

## Gasutsläpp från en naturgasdepå.

871021 MARS 1987\_12

Till följd av komplicerade omständigheter läckte naturgas ut från två tankar på en obemannad depå strax intill bostadshus. Fem dagar innan läckan, den 16 oktober, under en höststorm kom ett reglage att ställas fel av den kraftiga vinden. Högfyllnadsskyddet sattes ur spel i den ena tanken. Ytterligare ett reglage fallerade på grund av hög friktion och naturgas kunde slippa ut. Läckaget noterades från ett fjärrkontrollrum och ett katastroflag skickades ut att undersöka och åtgärda läckan. Gas fortsatte att läcka i en timmas tid men antändes inte. Gasläckan befann sig bara 10 meter från en privat tomt där huset låg ytterligare 15 meter bort. Efter olyckstillbudet sågs reglagen över.

### Inblandade ämnen och mängder

	CAS Nr.	Mängd
naturgas		
huvudsakligen metan	74-82-8	3750 kg

### Skador:

Människor: Inga.  
Materiella: Inga.  
Miljö/ekologi: Inga effekter rapporterade.  
Infrastruktur: Inga.

### Erfarenheter redovisade (Ja/Nej): Ja

Mycket kortfattat anges förebyggande åtgärder.

## Report Profile

### Identification of Report:

country: FA ident key: 1987\_012\_01

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

### Date of Major Occurrence: Time of Major Occurrence

start: 1987-10-21 start: 21:00:00

finish: finish:

### Establishment:

name:

address:

industry: 2005 power supply and distribution (electric, gas, etc.)

Natural Gas Storage (Water Sealed Gas Holders)

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:** 1987\_012\_01**Accident Types:****release:** Yes **explosion:** No**water contamination:** No **other:** No**fire:** No**description:**

The un-staffed site contained two water-sealed gas holders which received and delivered natural gas via a volume governor. The levels of gas in the holders were monitored in the remote control station by means of pressure indicators. Each h... 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, E.E.C. CODE: 601-001-00-4); amount involved = 3,750 kg.

**Immediate Sources of Accident:****storage:** Yes **transfer:** No**process:** No **other:** No**description:**

The accident occurred in a natural gas storage plant connected to a distribution system. The gas release occurred from one of the two water sealed gas holder of the storage plant. The location of the storage plant is shown on a map attached... 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:** No

**human deaths:** No

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

**other:** Yes

**ecological harm:** No

**national heritage loss:** No

**description:**

OTHER:... 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:** No

**description:**

INTERNAL TO THE ESTABLISHMENT:

A pressure indicator activated an alarm in the regional control room. An emergency team was sent to the storage plant.

## Immediate Lessons Learned:

**prevention:** Yes **other:** No

**mitigation:** No

**description:**

The sticky poppet valve has been replaced. The damages to the high/low knock-off spider arm have been repaired.... see Appendix Short Report / description of immediate lessons learned

# A Occurrence Full Report

**country:** FA **ident key:** 1987\_012\_01

## 1 Type of Accident

**remarks:** Due to the failure of the valves controlling the filling/unfilling of a gas holder, a large amount of natural gas was released into the atmosphere (code 1101). The gas cloud dispersed safely without igniting.

## 2 Dangerous Substances

**remarks:** The natural gas storage included two water sealed gas holders. Gas holder N<sup>-</sup> 4 (from which the gas release occurred) has a capacity of 21 tonnes. No data are available about the capacity of the second gas holder, the N<sup>-</sup> 5. The total establi... see Appendix Full Report A / dangerous substances

## 3 Source of Accident

**illustration:** - not applicable -

**remarks:** The accident occurred in a storage plant of natural gas connected to a

distribution system (codes 2005 and 3202). The gas release occurred from one of the two water sealed gas holders in the storage plant (code 4003). The location of the st... 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:** During a severe gales in the early hours of October 16, one holder descended from a full position above high knock-off level to a position just below the knock-off level. In descending, the high knock-off poppet valve failed to operate, may... see Appendix Full Report A / meteorological conditions

#### 5 Causes of Major Occurrence

**main causes**

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

5201 environment: natural event (weather, temperature, earthquake, etc.)

- not applicable -

- not applicable -

- not applicable -

**human / organizational** - not applicable -

- not applicable -

- not applicable -

- not applicable -

- not applicable -

**remarks:** The accident occurred because of the failure of two poppet valves that allowed the overfilling of a water sealed gas holder. One poppet valve failed to operate correctly due to the severe wind conditions on October 16 (code 5201). The second... see Appendix Full Report A / causes of major occurrence

#### 6 Discussion about the Occurrence

- not applicable -

**Type of Accident** country: FA ident key: 1987\_012\_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: 1987\_012\_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): 21

use of substance as: NORMAL FINISHED PRODUCT

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 3,75 potential quantity: 21

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: -1 indir\_pot\_quant: -1

Source of Accident - Situation country: FA ident key: 1987\_012\_01

### situation

#### industry

initiating event 2005 power supply and distribution (electric, gas, etc.)

