

Utsläpp från en naturgasdepå.

851026 MARS 1985_13

En stor mängd naturgas om ca 90 000 kubikmeter läckte ut genom sprickor i en svetsfog. Utsläppet inträffade klockan 05:00 varade i 17 minuter innan det kunde strypas. Anläggningen stängdes av och polisen informerades. Depån låg i ett tätbebyggt område med närmaste bostadshus 150 m bort. Gasen fann ingen antändning. Gasen skingrades i atmosfären och efter tre timmar blåstes faran över. Kontinuerliga mätningar av halter hade gjorts vid depåns periferi.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
naturgas		
huvudsakligen metan	74-82-8	60 ton

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: 1985_013_01

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

Date of Major Occurrence: Time of Major Occurrence

start: 1985-10-26 start: 05:00:00

finish: 1985-10-26 finish: 08:00:00

Establishment:

name:

address:

industry: 2002 petrochemical, refining, processing

Natural Gas Storage Installation

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:** 1985_013_01

Accident Types:

release: Yes **explosion:** No

water contamination: No **other:** No

fire: No

description:

In the early hours of the morning, a water seal failed on a low-pressure water-sealed gas holder causing the loss of approximately 90,000 m3 of natural gas. The gas holder had 4 lifts and a total capacity of 170,000 m3.

The site was unmanne... see Appendix Short Report / description of accident types

Substance(s) Directly Involved:

toxic: No **explosive:** Yes

ecotoxic: No **other:** No

flammable: Yes

description:

- Natural Gas [mainly Methane] (C.A.S. CODE:74-82-8): amount involved = about 60,000 kg (90,000 m3).

Immediate Sources of Accident:

storage: Yes **transfer:** No

process: No **other:** No

description:

The accident occurred in a process-associated storage plant of a gas processing industry. The component involved was a low-pressure water-sealed gas holder storing natural gas (mainly methane). The gas holder had 4 lifts and a total capacit... see Appendix Short Report / description of immediate sources

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: No

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

other: No

ecological harm: No

national heritage loss: No

description:

MATERIAL LOSS:

No material losses occurred except the escaped natural gas.

Emergency Measures taken:

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

external services: Yes **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: No

description:

The gas holder was taken out of commission and all the sediments and iron cement were removed from cups. The welds were examined and leak checked. The cracks were repaired by welding pressed steel channels over.... see Appendix Short Report / description of immediate lessons learned

A Occurrence Full Report

country: FA **ident key:** 1985_013_01

1 Type of Accident

remarks: As a result of a water seal failure on a low pressure water-sealed gas holder, several tens of tonnes of natural gas were released to atmosphere (code 1101). The gas cloud did not find an ignition source.

2 Dangerous Substances

remarks: The total establishment and the potential directly involved inventories of natural gas refer to the volumetric capacity of the gas holder involved in the accident. Methane is the main component of natural gas.

3 Source of Accident

illustration: - not applicable -

remarks: The accident occurred in a process associated storage plant (code 3201) of a gas processing industry (code 2002). The component involved was a low-pressure water-sealed gas holder for natural gas (code 4003). The gas

holder had 4 lifts 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): 2

direction (from): ENE

stability (Pasquill):

ambient temperature (°C):

remarks: The wind speed was about 1.8 m/sec. The wind direction was East North East.

5 Causes of Major Occurrence

main causes

technical / physical 5102 operation: component/machinery failure/malfunction

- not applicable -

- not applicable -

- not applicable -

- not applicable -

human / organizational 5313 organization: maintenance/repair (none, inadequate, inappropriate)

5314 organization: testing/inspecting/recording (none, inadequate,

inappropriate)

- not applicable -

- not applicable -

- not applicable -

remarks: The leak of natural gas was caused by cracks (that allowed the failure of water seal) in

the fillet welds at the base of the vertical stay positions in the first lift cup (code

5102). The vertical stay positions had previously been repaired... see Appendix Full

Report A / causes of major occurrence

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA ident key: 1985_013_01

event:

major occurrence 1101 release: gas/vapour/mist/etc release to air

initiating event 1101 release: gas/vapour/mist/etc release to air

associated event - not applicable -

Dangerous substances

country: FA ident key: 1985_013_01

a) total establishment inventory

CAS number: 74-82-8 **identity:** Methane (natural Gas)

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): 113,3

use of substance as: NORMAL FINISHED PRODUCT

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 60 **potential quantity:** 113,3

c) substance belongs to relevant inventory indirectly involved: No

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

Source of Accident - Situation **country:** FA **ident key:** 1985_013_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:** 1985_013_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 The site was in a residential area with the nearest houses about 150 metres away... 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 a significant ecological harm. Th... 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 No material losses occurred except the escaped natural gas.... 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 No Yes 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 s... see Appendix

7 Discussion of Consequences

C Response Full Report

country: FA ident key: 1985_013_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

The gas holder was taken out o... see Appendix Full Report C / lesson learned - prevent

measures to mitigate consequences:

- not applicable -

useful references:

Theoretical, and also practica... see Appendix Full Report C / lesson learned - references

