

1322114 December 2000

**Source** : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, DECEMBER 15, 2000, (<http://www.chemsafety.gov>).

**Location** : Woodlawn, Ohio, USA

**Injured** : 0      **Dead** : 0

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**Abstract**

One hundred and fifty people were evacuated when a hydrochloric acid spilled during preparations for offloading. The incident occurred when a flange on a road tanker broke spilling several hundred gallons of acid. Fortunately no one was injured in the incident.

[evacuation, unloading, flange failure]

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**Lessons**

[None Reported]

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1321113 December 2000

**Source** : BBC NEWS, 13 DECEMBER, 2000, (<http://www.bbc.co.uk>).

**Location** : Bermeja, ECUADOR

**Injured** : -      **Dead** : 6

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**Abstract**

An explosion occurred on a pipeline carrying crude oil. At least six people were killed in the explosion. It is thought that a bomb caused the rupture on the pipeline.

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, DECEMBER 11, 2000, (<http://www.chemsafety.gov>), Disclaimer: The Chemical Incident Reports Center (CIRC) is an information service provided by the U.S. Chemical Safety and Hazard Investigation Board (CSB). Users of this service should note that the contents of the CIRC are not intended to be a comprehensive listing of all incidents that have occurred; many incidents go unreported or are not entered into the database. Therefore, it is not appropriate to use the CIRC database to perform statistical analysis that extends conclusions beyond the content of the CIRC. Also, although the CSB never knowingly posts inaccurate information, the CSB is unable to independently verify all information that it receives from its various sources, much of which is based on initial reports. CIRC users should also note that the CSB receives more comprehensive reports about incidents that occur in the U.S.; comparisons made between U.S. incidents and those in other nations should take this fact into consideration.

**Location :** , SINGAPORE

**Injured :** 4      **Dead :** 0

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**Abstract**

An explosion and fire occurred on a pipe carrying diesel during routine work in a steam boiler at a chemical plant. Four workers were injured in the incident. An investigation into the incident found that the workers were trying to switch on an additional source of fuel supply to the boiler when the incident occurred. The cause of the incident is unknown.

[fire - consequence, burns, injury, normal operations]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, DECEMBER 7, 2000, (<http://www.chemsafety.gov>), Disclaimer: The Chemical Incident Reports Center (CIRC) is an information service provided by the U.S. Chemical Safety and Hazard Investigation Board (CSB). Users of this service should note that the contents of the CIRC are not intended to be a comprehensive listing of all incidents that have occurred; many incidents go unreported or are not entered into the database. Therefore, it is not appropriate to use the CIRC database to perform statistical analysis that extends conclusions beyond the content of the CIRC. Also, although the CSB never knowingly posts inaccurate information, the CSB is unable to independently verify all information that it receives from its various sources, much of which is based on initial reports. CIRC users should also note that the CSB receives more comprehensive reports about incidents that occur in the U.S.; comparisons made between U.S. incidents and those in other nations should take this fact into consideration.

**Location :** Jal, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

An explosion occurred on a gas pipeline at a gas plant setting fire to two chemical tanks containing methanol and glycol. The fire was contained within two hours and fortunately no one was injured in the incident. Fire fighters used water to cool the tanks and foam on the flaming liquid. An investigation into the incident is underway.

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, NOVEMBER 8, 2000, (<http://www.chemsafety.gov>), Disclaimer: The Chemical Incident Reports Center (CIRC) is an information service provided by the U.S. Chemical Safety and Hazard Investigation Board (CSB). Users of this service should note that the contents of the CIRC are not intended to be a comprehensive listing of all incidents that have occurred; many incidents go unreported or are not entered into the database. Therefore, it is not appropriate to use the CIRC database to perform statistical analysis that extends conclusions beyond the content of the CIRC. Also, although the CSB never knowingly posts inaccurate information, the CSB is unable to independently verify all information that it receives from its various sources, much of which is based on initial reports. CIRC users should also note that the CSB receives more comprehensive reports about incidents that occur in the U.S.; comparisons made between U.S. incidents and those in other nations should take this fact into consideration.

**Location :** Boston, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

An unknown quantity of hydrochloric acid spilled in to storm drains. The solution was made up of 70 percent water and 30 percent acid. Fortunately no one was injured in the incident.

**Lessons**

[None Reported]

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Source : CNN INTERACTIVE, OCTOBER 23, 2000, (<http://www.cnn.com>).

Location : Texas, USA

Injured : -      Dead : 1

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**Abstract**

An explosion occurred on a road tanker containing 8,000 gallons of liquid propane as it was unloading its contents at a propane storage facility. It has been reported that the incident occurred when the line exploded causing the tanker to catch fire and then the tanker itself exploded. One person was killed and another is missing. Nearby residents were evacuated as a precaution.

[fire - consequence, fatality, evacuation]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, OCTOBER 17, 2000, (<http://www.chemsafety.gov>), Disclaimer: The Chemical Incident Reports Center (CIRC) is an information service provided by the U.S. Chemical Safety and Hazard Investigation Board (CSB). Users of this service should note that the contents of the CIRC are not intended to be a comprehensive listing of all incidents that have occurred; many incidents go unreported or are not entered into the database. Therefore, it is not appropriate to use the CIRC database to perform statistical analysis that extends conclusions beyond the content of the CIRC. Also, although the CSB never knowingly posts inaccurate information, the CSB is unable to independently verify all information that it receives from its various sources, much of which is based on initial reports. CIRC users should also note that the CSB receives more comprehensive reports about incidents that occur in the U.S.; comparisons made between U.S. incidents and those in other nations should take this fact into consideration.

**Location :** Kilgore, Texas, USA

**Injured :** 3      **Dead :** 1

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**Abstract**

An explosion occurred at a truck repair facility when a worker was trying to weld a ball valve onto the back of an oil tanker truck when residue from a gaseous hydrocarbon ignited. The worker was killed and three others injured in the incident.

An investigation into the incident is underway.

[welding, road tanker, fatality, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, OCTOBER 4, 2000, (<http://www.chemsafety.gov>).

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**Location :** Albany, USA

**Injured :** 0      **Dead :** 0

**Abstract**

A fire occurred at a titanium processing plant. The fire occurred on a pipe carrying chlorine gas causing damage. A nearby residential area was evacuated. The fire was brought under control and the leak stopped in about thirty minutes. No injuries were reported.

[fire - consequence, damage to equipment, evacuation]

**Lessons**

[None Reported]



13209October 2000

**Source** : CNN.COM, DECEMBER 11, 2000, (<http://www.cnn.com>).

**Location** : South Carolina, USA

**Injured** : 0      **Dead** : 0

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**Abstract**

A crack has been found in a pipe at a nuclear power plant. A 2.7-inch tear occurred along a weld seam on the pipe, which carries scalding contaminated water from a nuclear reactor core. Approximately 100 pounds of boric acid spilled. It has been reported that there has been no threat to the environment. An investigation into the incident is underway.

[material transfer, weld failure, reactors and reaction equipment]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL HAZARDS IN INDUSTRY, NOVEMBER 2000.

**Location :** Antwerp, BELGIUM

**Injured :** 0      **Dead :** 0

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**Abstract**

A fire occurred at a refinery forcing the evacuation of the site and injuring a worker. It is thought that the cause of the fire occurred due to work that was being carried out to isolate a pipe within the pipeline network.

[fire - consequence, injury, maintenance]

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**Lessons**

[None Reported]

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1301821 August 2000

Source : CNN.COM, U.S. NEWS, AUGUST 19, 21, 2000, (<http://www.cnn.com>).

Location : New Mexico, USA

Injured : 5      Dead : 11

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**Abstract**

An explosion and subsequent fire occurred on a 30-inch underground natural gas pipeline reportedly killing eleven people and injuring at least five others.

An investigation into the rupture has revealed that a corroded section of the pipe was ejected in the explosion.

[fire - consequence, fatality, injury]

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**Lessons**

[None Reported]

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**1301420 August 2000**

**Source :** CNN.COM, U.S. NEWS, 20 AUGUST, 2000, (<http://www.cnn.com>).

**Location :** North Carolina, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

A gas pipeline ruptured forcing the evacuation of a nearby shopping mall. Fortunately no one was injured. The explosion occurred during construction work when workers apparently hit the gas line.

The line was shut off and fire fighters extinguished the fire.

[drilling/digging/ploughing vehicles, fire - consequence]

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**Lessons**

[None Reported]

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**1299312 August 2000**

**Source :** BBC NEWS, 15 AUGUST, 2000, (<http://www.bbc.co.uk>).

**Location :** , NIGERIA

**Injured :** -      **Dead :** 18

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**Abstract**

An explosion occurred on a pipeline killing eighteen people. The incident occurred as villagers at the site of the ruptured pipeline were scooping up the leaking fuel.

[fatality, deliberate acts]

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**Lessons**

[None Reported]

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**Source** : CHEMICAL HAZARDS IN INDUSTRY, NOVEMBER 2000.