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

associated event - not applicable -

## B Consequences Full Report

country: FA ident key: 1987\_012\_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 In the Original Report there is no evidence of significant effects outside the i... 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. Thi... 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 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 i... see Appendix

## 7 Discussion of Consequences

# C Response Full Report

country: FA ident key: 1987\_012\_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 operat... see Appendix Full Report C / lesson learned - prevent

**measures to mitigate consequences:**

- not applicable -

**useful references:**

- not applicable -

### **5 Discussion about Response**

- not applicable -

## **Appendices for the FA / 1987\_012\_01 report**

### **Appendix Short Report / description of accident types:**

The un-staffed site contained two water-sealed gas holders which received and delivered natural gas via a volume governor. The levels of gas in the holders were monitored in the remote control station by means of pressure indicators. Each holder had an automatic valve which was operated by a high and low-level trip via pilot gas connections containing poppet valves. During the severe gales in the early hours of October 16, one holder descended from a full position above high knock-off level to a position just below the knock-off level. In descending, the holder failed to operate the high knock-off valve correctly (it is assumed that this was due to wind pressure). During late afternoon of October 21 (five days later) the reducing ambient temperature caused the stock in both holders to fall. At approximately 20:00 the holder descended low enough to operate the change over poppet and the automatic holder valve opened. The ascending holder should have operated the change over poppet again and in the situation which prevailed the holder valve should have closed, but this failed to occur. It is assumed that this poppet valve dwelled in a mid point position. This allowed gas to pass from one holder into the other. The knock-off arm being in the incorrect position was damaged by the striker arm on its upward travel. Gas continued to pass into the holder when it was full and began to discharge via the ground level water seal. The high alarm was registered at the regional control room and an emergency team was sent to the site. Gas continued to leak for about one hour but it was not ignited. Gas leaked from one side of the seal which was about 4 metres from the boundary fence, about 5 metres from gardens of private houses and about 15 metres from the houses themselves.

### **Appendix Short Report / description of immediate sources:**

The accident occurred in a natural gas storage plant connected to a distribution system. The gas release occurred from one of the two water sealed gas holder of the storage plant. The location of the storage plant is shown on a map attached to the Original Report. It was in an urban area with nearest houses 15 metres away.

## **Appendix Short Report / description of suspected causes:**

CAUSES:

The accident occurred because of the failure of two poppet valves that allowed the overfilling of a gas holder. One poppet valve failed to operate correctly due to the severe wind conditions. The second poppet valve failed to operate correctly due to an abnormal friction within its bearing surfaces causing it to dwell in an intermediate position, allowing gas to discharge from one holder to the other.

## **Appendix Short Report / description of immediate effects:**

OTHER:

No material losses occurred except the escaped natural gas.

## **Appendix Short Report / description of immediate lessons learned:**

The sticky poppet valve has been replaced. The damages to the high/low knock-off spider arm have been repaired.

MEASURES TO PREVENT ANY RECURRENCE OF SIMILAR ACCIDENTS:

After the accident the operation of the holders was reviewed to decide whether any further changes were necessary to prevent a similar occurrence.

## **Appendix Full Report A / dangerous substances:**

The natural gas storage included two water sealed gas holders. Gas holder N<sup>o</sup> 4 (from which the gas release occurred) has a capacity of 21 tonnes. No data are available about the capacity of the second gas holder, the N<sup>o</sup> 5. The total establishment and the potential directly involved inventories of natural gas, therefore, refer to the maximum capacity of gas holder N<sup>o</sup> 4. Methane is the main component of natural gas.

## **Appendix Full Report A / source of accident - remarks:**

The accident occurred in a storage plant of natural gas connected to a distribution system (codes 2005 and 3202). The gas release occurred from one of the two water sealed gas holders in the storage plant (code 4003). The location of the storage plant is shown on a map attached to the Original Report. The site was in an urban area with nearest houses 15 metres away.

## **Appendix Full Report A / meteorological conditions:**

During a severe gales in the early hours of October 16, one holder descended from a full position above high knock-off level to a position just below the knock-off level. In descending, the high knock-off poppet valve failed to operate, may be due to wind pressure.

## **Appendix Full Report A / causes of major occurrence:**

The accident occurred because of the failure of two poppet valves that allowed the overfilling of a water sealed gas holder. One poppet valve failed to operate correctly due to the severe wind conditions on October 16 (code 5201). The second poppet valve failed to operate correctly (code 5102) due to an abnormal friction within its bearing surfaces causing it to dwell in an intermediate position, allowing gas to discharge from one holder to the other.

## **Appendix Full Report B / area concerned - remarks:**

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

## **Appendix Full Report B / ecological harm:**

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

## **Appendix Full Report C / lesson learned - prevent:**

After the accident, the operations of the gas holders were reviewed to decide whether any further changes were necessary to prevent a similar occurrence.