly involved inventories of the contaminated flammable wastes refer... see Appendix Full Report A / dangerous substances

3 Source of Accident

illustration: - not applicable -

remarks: The accident occurred in a waste oil de-oiling tank (code 4003) of a waste treatment and disposal industry (code 2007) where waste oil and other contaminated flammable liquid wastes, like toluene and xylene, were separated out by gravity fr... 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: Stormy weather.

5 Causes of Major Occurrence

main causes

technical / physical 5107 operation: unexpected reaction/phase-transition

- not applicable -

- not applicable -

- not applicable -

- not applicable -

human / organizational 5307 organization: process analysis (inadequate, incorrect)

5308 organization: design of plant/equipment/system (inadequate, inappropriate)

- not applicable -

- not applicable -

- not applicable -

remarks: The vapours displaced from the waste oil de-oiling tank during transfer operations were passed through an active carbon filter. Owing to self-heating in this absorption unit, the vapours ignited (code 5107). As no flame arrestors had been i... see Appendix Full Report A / causes of major occurrence

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA ident key: 1990_011_01

event:

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

initiating event - not applicable -

associated event - not applicable -

event:

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

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

associated event - not applicable -

Dangerous substances

country: FA **ident key:** 1990_011_01

a) total establishment inventory

CAS number: identity: Contaminated Flammable Wastes

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): 40

use of substance as: NORMAL FINISHED PRODUCT

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 40 **potential quantity:** 40

c) substance belongs to relevant inventory indirectly involved: No

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

Source of Accident - Situation **country:** FA **ident key:** 1990_011_01

situation

industry

initiating event 2007 waste treatment, disposal

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 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:** 1990_011_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

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** 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 Apart from damages to the tank construction, many electrical pumps were damaged ... 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:** 1990_011_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 / 1990_011_01 report

Appendix Short Report / description of accident types:

SAFETY SYSTEMS OR OPERATORS INTERVENTION:

The pumping of the fuel/water mixture to the storage tank was halted. The cooling of the neighbouring tanks was activated.

ENVIRONMENTAL AND ATMOSPHERIC CONDITIONS:

Stormy weather.

ACCIDENT CASE HISTORY DESCRIPTION:

The accident occurred in a waste oil de-oiling storage tank where waste oil and other contaminated flammable liquid wastes, like toluene and xylene, were separated out by gravity from the water contents. Water was discharged from the bottom of the tank and the floating fuel used in treatment furnaces. The vapours displaced during transfer operations were passed through an active carbon filter. Owing to self-overheating in this absorption unit, the vapours ignited; as no flame arrestors had been installed, a flashback occurred to the de-oiling tank. The following explosion (deflagration) tore the roof partly loose from the sidewall and destroyed the cooling unit and foam chamber of the tank. The subsequent fire also threatened other storage tanks, and a boil-over danger existed. Fire brigades of the company, a neighbouring Shell Chemical factory and from local and regional communities were activated to fight the fire. Cooling of the neighbouring tanks by means of their water-cooling rings and additional portable/mobile fire fighting equipment employed by the fire brigade was started to prevent escalation. The tank was left to burn until adequate foam concentrate and water pumping capacity were available to undertake a successful foam attack using monitors (a second foam unit was on stand-by to fight pitfires should a boil-over occurred). Additional fire fighting water had to be supplied by a fire fighting boat because one of the two fire fighting water pumps of the installation failed. After the fire had been extinguished, the contents of the remaining tank were cooled down and, several days later, to the furnaces.

Appendix Short Report / description of substances involved:

- Explosive mixture of fuel vapours/air inside the storage tank: amount involved = not known (it was estimated to be a few kg).
- Fuel containing heavy fuel-oil, toluene, xylene: amount involved = approximately 40,000 kg.

Appendix Short Report / description of immediate sources:

The accident occurred in a waste oil de-oiling tank of a waste treatment and disposal industry where waste oil and other contaminated flammable liquid wastes, like toluene and xylene, were separated out by gravity from the water contents. In this way the waste oil sludges were upgraded to usable fuel for soil-cleaning treatments in heating furnaces. Water was discharged from the bottom of the tank and the floating fuel used in treatment furnaces. The vapours displaced during transfer operations were passed through an active carbon filter.