**Location** : Borneo, INDONESIA

**Injured** : 0      **Dead** : 0

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**Abstract**

An explosion and fire occurred in a hydroskimming unit at an oil refinery. An investigation into the cause of the incident found that a leaking pipe was to blame.  
[fire - consequence]

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**Lessons**

[None Reported]

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1293231 July 2000

**Source** : BBC NEWS, 31 JULY, 2000, (www.bbc.co.uk).

**Location** : Okwabude, AFRICA

**Injured** : -      **Dead** : -

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**Abstract**

An explosion and fire occurred on an oil pipeline, it is not known whether anyone was killed. This is the sixth incident to have involved such vandalism to pipelines.

[fire - consequence, deliberate acts]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, AUGUST 1, 2000, (<http://www.chemsafety.gov>).

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**Location :** Convent, USA

**Injured :** 0      **Dead :** 0

**Abstract**

An explosion occurred at a phosphate plant. The incident occurred when a 12 inch line carrying processed gas exploded and caught fire an hour after the plant began to shutdown.

Damage is thought to be minor.

[fire - consequence, damage to equipment]

**Lessons**

[None Reported]



**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, AUGUST 1, 2000, (<http://www.chemsafety.gov>).

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**Location :** Volgograd, RUSSIA

**Injured :** 7      **Dead :** 2

**Abstract**

An explosion occurred on a chemical plant killing two workers and injuring seven others. The incident occurred when a pipe exploded at the chemical factory releasing vapour, which evaporated.

An investigation into the cause of the incident is underway.

Chemical involved: ammonia

[fatality, gas / vapour release, injury]

**Lessons**

[None Reported]

1292229 July 2000

Source : BBC NEWS, 1 AUGUST, 2000, (<http://www.bbc.co.uk>).

Location : , BRAZIL

Injured : 0      Dead : 0

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**Abstract**

Approximately 1,000 litres of toxic fuel additive leaked from a pipeline into a nearby watercourse.

The company was alerted when nearby residents complained of nausea and a strong chemical smell.

An investigation into the leak found a small hole in the pipe.

The company was fined up to \$560,000 (2000).

This incident occurred just two weeks after the same company spilt approximately four million litres of crude oil into one of the country's main rivers.

[spill, environmental]

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**Lessons**

[None Reported]

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1287225 July 2000

**Source** : BBC NEWS, 25 JULY, 2000, (<http://www.bbc.co.uk>).

**Location** : Warri, NIGERIA

**Injured** : -      **Dead** : 40

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**Abstract**

An explosion and fire occurred on a oil pipeline, the third in the space of a month. It is thought that forty people have been killed in the incident. It is reported that this is the sixth fire in two months.  
[fire - consequence, fatality, deliberate acts, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, AUGUST 1, 2000, (<http://www.chemsafety.gov>).

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**Location :** Lawrence, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

An explosion occurred at an industrial plant, the second to have happened in a week.

The explosion is thought to have occurred in the compressor building involving a pipeline containing hydrogen gas as workers were examining the system. It is thought there was approximately 12,000 pounds of gas in the system.

No one is thought to have been injured in the incident.

An investigation is being carried out into the cause of the incident.

[see record 12929]

[maintenance]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 21, 2000. (<http://www.chemsafety.gov>).

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**Location :** Willoughby, USA

**Injured :** 1      **Dead :** 0

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**Abstract**

A series of explosions and fires occurred at a plant. The explosion was caused by a spark or static electricity, which ignited gas leaking from overfilled cylinders. One person was injured in the incident.

An investigation found that an estimated 900 of 1,1000 cylinders were leaking from safety relief valves. The building was evacuated.

[burns, fire - consequence, overflow, evacuation, injury]

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**Lessons**

[None Reported]

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1282716 July 2000

**Source** : BBC NEWS, 17 JULY, 2000, (<http://www.bbc.co.uk>) .

**Location** : Ife, Ijala, NIGERIA

**Injured** : -      **Dead** : 30+

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**Abstract**

A fire and explosion occurred on a pipeline killing more than thirty people. It is thought that vandals are the main cause of the incident.

This incident occurred less than a week after a similar incident that killed over two hundred people just ten kilometres away in Warri.

[fire - consequence, deliberate acts, fuel, injury]

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**Lessons**

[None Reported]

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1283916 July 2000

Source : BBC NEWS, 18 JULY, 2000, (<http://www.bbc.co.uk>).

Location : Curitiba, BRAZIL

Injured : 0      Dead : 0

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**Abstract**

At least four million litres of crude oil leaked from an underwater pipeline at a refinery into a nearby river.

The incident occurred when the pipeline ruptured spilling the crude for up to two hours into the river.

More than thirty floating barriers have been set up to try to contain the spill and to vacuum the oil off the surface.

The company has been fined \$100m (2000).

[pipeline failure, environmental, ecological damage]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 12, 2000. (<http://www.chemsafety.gov>).

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**Location :** Lancaster, USA

**Injured :** 2      **Dead :** 0

**Abstract**

An explosion occurred at a food packaging plant releasing ammonia into the atmosphere. A worker was seriously burned and a nearby resident affected by the fumes. The building was evacuated.

It is thought that a flange on an air compressor failed causing the safety valve to fly off releasing ammonia. The ammonia may have mixed with oil in the workshop area resulting in the explosion.

The fire started by the explosion was extinguished and the leak stopped within minutes.

[gas / vapour release, burns, fire - consequence, flange failure, injury]

**Lessons**

[None Reported]



Source : BBC NEWS, 11 JULY, 2000, (<http://www.bbc.co.uk>)

Location : Warri, NIGERIA

Injured : 100+ Dead : 100+

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**Abstract**

An explosion occurred on a pipeline carrying petrol killing and injuring at least one hundred people. Another one hundred are reported missing. The incident occurred when people were using buckets to collect petrol leaking from the pipeline after thieves had apparently punctured it. The area has been sealed off. It is feared that two hundred and fifty people may have been killed in the incident.

[deliberate acts, fatality, gasoline, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 10, 2000. (<http://www.chemsafety.gov>).

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**Location :** Tooele, USA

**Injured :** 6      **Dead :** 0

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**Abstract**

Six workers were injured at a chemical weapons depot whilst cleaning a line containing sulphuric acid when a spillage occurred. All six were treated for burns and inhalation of fumes.

[injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 3, 2000, (<http://www.chemsafety.gov>).

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**Location :** Philadelphia, USA

**Injured :** 1      **Dead :** 0

**Abstract**

An explosion occurred on a pipeline carrying heated gasoline injuring a worker. The incident occurred as workers were trying to shut down the unit because of a leak.

The fire was eventually brought under control.

[fire - consequence, injury]

**Lessons**

[None Reported]

Source : CNN.COM, U.S. NEWS, JULY 1, 2000, (<http://www.cnn.com>).

Location : Philadelphia, USA

Injured : 0      Dead : 0

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**Abstract**

A fire occurred at a refinery that produces cumene, used to manufacture plastics and synthetics. The fire occurred due to a leak of hydrogen from a ruptured pipeline, which ignited.

The fire was brought under control within a few hours and fire fighters remained on site to make sure escaping vapours burned out safely.

An investigation into the cause of the incident is being carried out.

[fire - consequence, refining]

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**Lessons**

[None Reported]

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**Source :** BBC NEWS, 25 JUNE, 2000, (<http://www.bbc.co.uk>); CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JUNE 25, 2000, (<http://www.chemsafety.gov>).

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**Location :** Al-Ahmedi, KUWAIT

**Injured :** 49    **Dead :** 3

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**Abstract**

An explosion occurred at an oil refinery killing three and injuring forty-nine people. Most of the injured suffered burns and cuts from flying glass.

Production was shut down and workers evacuated at the 444,000 barrels per day refinery.

The explosion occurred during attempts to try and control a gas leak in one of the pipelines. The force of the blast shattered windows in the office building at the complex.

Damage is estimated at \$324 million (2000).

[refining, fatality, people, evacuation, plant shutdown, damage to equipment, fire - consequence, injury]

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**Lessons**

[None Reported]

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Source : BBC NEWS, 22 JUNE, 2000, (<http://www.bbc.co.uk>).

Location : , NIGERIA

Injured : -      Dead : 10+

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**Abstract**

An explosion and fire occurred on a pipeline. The explosion enveloped people as they siphoned petrol from the pipeline with buckets. It is thought that ten people were killed after the vandalised oil pipeline caught fire.

[fire - consequence, deliberate acts, fatality, gasoline]

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**Lessons**

[None Reported]

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1269822 June 2000

Source : BBC NEWS, 22 JUNE, 2000, (<http://www.bbc.co.uk>);, CNN.COM, U.S. NEWS, JUNE 22, 2000, (<http://www.cnn.com>).

Location : Miami, USA

Injured : 0      Dead : 0

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**Abstract**

More than 95 million litres of raw sewage spilled into the sea causing a health alert. Swimming has been banned along a 40km stretch of coastline.

The incident occurred after marine construction workers drilled through the sewage pipe.

Sewage has been diverted from the punctured pipeline to an old waste pipe for the time being whilst the hole is repaired.