5 Discussion about Response

- not applicable -

Appendices for the FA / 1985_013_01 report

Appendix Short Report / description of accident types:

In the early hours of the morning, a water seal failed on a low-pressure water-sealed gas holder causing the loss of approximately 90,000 m³ of natural gas. The gas holder had 4 lifts and a total capacity of 170,000 m³. The site was unmanned during the silent hours but the volume at the holder was monitored by remote control from the Control Centre. The leak was caused by cracks in the fillet welds at the base of the vertical stay positions in the first lift cup. These had previously been repaired by the use of iron cement over the welds, probably at the time of construction. There was a release of natural gas over a period of 17 minutes. The escape took place above ground level as the gas holder dropped. Since natural gas is lighter than air, the main movement of the escaping gas would therefore be upwards. The gas cloud did not find an ignition source. The gas inflow to the holder and the gas outflow to the distribution system were stopped. By 08:00 am conditions at the site were back to normal. Theoretical, and also practical studies (involving an old gas holder), indicated that there was no chance of a gas flammable concentration outside the site boundaries.

Appendix Short Report / description of immediate sources:

The accident occurred in a process-associated storage plant of a gas processing industry. The component involved was a low-pressure water-sealed gas holder storing natural gas (mainly methane). The gas holder had 4 lifts and a total capacity of 170,000 m³. The water seal was operating at 37 cms water gauge. The site is in a residential area with the nearest houses about 150 meters away. A railway passed close by.

Appendix Short Report / description of suspected causes:

INITIATING EVENT AND CONSEQUENCES:

The leak of natural gas was caused by cracks in the fillet welds at the base of the vertical stay positions in the first lift cup. These cracks allowed the failure of water seal and, consequently, the release of natural gas over a period of 17 minutes.

CAUSES:

The failure of water seal was caused by cracks in the fillet welds. The vertical stay positions in the first lift cup had previously been repaired by the use of iron cement over the welds, probably at the time of construction. The iron cement used to seal the cracks was not suitable to guarantee their isolation for a long period of time. No inspection of the gas holder has been foreseen to check the water seals.

Appendix Short Report / description of emergency measures taken:

INTERNAL TO THE ESTABLISHMENT:

The Emergency procedures were activated and the emergency teams arrived on-site. The plant was shut-down and the gas holder isolated (inflow gas and outflow gas to the distribution system were stopped). The police was informed.

EXTERNAL TO THE ESTABLISHMENT:

Emergency leakage control teams measured gas concentrations off-site.

Appendix Short Report / description of immediate lessons learned:

The gas holder was taken out of commission and all the sediments and iron cement were removed from cups. The welds were examined and leak checked. The cracks were repaired by welding pressed steel channels over.

MEASURES TO PREVENT ANY RECURRENCE OF SIMILAR ACCIDENTS:

After the accident, the following measures were established:

- 1- checks on similar gas holders to be foreseen;
- 2- improvement of safety and reliability of water-sealed gas holders;
- 3- development of equipment for the monitoring of the water seal depths in gas holders.

Appendix Full Report A / source of accident - remarks:

The accident occurred in a process associated storage plant (code 3201) of a gas processing industry (code 2002). The component involved was a low-pressure water-sealed gas holder for natural gas (code 4003). The gas holder had 4 lifts and a total capacity of about 170,000 m³ (about 113.3 tons of methane). The water seal was operating at 37 cms water gauge.

Appendix Full Report A / causes of major occurrence:

The leak of natural gas was caused by cracks (that allowed the failure of water seal) in the fillet welds at the base of the vertical stay positions in the first lift cup (code 5102). The vertical stay positions had previously been repaired by the use of iron cement over the welds, probably at the time of construction. Iron cement used to seal the cracks was not suitable to guarantee their isolation for a long period (code 5313). No inspection of water seal level has been foreseen (code 5314).

Appendix Full Report B / area concerned - remarks:

The site was in a residential area with the nearest houses about 150 metres away. A railway passed close by. Theoretical, and also practical studies (involving an old gas holder), showed that there was no chance of a flammable concentration of gas outside the site boundaries.

Appendix Full Report B / ecological harm:

In the Original Report there is no evidence of a significant ecological harm. This is due to the low ecotoxic risks of natural gas.

Appendix Full Report B / material loss:

No material losses occurred except the escaped natural gas.

Appendix Full Report B / disruption of community life:

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

Appendix Full Report C / lesson learned - prevent:

The gas holder was taken out of commission and all the sediments and iron cement were removed from cups. The welds were examined and leak checked. The cracks were repaired by welding pressed steel channels over.

After the accident, the following measures were established:

- 1- checks on similar gas holders to be foreseen;
- 2- improvement of safety and reliability of water-sealed gas holders;
- 3- development of equipment for the monitoring of the water seal depths in gas holders.

Appendix Full Report C / lesson learned - references:

Theoretical, and also practical studies (involving an old gas holder), have been carried out to evaluate the natural gas concentration beyond the site boundary. Both studies have shown that there was no chance of a flammable concentration of natural gas outside the site boundaries.