Appendix Short Report / description of suspected causes:

CAUSES:

The vapours displaced from the waste oil de-oiling tank during transfer operations were passed through an active carbon filter. Owing to self-heating in this absorption unit, the vapours ignited. As no flame arrestors had been installed (due to an inadequate plant design and to an insufficient process analysis), a flashback occurred to the de-oiling tank resulting in an explosion (deflagration) inside it.

Appendix Short Report / description of immediate effects:

MATERIAL LOSS:

Apart from damages to the tank construction, many electrical pumps were damaged owing to flooding by cooling and firefighting water. No data are available about the cost of the damages.

Appendix Short Report / description of emergency measures taken:

INTERNAL TO THE ESTABLISHMENT:

The fire that followed the explosion also threatened the other storage tanks, and a boil-over danger existed. Fire brigades of the company, a neighbouring Shell Chemical factory and from local and regional communities were activated to fight the fire. Cooling of the neighbouring tanks by means of their water-cooling rings and additional portable/mobile fire fighting equipment employed by the fire brigade was started to prevent escalation; the tank was left to burn until adequate foam concentrate and water pumping capacity were available to undertake a successful foam attack using monitors (a second foam unit was on stand-by to fight pitfires should a boil-over occurred). Additional fire fighting water had to be supplied by a fire fighting boat because one of the two fire fighting water pumps of the installation failed. After the fire had been extinguished, the contents of the remaining tank were cooled down and, several days later, to the furnaces.

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- monitoring the temperature of the absorption unit and, eventually, the installation of a fire extinguishing unit;
- 2- installation of flame arrestors.

MEASURES TO MITIGATE THE EFFECTS OF THE ACCIDENT:

After the accident, the following measures were established:

- 1- installation of (semi) sub-surface foam application devices for these tanks instead of foam chambers;
- 2- the operational plans of the fire brigade to be evaluated as to the time necessary to get the right equipment and skilled decision-makers onto the scene.

Appendix Full Report A / type of accident:

Owing to self-heating in an absorption unit (active carbon filter), flammable vapours coming from a waste oil de-oiling tank during transfer operations were ignited. As no flame arrestors had been installed, a flashback occurred to the tank resulting in an explosion (deflagration) inside it (code 1307). The explosion was followed by the fire (code 1202) of the flammable liquid contained in the de-oiling tank.

Appendix Full Report A / dangerous substances:

In the waste oil de-oiling tank was stored waste oil and other contaminated flammable liquid wastes, like toluene and xylene. The total establishment and the potential directly involved inventories of the contaminated flammable wastes refer to the amount contained in the de-oiling tank that was involved in the explosion and the subsequent fire. The amount of the explosive mixture of fuel vapours with air inside the tank involved in the explosion is not known (it was estimated to be a few Kg).

Appendix Full Report A / source of accident - remarks:

The accident occurred in a waste oil de-oiling tank (code 4003) of a waste treatment and disposal industry (code 2007) where waste oil and other contaminated flammable liquid wastes, like toluene and xylene, were separated out by gravity from the water contents (code 3104). In this way the waste oil sludges were upgraded to usable fuel for soil-cleaning treatments in heating furnaces. Water was discharged from the bottom of the tank and the floating fuel used in treatment furnaces.

Appendix Full Report A / causes of major occurrence:

The vapours displaced from the waste oil de-oiling tank during transfer operations were passed through an active carbon filter. Owing to self-heating in this absorption unit, the vapours ignited (code 5107). As no flame arrestors had been installed (due to an inadequate plant design [code 5308] and to an insufficient process analysis [code 5307]), a flashback occurred to the de-oiling tank resulting in an explosion (deflagration) inside it.

Appendix Full Report B / area concerned - remarks:

In the Original report there is no evidence of significant effects outside the establishment.

Appendix Full Report B / ecological harm:

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

Appendix Full Report B / material loss:

Apart from damages to the tank construction, many electrical pumps were damaged owing to flooding by cooling and firefighting water. No data are available about the cost of the damages.

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:

After the accident, the following measures were established:

- 1- monitoring the temperature of the absorption unit and, eventually, the installation of a fire extinguishing unit;
- 2- installation of flame arrestors.

Appendix Full Report C / lesson learned - mitigate:

After the accident, the following measures were established:

- 1- installation of (semi) sub-surface foam application devices for these tanks instead of foam chambers;
- 2- the operational plans of the fire brigade to be evaluated as to the time necessary to get the right equipment and skilled decision-makers onto the scene.