[human causes]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JUNE 15, 2000, (<http://www.chemsafety.gov>).

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**Location :** Blue Ash, USA

**Injured :** 6      **Dead :** 0

**Abstract**

A flash fire was triggered when a hydraulic fluid leak occurred near a series of electrical switches.

The incident occurred when a worker dropped a mold used in the manufacturing process, the mold hit the hydraulic fluid line causing it to spring a leak. Six workers were affected by smoke.

Slight damage occurred to equipment.

[fire - consequence, flashover, damage to equipment, injury]

**Lessons**

[None Reported]



**Source** : BBC NEWS, 8 JUNE, 2000, (<http://www.bbc.co.uk>)

**Location** : Scotland, UK

**Injured** : 0      **Dead** : 0

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**Abstract**

A high-pressure steam pipe fractured releasing steam at a petrochemicals complex. Eight fire engines attended the scene whilst engineers isolated the leak. The fractured occurred due to pipe failure.  
[mechanical equipment failure, gas / vapour release]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL WEEK, JUNE 7, 2000

**Location :** Texas, USA

**Injured :** 0      **Dead :** 0

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**Abstract**

A rail transportation incident. A rail car derailed and crashed into pipelines carrying crude oil, gasoline, methanol and natural gas. Damage to the pipelines occurred but no release was reported.

Repairs could take up to three weeks to complete.

[damage to equipment, derailment]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MAY 31, 2000, (<http://www.chemsafety.gov>)

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**Location :** Ontario, CANADA

**Injured :** 0      **Dead :** 0

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**Abstract**

A 42-inch pipeline ruptured releasing natural gas. The incident occurred during pressure testing. The gas was quickly turned off and there was no danger to the environment.

[pipeline failure, near miss]

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**Lessons**

[None Reported]

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**Source** : HAZARDOUS CARGO BULLETIN, JULY 2000,; REUTERS.

**Location** : Louisiana, USA

**Injured** : 0      **Dead** : 0

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**Abstract**

Approximately 2,200 litres of oil leaked from a pipeline into the Gulf of Mexico causing a 4 km oil slick. The pipeline was immediately shutdown and an investigation into the leak is being carried out.

[spill, environmental]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 9 APRIL, 2000, (<http://www.chemsafety.gov>),

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**Location :** Prince George's County, USA

**Injured :** 0      **Dead :** 0

**Abstract**

Approximately 125,000 gallons of oil leaked from a power company's pipeline causing a massive oil spill. The spill occurred in a marshland and was contained in a nearby creek but did not enter the nearby river.

An investigation is being carried out into the cause of the leak.

[ecological damage, environmental]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 28 MARCH 2000, (<http://www.chemsafety.gov>).

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**Location :** Calgary, Alberta, CANADA

**Injured :** 0      **Dead :** 0

**Abstract**

A factory was evacuated after a road tanker spilled 150 litres of sodium hydroxide into a sewer system during unloading operations.

A leak occurred in the tanker causing the spill.

Sodium hydroxide has corrosive effects; contact on skin and toxic if fumes are inhaled.

[evacuation]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 26 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Canton, USA

**Injured :** 0      **Dead :** 0

**Abstract**

Approximately 360 gallons of gasoline spilled into a lake when a fuel pipe ruptured. Approximately 20 people were evacuated as a precaution.

[material of construction failure, evacuation]

**Lessons**

[None Reported]

1275824 March 2000

**Source** : CHEMICAL HAZARDS IN INDUSTRY, JUNE 2000.; CHEM. WEEKBL., 27 MAR 2000, (DUTCH) (<http://www.chemischweekblad.nl/>).

**Location** : Arnhem, NETHERLANDS

**Injured** : 0      **Dead** : 0

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**Abstract**

An explosion occurred in a thermoreactor at a production site used to incinerate waste gases from the production process.

The incident occurred due to excessive pressure in a pipeline leading into the vessel. Production was stopped immediately after the explosion.

The plant makes synthetic polymer dispersions (latex) from styrene and butadiene.

No one was injured and no harmful emissions occurred.

[overpressurisation, processing]

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**Lessons**

[None Reported]

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**Source** : BBC NEWS, 23 MARCH, 2000, (<http://www.bbc.co.uk>); CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 22 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location** : Abia State, NIGERIA

**Injured** : -      **Dead** : 50

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**Abstract**

A fire occurred on a pipeline killing approximately 50 people who at the time is thought to have been siphoning gasoline from the pipeline. It was not immediately clear what started the fire but sabotage is thought to have been the cause.

[fire - consequence, deliberate acts]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 25 APRIL, 2000, (<http://www.chemsafety.gov>),

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**Location :** Martinez, California, USA

**Injured :** 2      **Dead :** 0

---

**Abstract**

A fire occurred at a refinery when fire fighting water became contaminated with fuel. An investigation into the incident found a small leak in a closed valve that is meant to separate the fire fighting water used to wash out fuel processing vessels.

Four other valves were meant to serve as backup devices to prevent contaminated water from flowing backward into the fire fighting water. But three were stuck in the open position and the fourth one had a broken spring.

The incident occurred when the fire fighting water was sprayed underneath a welding job to quickly extinguish sparks that might ignite any stray vapours from refining units. But the water released a cloud of gas that burst into flames. The worker holding the hose and the welder suffered burns in the fire.

[fire - consequence, contamination, mechanical equipment failure, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 23 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Kenedy, Texas, USA

**Injured :** 0      **Dead :** 0

**Abstract**

An explosion occurred on a pipeline causing severe damage. Valves were shut off to stop the flow of natural gas and a nearby road was closed as precaution. The subsequent fire was extinguished in about an hour.

An investigation into the explosion is underway.

[fire - consequence, damage to equipment]

**Lessons**

[None Reported]

**Source** : AUSTRALIAN BROADCASTING COMPANY, 14, MARCH, 2000.; CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 14 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location** : Collie, AUSTRALIA

**Injured** : 0      **Dead** : 0

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**Abstract**

An explosion occurred on a construction site when a pipe containing caustic soda burst. The caustic soda sprayed 100 meters in the air. Fortunately no one was injured in the incident.

**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 15 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Mexico City, MEXICO

**Injured :** 1      **Dead :** 0

**Abstract**

Seven gas lines at a distribution centre caught fire and sparked off several explosions. Fire fighters manage to contain the blaze after three hours one fire fighter was injured.

Each gas pipeline had a 2,600-gallon capacity.

It is thought that the cause of the explosion was due to a high-pressure release from emergency blowout valves.

[explosion, fire - consequence, high pressure, injury]

**Lessons**

[None Reported]

1225308 March 2000

Source : CNI NEWS, 8 MARCH, 2000, (<http://www.cnionline.com>).

Location : Rayong, SINGAPORE

Injured : 200+ Dead : 1

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**Abstract**

A 50,000-tonne/year polycarbonate plant was shutdown after a leak of carbonyl chloride gas or phosgene occurred.

One person was killed and approximately 200 workers and residents needed hospital treatment for breathing problems, one worker was critical.

The incident occurred after the leak was detected issuing from a fractured pipe, the gas then travelled through the plant's ventilator system and was released into the atmosphere surrounding the building and nearby residential areas.

An investigation is being carried out into the cause of the incident.

[plant shutdown, processing, fatality, injury]

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**Lessons**

[None Reported]

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1224208 March 2000

**Source** : BBC NEWS, 8 MARCH, 2000, (<http://www.bbc.co.uk>); CNI NEWS, 8 MARCH, 2000, (<http://www.cnionline.com>); CHEMICAL HAZARDS IN INDUSTRY, JUNE 2000.

**Location** : Cheshire, UK

**Injured** : 7      **Dead** : 0

---

**Abstract**

A major gas leak occurred at a chemical plant after an explosion. Approximately half a tonne of hydrogen chloride gas was released from a storage container. It is thought that the cause of the incident was due to the failure of a set of bellows.

Fire crews used a curtain of water jets to minimise the amount of gas spreading.

Nearby residents were advised to keep windows and doors closed until further notice.

A report stated seven minor casualties.

[gas / vapour release, mechanical equipment failure, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 9 MARCH, 2000. (<http://www.chemsafety.gov>).

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**Location :** Rayong Province, THAILAND

**Injured :** 92    **Dead :** 1

---

**Abstract**

Toxic carbonyl chloride (phosgene fumes leaked from a fractured pipe affecting 200 factory workers and nearby residents. One worker died and two were critically injured in the incident.

More than 80 people were taken to hospital for treatment for breathing difficulties, nausea and eye irritations.

[gas / vapour release, fatality, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MARCH 7, 2000. (<http://www.chemsafety.gov>).

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**Location :** Salt Lake City, USA

**Injured :** 6      **Dead :** 0

---

**Abstract**

A series of explosion occurred at a vineyard plant. The incident occurred when workers were taking a steel sample from a furnace. The molten steel, heated to a temperature of 2,300 degrees, hit a water line, releasing steam and setting off a series of explosion.

[burns, sampling, process causes, fire - consequence, evacuation, injury]

---

**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MARCH 6, 2000,  
(<http://www.chemsafety.gov>).

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**Location :** Millsboro, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Approximately 600,000 gallons of oil is thought to have leaked over a period of 8-12 years from a hole in an underground pipeline previously discovered. The problem emerged after contractors sank a well and began pumping oil from the ground.

So far approximately 40,000 gallons of oil had been pumped from the ground at a rate of approximately 3,000 gallons a day.

[diesel fuel, excavation, spill]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 29, 2000, (<http://www.chemsafety.gov>).

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**Location :** Bellefonte, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A 300-gallon barrel of sulphuric acid fell off a forklift truck, releasing approximately 75 to 100 gallons of the chemical into a storm sewer leading directly into a stream.

The spill impacted a mile-long stretch of the waterway.

The company contained some of the spill by adding lime to the acid in order to neutralize it.

[ecological damage, container, design or procedure error, spill, transportation]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 13 MARCH, 2000, (<http://www.chemsafety.gov>).

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**Location :** Lexington, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A chemical spill occurred at a sewer plant causing the plant to be shutdown.

The waste from the spill contains industrial solvents, which overpowered the plant and leaked into nearby waterways, killing hundreds of fish and made drinking water unsafe.

[plant shutdown, environmental, ecological damage]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 14, 2000. (<http://www.chemsafety.gov>).

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**Location :** British Columbia, CANADA

**Injured :** 0      **Dead :** 0

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**Abstract**

A leak occurred on a pipeline carrying canola oil from a pumping station to a marine tanker.

It is thought that an estimated 50 tonnes has been spilt.

This is the third time in two years that birds in the area have been threatened by large canola oil spills.

Although cooking oil is not poisonous to the birds, it soaks their feathers, making them very heavy and no longer waterproof. Within hours birds can die from hypothermia.

[environmental, material transfer]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 14, 2000. (<http://www.chemsafety.gov>).

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**Location :** Fargo, USA

**Injured :** 1      **Dead :** 0

---

**Abstract**

A worker welding a pipe onto a 55-gallon drum was seriously injured when oil vapours from the drum ignited causing an explosion. The drum had been used to store waste oil.

[drums, leak, storage, injury]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 10, 2000. (<http://www.chemsafety.gov>).

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**Location :** ,

**Injured :** 0      **Dead :** 0

---

**Abstract**

A gas leak occurred on an 8-inch pipe causing a gas cloud to seep into a residential area.

[gas / vapour release]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MARCH 6, 2000. (<http://www.chemsafety.gov>).

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**Location :** Hong Kong, CHINA

**Injured :** 0      **Dead :** 0

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**Abstract**

A marine transportation incident. Approximately 15 tonnes of styrene leaked into underground drains after a tanker overturned.

The chemical spilled into waters surrounding a bird-watching area.

[shipping incidents]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 6, 2000. (<http://www.chemsafety.gov>).

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**Location :** Mineapolis, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A hydrochloric acid spill occurred at a printing plant. Approximately 1,000 gallons of the acid spilled in the plant forcing the evacuation of the entire building. A 1-inch pipe is thought to have broken on a 4,700-gallon tank, spilling the acid. The spill was contained in the building. The buildings air system was shut down to keep vapours from being emitted from ducts. Hydrochloric acid is considered poisonous if inhaled as vapours or absorbed through the skin.  
[mechanical equipment failure, normal operations]

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**Lessons**

[None Reported]

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Source : CHEMICAL HAZARDS IN INDUSTRY, APRIL 2000.

Location :

Injured : 0      Dead : 3

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**Abstract**

An incident occurred at a naphtha cracking complex during installation work on an armoatics plant under construction.

Three workers were asphyxiated by argon and hydrogen which was found to be leaking from the pipes that they were installing at the time of the incident.

[asphyxiation, maintenance]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 8, 2000. (<http://www.chemsafety.gov>).

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**Location :** Texas, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A road transportation incident. A tanker truck carrying furfural overturned causing the substance to spill into a drainage hole that empties into a nearby ditch, which drains into a ship channel. Approximately 9,000-gallons was spilt.

People were advised that fish in and around the area might be contaminated.

Clean-up efforts are underway.

Furfural is a colourless, oil, all-natural ethanol derivative used mainly in the manufacture of plastics. The substance is highly flammable, explosive and toxic.

Furfural is lethal if ingested or inhaled. If a person comes in contact with the chemical it can also irritate the skin, eyes and throat.

[contamination]

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**Lessons**

[None Reported]

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**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 1, 2000. (<http://www.chemsafety.gov>).

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**Location :** , USA

**Injured :** 1     **Dead :** 0

---

**Abstract**

A fire and explosion occurred at a refinery on two separate days. The first to occur was an explosion, which slightly injured a worker and badly damaged a platformer.

The fire occurred about a week later and involved a vacuum that feeds into the plant's fluid catalytic cracking unit. Approximately 130 gallons of crude oil had caught fire.

The fire was put out within minutes using hand-held fire extinguishers.

It is thought that a fractured steam line caused the fire.

[fire - consequence, damage to equipment, injury]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 27, 2000, (<http://www.chemsafety.gov>).

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**Location :** Winchester, USA**Injured :** 0      **Dead :** 0**Abstract**

Approximately 11,500 and 21,000 barrels of oil spilt from a ruptured pipeline into a creek. Nearby residents were evacuated. A precautionary boom was placed by the mouth of the creek to contain any oil from spilling into the river. It was not immediately known what caused the rupture.

[spill, evacuation]

**Lessons**

[None Reported]

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 24, 2000, (<http://www.chemsafety.gov>).

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**Location :** Garrison, USA

**Injured :** 1      **Dead :** 0

---

**Abstract**

An acetylene tank exploded as a plumber was carrying out welding work on pipes at a hospital.

The plumber was involved in maintenance work in a tunnel system under the building at the time of the accident. The plumber suffered minor burn injuries.

[explosion, burns, injury]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 21, 2000, (<http://www.chemsafety.gov>).

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**Location :** Guanabara Bay, BRAZIL

**Injured :** 0      **Dead :** 0

---

**Abstract**

Approximately 1,300 tonnes of oil leaked from a pipeline into the sea. 26km of floating barriers were deployed to prevent the oil from reaching nearby beaches.

[spill]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 15, 2000, (<http://www.chemsafety.gov>).

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**Location :** St Petersburg, USA**Injured :** 1      **Dead :** 0**Abstract**

A gas pipeline ruptured during construction work. A contractor was digging a hole in a highway when he hit the 2-inch natural gas line.

A gas employee who responded to the leak climbed into the 6-foot hole but was overcome by the gas. He passed out, fortunately three fire fighters managed to lift him to the surface and revive him with oxygen.

[operator error, asphyxiation, injury]

**Lessons**

[None Reported]



Source : ENVIRONMENTAL TIMES, VOLUME 6, ISSUE 3, SPRING 2000.

Location : Wales, UK

Injured : 0      Dead : 0

---

**Abstract**

A firelighter manufacturer's tank overflowed. The resulting discharge spilled into the surface water drains and an interceptor into a nearby watercourse. The company was fined £7,000 and £150 costs (2000).

[pollution]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 14, 2000, (<http://www.chemsafety.gov>).

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**Location :** , USA

**Injured :** 10    **Dead :** 0

---

**Abstract**

Chemical fumes from an anti-corrosion compound were spread through a building by the facility's ventilation system, causing the evacuation of about 1,100 employees. Ten people were sent to hospital complaining of respiratory problems.

The anti-corrosion compound collected as a result of a drain blockage.

[gas / vapour release, flow restriction, people, chemical - fume, injury]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 12, 2000, (<http://www.chemsafety.gov>).

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**Location :** , USA

**Injured :** 30+ **Dead :** 0

---

**Abstract**

An ammonia line broke in an area where approximately 50 people were working.

Five people were reported to have suffered injuries and another twenty-five to thirty were sent to a local hospital for the effects of ammonia.

[mechanical equipment failure, injury]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 12, 2000, (<http://www.chemsafety.gov>).

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**Location :** , USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

An 8-inch gas pipeline ruptured creating a large crater on a highway forcing its closure. The release of gas from the pipeline rupture did not ignite.

Several nearby homes were evacuated, there were no reports of any injuries.

[gas / vapour release, evacuation, near miss]

---

**Lessons**

[None Reported]

---

132242000

**Source** : CHEMICAL HAZARDS IN INDUSTRY, NOVEMBER 2000.

**Location** : Ontario, CANADA

**Injured** : 5      **Dead** : 0

---

**Abstract**

An explosion occurred in a paint area of an automotive assembly plant. The explosion occurred after a solvent line rupture. Five people were injured in the incident.

[injury]

---

**Lessons**

[None Reported]

---

12110December 1999

Source : BBC NEWS, 2 DECEMBER, 1999, (<http://www.bbc.co.uk>).

Location : Chernobyl, UKRAIN

Injured : 0      Dead : 0

---

**Abstract**

A nuclear power station was closed down due to a leaking pipe only days after it was re-started following five months of repair.

Officials stated that there had been no release of radioactive material and that the pipe affected the cooling system rather than the reactor itself.

[power plant, near miss]

---

**Lessons**

[None Reported]

---

1222717 November 1999

Source : CHEMICAL HAZARDS IN INDUSRTY, FEBRUARY 2000,; CHEM. WEEK, 1 DECEMBER 1999, 161(45), 18.

Location : Texas, USA

Injured : 2      Dead : 0

---

**Abstract**

An explosion occurred on a liquid propane gas line. Two people were injured.

The most likely cause of the explosion is thought to have been due to two passing trucks igniting a vapour cloud, which had formed from a leak in the pipeline.

[road transport, road transportation, LPG, hot surface, leak, vapour cloud explosion, injury]

---

**Lessons**

[None Reported]

---

**Source :** BBC NEWS, NOVEMBER 16, 1999.

**Location :** Ecuador, SOUTH AMERICA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A main oil pipeline was blown-up. The blast, caused by dynamite, put a section of the line out of service and caused tens of thousands of barrels of crude oil to spill.

[deliberate acts]

---

**Lessons**

[None Reported]

---



1206824 October 1999

Source : BBC NEWS, OCTOBER 25, 1999, (<http://www.bbc.co.uk>).

Location : , PAKISTAN

Injured : 35    Dead : 11

---

**Abstract**

A gas explosion occurred whilst workers were digging up a gas pipeline, killing at least eleven people and injuring thirty five. The incident was brought under control by cutting the gas supply, but the fires took several hours to burn out.

Several houses were damaged in the blast and local people were evacuated.

[excavation, fatality, evacuation, fire - consequence, injury]

---

**Lessons**

[None Reported]

---

Source : CNN.COM, U.S. NEWS, SEPTEMBER 21, 1999, (<http://www.cnn.com>).

Location : , AFRICA

Injured : 0      Dead : 0

---

**Abstract**

A bomb attack carried out on a pipeline stemmed the flow of crude oil. The pipeline had just begun exporting crude oil. Slight damage occurred.  
[damage to equipment]

---

**Lessons**

[None Reported]

---

1164515 August 1999

Source : CNN.COM, U.S. NEWS, AUGUST 16, 1999, (<http://www.cnn.com>); HAZARDOUS CARGO BULLETIN, NOVEMBER 1999.

Location : North Carolina, USA

Injured : 2      Dead : 0

---

**Abstract**

A break in a pipeline sent a yellowish cloud of toxic chemicals into the air above a pharmaceutical plant causing the evacuation of a nearby trailer park. Two workers were injured when the pipeline broke, releasing approximately 400 gallons of bromine, one suffered burns and the other complained of respiratory problems. Both were under observation at hospital. Approximately seventy five people were evacuated. Much of the bromine released was in liquid form and was contained, though some formed a cloud.

[gas / vapour release, pipeline failure, processing, evacuation, injury]

---

**Lessons**

Bromine, a chemical that can cause severe injury or death when inhaled, ingested or after coming into skin contact

---

**Source** : CHEMICAL HAZARDS IN INDUSTRY, NOVEMBER 1999.; HAZARDOUS CARGO BULLETIN, NOVEMBER 1999.

**Location** : Texas, USA

**Injured** : 0      **Dead** : 1

---

**Abstract**

An explosion occurred when a worker punctured an ethane propane pipeline whilst digging holes for electric utility poles. The worker was killed.  
[excavation, fatality]

---

**Lessons**

[None Reported]

---

1207205 July 1999

Source : CHEMICAL HAZARDS IN INDUSRY, OCTOBER 1999.

Location : , USA

Injured : 150+ Dead : 0

---

**Abstract**

A series of explosions occurred at a chemical plant, injuring 21 workers. Clouds of bauxite dust were dispersed into the atmosphere.

Over one hundred and fifty residents were treated at hospital. The cause of the incident is not yet known but it is thought that an explosion in a powerhouse burst a gas line which then caused the caustic soda facility to explode.

[processing, gas / vapour release, bauxite, injury]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, SEPTEMBER 1999.

**Location** : Illinois, USA

**Injured** : 2      **Dead** : 0

---

**Abstract**

Two workers were hospitalised after being affected by fumes after sulphuric acid and bleach had been mixed to clean drains.  
[cleaning, gas / vapour release]

---

**Lessons**

[None Reported]

---

1210424 June 1999

Source : CHEMICAL HAZARDS IN INDUSTRY, DECEMBER 1999,; ENDS REP., SEP 1999(296), 16-17.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A paper producer was fined £17,500 (1999) and ordered to pay costs of £37,445 (1999), for polluting three rivers causing the death of approximately 10,000 fish.

A white liquid was discovered entering a culvert under the mill. A stock record proved that there had been a spillage to drain of cationic flocculant.  
[ecological damage, pollution, leak, milling, spill, environmental]

---

**Lessons**

[None Reported]

---

**Source :** HAZARDOUS CARGO BULLETIN, SEPTEMBER 1999.

**Location :** , NIGERIA

**Injured :** 0      **Dead :** 15

---

**Abstract**

An explosion occurred on an oil pipeline killing 15 people. Approximately 100 m3 unspecified fuel was lost.  
[fuel, fatality, product loss]

---

**Lessons**

[None Reported]

---



**Source** : HAZARDOUS CARGO BULLETIN, SEPTEMBER 1999.

**Location** : Dagestan, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A crude export line was bombed causing oil to leak. A fire ensued.

[fire - consequence, pipeline, crude oil, spill, leak]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, SEPTEMBER 1999.

**Location** : Bashkortostan, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A rupture occurred on a main oil line. More than 400 tonnes of oil spilled into a near-by river. A response team was brought in to deal with the spill.  
[material transfer, pipeline, crude oil]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, SEPTEMBER 1999.

**Location** : Washington, USA

**Injured** : 0      **Dead** : 3

---

**Abstract**

A leak occurred on a pipeline releasing vapours over a nearby creek. The vapours ignited causing a fireball which killed three people. Approximately 1,100 m3 of gasoline was spilt into the creek.

[gas / vapour release, explosion, fire - consequence, fatality, spill]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JUNE 27, 2000, (<http://www.chemsafety.gov>).

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**Location :** Bellingham, USA

**Injured :** 0      **Dead :** 3

**Abstract**

Approximately 277,000 gallons of fuel spilled from a ruptured pipeline killing three people. Nearby residents were evacuated and other parts of the area were asked to conserve water after a pump station was damaged in the fire and explosion.

The pipeline was later tested. During the first test the pipeline ruptured and spilled 10,000 gallons of water.

Further testing was carried out and all defects were found and repaired.

It is thought that the company will apparently be fined an estimated \$3.05 million (2000), the largest fine ever sought against a pipeline operator.

[fire - consequence, evacuation, fatality, material of construction failure]

**Lessons**

[None Reported]

1210308 June 1999

Source : CHEMICAL HAZARDS IN INDUSTRY, DECEMBER 1999,; ENDS REP., AUG 1999, 1999(295), 7-8.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A public house next to a chemical plant suffered contamination of ground water with xylene. It is thought that the most likely pollution source was the chemical plants' underground xylene storage tanks.

An enforcement order was served on the company on 9 June 1999, to empty the tanks and have them tested for leaks.

The public house had to close a number of times due to the risk of explosions.

An investigation into the incident revealed that xylene may have leaked from the pipes entering the tanks at ground level. The ground water flow under the chemical plant is strongly effected by tidal flow in the river on its boundary.

---

**Lessons**

[None Reported]

---

11247 June 1999

**Source** : BBC NEWS, 28 JUNE, 1999,  
(<http://www.bbc.co.uk>).

**Location** : , NIGERIA

**Injured** : 0      **Dead** : 15

---

**Abstract**

Fifteen people were burned to death by a blazing fuel from a ruptured oil pipeline. The fire broke out after the pipeline was deliberately punctured to enable people to drain off fuel.

More than one hundred thousand litres of oil spilled out.

[fatality, burns, deliberate acts]

---

**Lessons**

[None Reported]

---

1148224 May 1999

**Source** : BBC NEWS, MAY 24, 1999,  
(<http://www.bbc.co.uk>).

**Location** : Yeman, MIDDLE EAST

**Injured** : 0      **Dead** : 0

---

**Abstract**

An explosion and fire occurred on an oil pipeline. The pipeline carries one hundred and seventy thousand barrels of oil a day. The explosion occurred along a section which runs through territory of a fiercely independent tribe.  
[fire - consequence]

---

**Lessons**

[None Reported]

---

1148423 May 1999

Source : CNN.COM, U.S. NEWS, MAY 24, 1999, (<http://www.cnn.com>); BBC NEWS, MAY 24, 1999, (<http://www.bbc.co.uk>).

Location : Khuzestan, IRAN

Injured : 70    Dead : 0

---

**Abstract**

An explosion and fire occurred on a gas pipeline injuring 70 workers, 30 seriously, but causing no major damage. The blast occurred whilst workers were repairing the pipeline. The injured workers suffered burns.

It is thought that the cause of the explosion was due to a gas leak.

[fire - consequence, repair, injury]

---

**Lessons**

[None Reported]

---



1143118 May 1999

**Source :** CNN.COM, U.S. NEWS, MAY 18, 1999,  
(<http://www.cnn.com>).

**Location :** , AFRICA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A fire occurred causing the shutdown of a refinery. The plant is estimated to be down for approximately seven to eight months. The fire damaged the primary distillation unit and the main crude pipeline supplying the refinery.  
[fire - consequence, plant shutdown, refining, damage to equipment, crude oil]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 14, 2000. (<http://www.chemsafety.gov>).

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**Location :** Dacatur, USA

**Injured :** 1      **Dead :** 3

**Abstract**

An explosion occurred when workers were reassembling a tetrafluoroethylene (TFE) pipeline.

The cause of the explosion was due to a combination of air remaining in the lines at the purification tower and a sudden pressurisation of TFE. The flammable TFE was highly pressurised and was released into the air in the lines, which resulted in a sudden eruption and caused the flammable gas to ignite.

An investigation into the incident found the following:

The line and piece of equipment had been taken apart and the workers were trying to take out a blockage that was causing a low flow.

The workers then connected the two lines, which were separated by a valve, one side had the TFE in, and the other was a newly repaired one.

There should have been no air in the repaired line, it should have been a vacuum, but air had been left in the line. The valve was opened too quickly.

When the valve was opened, the TFE burst into the air filled line and caused the explosion.

There was no external source of the explosion, no smoking and no welding.

A further investigation is still being carried out.

[overpressurisation, operation inadequate, fatality, maintenance, injury]

**Lessons**

[None Reported]

12497May 1999

**Source** : EVENING CHRONICLE, 21 MAY, 1999, (<http://www.evening-chronicle.co.uk>)

**Location** : Tynside, UK

**Injured** : 2      **Dead** : 1

---

**Abstract**

An explosion occurred at a factory killing a worker and injuring two others. At the time of the incident repair work was being carried out on a press heat exchanger when a filter blocked. It is thought that due to the filter being blocked a pipe fracture occurred resulting in a massive release of high-pressure steam. An investigation is underway into the cause of the explosion.

[burns, fatality, flow restriction, injury]

---

**Lessons**

[None Reported]

---

11480May 1999

**Source** : CHEMICAL WEEK, MAY 19, 1999.

**Location** : Dacatur, USA

**Injured** : 2      **Dead** : 2

---

**Abstract**

An explosion and fire occurred on a fluoropolymers plant killing two employees and seriously injuring two.

The explosion involved tetrafluoroethylene (TFE), a flammable gas used to make several fluorocarbon resins, including polytetrafluoroethylene resin.

The TFE escaped from a pipeline, but is still under investigation as to whether it leaked from the pipe or burst from a safety valve.

[burns, fatality, fire - consequence, leak, injury]

---

**Lessons**

[None Reported]

---

**Source** : CHEMICAL HAZARDS IN INDUSTRY, MARCH 2000,; FIRE PREVENTION, JAN 2000, (328), 40

**Location** : Staffordshire, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire occurred at a storage yard storing plastic pipes. The fire caused an estimated damage of £750,000 (1999).

The yard contained polyethylene and PVC pipes stacked at heights of 2-6 metres.

Fire fighters and fork lift truck drivers created a fire break between stored stock.

An investigation into the incident found a carelessly discarded cigarette-end in a rubbish bin and the subsequent ignition of a plastic pipe was the most likely cause of the fire.

[fire - consequence]

---

**Lessons**

[None Reported]

---

Source : CHEMICAL HAZARDS IN INDUSTRY, DECEMBER 1999,; ENDS REP., SEP 1999, 1999(296), 48.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A company was fined £9,000 (1999) plus costs for causing polluting matter to enter controlled waters. High levels of ammonia discharging from a surface drain were traced to an ice cream manufacturing plant, which was being dismantled. The plant contained 1.5 tonnes of ammonia.

A tanker due to collect the refrigerant failed to arrive, so it was decided to dissolve the gas in water filled drums, but there was insufficient drums available. A trough filled with running water was then used but this overflowed into a drain leading to a tributary of a river. The discharge killed 11,000 fish and caused sore throats and stinging eyes to local residents. Clean-up costs amounted to approximately £14,000 (1999).

[pollution, demolition, leak, ecological damage, people, environmental]

---

**Lessons**

[None Reported]

---

1291925 March 1999

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

During blind replacement a flange was cracked open releasing LPG, the contractors attempted to close it but this was not possible due to icing.

A steam lance was used to warm up the flange so that it could be closed but this was unsuccessful.

The emergency services were called to assist in the dispersion of the gas cloud.

Measures were taken to remove the source of the LPG including checking of all isolation valves. Finally the pump was started to transfer the butane to the gasoline bleeding system. The leak stopped.

[gas / vapour release, operation inadequate, maintenance]

---

**Lessons**

[None Reported]

---

1052423 February 1999

Source : CHEMICAL ENGINEERING, MAR, 1999,; LOSS PREVENTION BULLETIN, 146, 24.

Location : Martinez, California, USA

Injured : 1      Dead : 4

---

**Abstract**

A fire occurred in a distillation unit at a refinery. The unit was shutdown.

Four workers were killed and the other was critically injured when a fireball engulfed them while they attempted to repair a leak in a pipe containing highly flammable naphtha.

[fire - consequence, refining, fatality, burns, injury]

---

**Lessons**

[None Reported]

---



**1054317 February 1999**

**Source :** BBC NEWS, FEB 19, 1999,  
(<http://www.bbc.co.uk>).

**Location :** Teesside, UK

**Injured :** 0      **Dead :** 0

---

**Abstract**

A chemical leak occurred at a chemical plant when hydrochloric acid leaked from a pipe into a stone drain and then onto a nearby marshland, polluting 70,000 square metres of marshland.

The area was diluted with sea water to minimise the effect of the pollution.

[drains & sewers, pollution]

---

**Lessons**

[None Reported]

---

10534February 1999

**Source** : BBC NEWS, FEB 9, 1999,  
(<http://www.bbc.co.uk>).

**Location** : , UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Ground water contaminated with tritium leak into a stream via a drainage system at an atomic weapons plant.  
[spill, contamination]

---

**Lessons**

There is no safe level of radioactivity. Tritium as a substance is difficult to control as it is an element of hydrogen and therefore, easily gets into the body and blood system.

---

110331999

Source : CHEMICAL HAZARDS IN INDUSTRY, JUNE, 1999, ISSN 0265-5271.; ENDS REPORT, FEB 1999, (289), 5-6.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A leak of hydrochloric acid occurred at a site. The area contains a Greenabella Marsh bird and is a roosting and feeding site for wading birds. Acid contaminated over half of the marsh.

The leak was from a fractured underground pipeline taking waste to storage lagoons.

[pollution, ecological damage, material transfer]

---

**Lessons**

[None Reported]

---

118791999

Source : BBC NEWS, SEPTEMBER 13, 1999, (<http://www.bbc.co.uk>).

Location : , UK

Injured : 0      Dead : 1

---

**Abstract**

A manhole cover had been left off an access pit causing a worker to fall 20 ft, the worker died from the fall.

The worker fell through the open manhole while walking through a dimly lit corridor.

The company was fined £200,000 (1999) plus £3,500 (1999) towards prosecution costs.

[fatality, safety procedures inadequate]

---

**Lessons**

[None Reported]

---

1301911 December 1998

**Source :** NATIONAL TRANSPORTATION SAFETY BOARD ABSTRACT OF FINAL REPORT, PIPELINE ACCIDENT REPORT, NTSB/PAR-00/01, NATURAL GAS PIPELINE RUPTURE AND SUBSEQUENT EXPLOSION, ST. CLOUD MINNESOTA, DECEMBER 11, 1998.

**Location :** St. Cloud, Minesota, USA

**Injured :** 13    **Dead :** 4

---

**Abstract**

An explosion occurred on a 1-inch diameter high-pressure plastic gas pipeline. The incident occurred when an installation crew struck and ruptured the pipeline causing a gas leak. Approximately forty minutes later an explosion occurred. Four people were killed and thirteen people injured in the incident. Damage to buildings and equipment is estimated at \$399,000 (1998).

An investigation into the incident revealed the following:

1. The marked location of the ruptured gas line was accurate and therefore was not a factor in the incident.
2. Installation procedures were inadequate in that they did not address steps to take under unusual circumstances such as striking a significant underground obstacle, to ensure that buried utilities were protected during the entire installation process including the underground portion.
3. Has someone immediately called for emergency assistance after the rupture, they may have had time to fully assess the risk and to take actions that could have helped either to prevent the explosion or to avoid the resulting loss of life.
4. The risk to people and property was not fully addressed by emergency personnel.
5. Had the gas line in this incident been equipped with an excess flow valve, the valve may have closed after the pipeline ruptured and the explosion may not have occurred.

[excavation damage, human causes, fatality, injury]

---

**Lessons**

[None Reported]

---

10970December 1998

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A blockage occurred on a pipe of a thermal oxide reprocessing plant. The pipe transfers dissolved fuel from the plant to its separation units. The partial blockage forced the plant to halt operations at the head end, meaning it could only operate the rest of the plant for two weeks as it depleted the buffer tank of dissolved fuel.

The blockage was removed and the pipework flushed out.

An investigation is to be carried out to find the cause of the build-up of fragments of cladding inside the pipe.

[flow restriction, plant / property / equipment]

---

**Lessons**

[None Reported]

---

11884December 1998

**Source** : CHEMICAL HAZARDS IN INDUSTRY, SEPTEMBER 1999.

**Location** : Pennsylvania, USA

**Injured** : 0      **Dead** : 2

---

**Abstract**

Workers were using a welding/cutting torch in an aerial lift when flammable materials seeped out of a pipe and were ignited by the torch. Two workers died.

[leak, fire - consequence, fatality]

---

**Lessons**

[None Reported]

---

**Source :** ENVIRONMENTAL TIMES, VOLUME 6, ISSUE 3, SPRING 2000.

**Location :** Wales, UK

**Injured :** 0      **Dead :** 0

---

**Abstract**

Sewage spilled into a nearby river from a fracture sewer pipe. The area in which the spill occurred is an important spawning area for salmon, sea trout and brown trout.

The company took several days to rectify the problem causing further release of sewage.

The company was fined £3,000 and costs of £1,027 (2000).

[pollution, ecological damage, waste, drains & sewers]

---

**Lessons**

[None Reported]

---



**Source :** CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 29 JULY, 1999. (<http://www.chemsafety.gov>).

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**Location :** Moses Lake, USA

**Injured :** 4      **Dead :** 2

**Abstract**

An explosion and fire occurred at a silicon materials plant. The incident occurred when a six-inch pipe ruptured. Two people were killed and four others were injured.

[fire - consequence, material of construction failure, fatality, injury]

**Lessons**

[None Reported]

1072815 October 1998

Source : BBC NEWS, OCT 19, 1998, (<http://www.bbc.co.uk>).

Location : , AFRICA

Injured : -      Dead : 100+

---

**Abstract**

A fire and explosion occurred on a ruptured pipeline.

Local people were scooping up the leaking fuel from the pipeline when there was an explosion.

It is thought that ignition was caused by a spark from either a cigarette or a motorbike engine.

Many of the victims had become saturated by fuel.

[burns, fatality, fracture, transportation]

---

**Lessons**

[None Reported]

---

Source : EUROPEAN CHEMICAL NEWS, 26 OCT, 1 NOV, 1998.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Approximately 80 tonnes of 36% hydrochloric acid leaked from a 200 tonne stock tank.

A pipe at the base of the failed, causing a gas cloud.

[storage tanks, pipeline failure, gas / vapour release, spill]

---

**Lessons**

[None Reported]

---

10790September 1998

Source : BBC ONLINE NETWORK 1998, (<http://www.bbc.co.uk>).

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Vandals caused five million gallons of raw sewage to pour into an estuary, decimating fish stocks in part of a nearby river.

The vandals cut through a chain fence and closed the valves of a sewage pipe leading to a nearby treatment works. This caused a build-up of pressure which blew open a manhole cover.

Workers had to overcome ammonia fumes to stop the flow of sewage, which is thought to have continued for three hours.

Samples taken from the river revealed levels of oxygen a tenth of what they should be.

[vandalism, spill, pollution, drains & sewers, waste water treatment, overpressure, ecological damage]

---

**Lessons**

[None Reported]

---

10445September 1998

Source : BBC ONLINE NETWORK, 1998, (<http://www.bbc.co.uk>).

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Vandals caused five million gallons of raw sewage to pour into an estuary, decimating fish stocks in part of a nearby river.

The vandals cut through a chain fence and closed the valves of a sewage pipe leading to a nearby treatment works. This caused a build-up of pressure which blew open a manhole cover.

Workers had to overcome ammonia fumes to stop the flow of sewage, which is thought to have continued for three hours.

Samples taken from the river revealed levels of oxygen a tenth of what they should be.

[vandalism, ecological damage, sewer]

---

**Lessons**

[None Reported]

---

**Source** : ENVIRONMENT ACTION, OCTOBER/NOVEMBER 1999.

**Location** : Norfolk, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

A company was fined £30,000 and costs of £3,228 (1999) for polluting a harbour with sewage effluent.

Sewage was found to be leaking from a manhole cover into the surrounding area.

[pollution, sewer]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

An incident at an ethylene plant. A crane had completed a lifting operation on the previous day. The driver was asked by contractors to look at another job, and when moving the crane, collided with an overhead pipe track. The direct cause was the crane jib being left in the upright position whilst the crane was being driven away.

Personnel congregating at a muster point spilt onto the road and delayed emergency services getting to the scene.

Damage was sustained by two flare lines, but later declared fit for use following leak and pressure testing. Planned flare operations were suspended whilst the lines were inspected. Damage to the pipe-bridge was relatively minor and it was declared fit for short-term use.

[collision, pipeline, transportation, damage to equipment

---

**Lessons**

A notice was issued to all of the contracting company's crane drivers informing them of correct procedures.

An indicator to be installed in the front cab of all cranes to inform the driver when the jib was in the upright position.

Improved control of crane and other large vehicle movements on site, with risk assessments as necessary.

Further familiarisation of the Fire and Emergency Service shift teams.

---

11035July 1998

Source : CHEMICAL HAZARDS IN INDUSTRY, JUNE, 1999, ISSN 0265-5271.; ENDS REPORT, FEB 1999, (289), 54.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A company was fined £13,500 (1999) for the pollution of ground water from around 7000 litres of unleaded petrol which had leaked from a petrol station. The company was also found guilty for causing polluting matter to enter controlled waters. Fuel had escaped from underground piping. The leak detection system at the petrol station did not function. About 1000 litres of fuel has been recovered but it is not known what happened to the remaining 5000-6000 litres of petrol.

[pipeline, spill, gasoline]

---

**Lessons**

[None Reported]

---



12226 July 1998

**Source** : CHEMICAL HAZARDS IN INDUSRTY, FEBRUARY 2000.

**Location** : Oxfordshire, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

An ink and varnish company was fined £10,000 (1999), for polluting a pond linked to a river with linseed oil.

An investigation into the incident found that the company's drainage system was full. A large volume of oil had collected in a bund protecting oil tanks.  
[pollution, human causes, processing]

---

**Lessons**

[None Reported]

---

12630July 1998

Source : ENVIRONMENTAL TIMES, VOLUME 6, ISSUE 3, SPRING 2000.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Approximately 213,000 litres of fuel was lost over a period of eight months from an underground pipeline resulting in groundwater pollution.

Two companies involved were fined, one £125,000 and the other £125,000, both companies split costs of £25,000 (2000).

[human causes]

---

**Lessons**

[None Reported]

---

11427 July 1998

**Source** : BBC NEWS, JULY 5, 1999,  
(<http://www.bbc.co.uk>).

**Location** : , CHINA

**Injured** : 0      **Dead** : 0

---

**Abstract**

An incident occurred at a nuclear power plant leaving it crippled for more than twelve months.

The 300 megawatt plant was shut down last July after an apparent welding problem.

The problem caused bolts holding guide pipes to the main body of the reactor to fall off under strong water pressure, an official was quoted as saying.

[weld failure, high pressure, material of construction failure, operational activities, plant / property / equipment]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A plant used boron trifluoride (BF<sub>3</sub>) catalyst, dissolved in ethanol. The catalyst was fed to the plant from a pair of drums which were pressurised to feed catalyst through one of two parallel filters to the reactor. The drain/vent system from the filters passed through a non-return valve to a caustic scrubber. One drum ran empty and the operator changed over to the second. He noticed high pressure drop over the on-line filter and changed this over too. A valve operating error exposed the non-return valve pressure, rather than the normal 1 bar, although this was still within its design pressure.

A leak then occurred from the cover of the non return valve. The BF<sub>3</sub> reacted with moisture in the air to form a dense cloud containing hydrogen fluoride which dispersed slowly due to calm weather conditions.

Operators donned gastight suits to enable plant isolation. A water curtain was used to contain the gas cloud and sodium carbonate to treat acidic material in the drain sump.

The non-return valve cover had been deformed due to overtightening of the bolts and the gasket thickness was too low for the duty, providing an inadequate seal.

[non-return valve, spill, gasket failure, processing]

---

**Lessons**

1. Better specification of equipment was required to ensure its fitness for purpose. This especially applies to pipework specification and materials, gasket materials and thickness. Checks required to ensure installed equipment meets specification.
  2. Need for a system to identify gasket thickness and type on the plant.
  3. Review need for automatic leak detection and benefit of remote isolation valves of the BF<sub>3</sub> banded area from the main effluent system.
  4. Assess danger of toxic fumes being drawn into the control room ventilation system.
-

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Fourteen tonnes of concentrated sulphuric acid was lost in 3.5 hours into the sump and kerbed bunded area around a sulphuric acid storage tank. The alert was raised by an area operator who noticed that the sump was full and the bund area partially full. Earlier the same operator had noticed a leak from the feed pump in commission and decided to switch over to the stand-by pump. This stand-by pump was noted in the night order book as being on emergency stand-by due to an earlier pin hole leak on the pipework.

The operation of the pump was checked several times by the operator in the first few hours of its operation, but the rise in the level in the sump was not noticed until the liquid level was present within the main kerbed area as noted above. The rapid fall in the sulphuric acid tank level was not noticed by the control room operator. The cause of the leak was found to be an open pump casing drain valve. This valve was shut and the area barriered off.

As the spillage was contained and under control it was decided to deal with the spillage the following morning when a suitable external company was appointed to suck out the spillage into a road tanker for subsequent disposal. This was completed without further incident.

[storage tanks, spill, design or procedure error]

---

**Lessons**

1. Counsel staff to enforce the requirement to follow procedures carefully and fully understand the dangers of concentrated sulphuric acid.
  2. The Operating instructions should be revised to include the reasons for the high level alarm settings and importance of controlling the sump level.
  3. The operating team should install a rate of change alarm on the sulphuric acid tank and level instrumentation on the associated sump.
  4. The operating team should check the pipework for erosion/corrosion.
  5. Manufacturing Managers should ensure that formal risk assessments are used for the installation of patches on hazardous systems across the site.
-

1265005 May 1998

**Source :** ENGINEERS AUSTRALIA, JANUARY 2000.

**Location :** , AUSTRALIA

**Injured :** -      **Dead :** 4

---

**Abstract**

A marine transportation incident. A fire occurred onboard a ship when diesel fuel leaked from a burst flexible hose onto a hot engine component in the main machinery space. Four people were killed in the incident.

[fire - consequence, hose failure, hot surface, fatality]

---

**Lessons**

[None Reported]

---

12767May 1998

**Source** : CHEMICAL HAZARDS IN INDUSTRY, JUNE 2000.; MADDEN, G. (SOUTH GLOSTERSHIRE ENVIRONMENTAL SERVICES, UK) ENVIRONMENTAL HEALTH JOURNAL, FEB 2000, 108(2), 46-48.

**Location** : Bristol, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

An underground fuel pipeline was damaged during planned maintenance work forcing two families to be moved out of their homes. Approximately 27,000 litres of kerosene were recovered following the incident. It is estimated that approximately 500-900 litres has been lost to ground. [evacuation, spill, excavation damage, damage to equipment]

---

**Lessons**

[None Reported]

---

1199214 April 1998

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Ammonia was released through a small hole when a contractor, dismantling a redundant plant, cut into a pipe. The site was evacuated as a precaution.  
[contractor error, demolition, evacuation, gas / vapour release]

---

**Lessons**

[None Reported]

---



1234830 March 1998

**Source** : NATIONAL TRANSPORTATION SAFETY BOARD, 1999, (<http://www.nts.gov>); ENVIRONMENTAL PREVENTION BULLETIN, 068.

**Location** : Sandy Springs, Georgia, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A pipeline rupture caused approximately 30,000 of gasoline of which 17,000 gallons were recovered.

The incident occurred on a 40-inch diameter steel pipeline, which ran through a landfill site.

An employee at the site detected the odour of gasoline flowing up through the ground in the vicinity of the site and immediately reported the leak to the pipeline owner. The pipeline was subsequently shutdown.

An investigation into the leak found that the pipeline had buckled and cracked.

It is thought that the stress damage was due to soil settlement underneath the pipe.

Clean-up costs exceeded \$3.2 (1998).

[material of construction failure, spill, design or procedure error]

---

**Lessons**

[None Reported]

---

**Source :** LOSS PREVENTION BULLETIN 154, 9-14.; U.S. CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, (<http://www.chemsafety.gov>).

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**Location :** Louisiana, USA

**Injured :** 1      **Dead :** 1

---

**Abstract**

A worker was killed and a contractor was seriously injured due to nitrogen asphyxiation.

On March 27, 1998, at approximately 12:15 pm, two workers at a manufacturing plant, were overcome by nitrogen gas while performing a black light inspection at an open end of a 48-inch-wide horizontal pipe. The 48-inch pipe was open because chemical-processing equipment had been shut down and opened for major maintenance. Nitrogen was being injected into the process equipment primarily to protect new catalyst in reactors from exposure to moisture. The nitrogen was also flowing through some of the piping systems connected to the reactors. The nitrogen was venting from one side of the open pipe where it had formerly been connected to an oxygen feed mixer. No warning sign was posted on the pipe opening identifying it as a confined space or warning that the pipe contained potentially hazardous nitrogen.

The two workers had placed a sheet of black plastic over the end of the pipe to provide shade to make it easier to conduct the black light test during daylight.

While working just outside the pipe opening and inside of the black plastic sheet, the two workers were overcome by nitrogen. One worker died from asphyxiation. The other worker survived but was severely injured.

[fatality, entry into confined space, safety procedures inadequate, injury]

---

**Lessons**

Nitrogen is an odourless, tasteless, and invisible gas that can cause asphyxiation at high concentrations. When used in confined spaces, nitrogen is especially hazardous because it cannot be detected by human senses but can cause injury or death within minutes by displacing the oxygen that is required to sustain life.

The following recommendations were made:

1. Post signs containing the warning "Danger, Confined Space: Do Not Enter Without Authorization" or similar wording at potential entryways when tanks, vessels, pipes, or other similar chemical industry equipment are opened.
  2. When nitrogen is added to a confined space, post an additional sign that warns personnel of the potential nitrogen hazard.
  3. Ensure that the plant safety program addresses the control of hazards created by erecting temporary enclosures around equipment that may trap a dangerous atmosphere in the enclosure if the equipment leaks or vents hazardous material.
-

Source : ICHEME

Location : , FRANCE

Injured : 1      Dead : 0

---

**Abstract**

An contractor operator fell into the water between a ship and a jetty.

The accident occurred when the seaman on board the ship released the tanker hose. It appears that the hose knocked the operator off the jetty into the water. Fortunately the location of a nearby ladder allowed the operator to climb back to safety. He suffered extensive bruising.

The cargo loading arm was too short (outside its operating envelope) for this particular ship and therefore the transfer operation had to be undertaken using a hose.

The incident happened during darkness and the operator was not wearing a life jacket.

The immediate cause of the accident was the unsafe way in which the hose was released from the ship to the shore.

The basic causes were :

1. An inadequate loading arm which was not designed with an operating envelope which takes into account all the various factors including the freeboard of the largest and smallest tankers.
2. No risk assessment (task analysis) prior to using a hose instead of the loading arm.
3. A potential contributory factor was that the jetty operator was not wearing a life jacket since he could have easily drowned.

[fall, marine transport, operator error, design or procedure error]

---

**Lessons**

[None Reported]

---

10397February 1998

**Source** : BBC NEWS, INTERNET, 1998,  
(<http://www.bbc.co.uk>).

**Location** : Esmeraldas, ECUADOR

**Injured** : 70    **Dead** : 11

---

**Abstract**

An oil pipeline explosion. The explosion followed an oil leak and sent a ball of flames through a nearby community, destroying many houses and spilling oil into a nearby river.

Many people threw themselves into the river as a huge fireball made its way down the pipeline. Around 70 people were injured, some with severe burns.

It took more than five hours to bring the blaze under control. Rescue efforts were hampered by water shortages.

About 500 people were evacuated to a military base nearby and were not allowed to return to their homes until the pipeline was declared safe.

[evacuation, transportation, damage to equipment, fatality, injury]

---

**Lessons**

[None Reported]

---

Source : CHEMICAL HAZARDS IN INDUSTRY, JUNE, 1999, ISSN 0265-5271,; ENDS REPORT, FEB 1999, (289), 53.

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A company was fined £70,000 (1998) for an oil leak from a pipeline at its nuclear power station. Polluting matter was spilt into controlled waters. Oil had seeped into a shingle aquifer used to provide drinking water. Four boreholes were closed as a precaution. Over 80,000 litres of the total spillage of 190,000 has been recovered.

[spill, pollution]

---

**Lessons**

[None Reported]

---

9057 January 1998

**Source** : CNN.COM, U.S. NEWS, (<http://www.cnn.com>).

**Location** : Shaanxi Province, CHINA

**Injured** : 50+ **Dead** : 100+

---

**Abstract**

A liquefied nitrogen pipeline exploded in a fertiliser plant. About 60 workers were on night shift during the incident.

---

**Lessons**

[None Reported]

---

121371998

Source : NUCLEAR SAFETY NEWSLETTER/ HEALTH AND SAFETY EXECUTIVE, FEB, 1999.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A leak of clean water occurred from a valve in the outlet of a cooling coil line from a high active storage tank which came into contact with some pre-existing deposited contamination and became contaminated. The drain from the collection facility for such leaks had previously been blocked. An analysis of the situation at the time of the blockage indicated that removal of the blockage was not reasonably practicable due to high dose rates and the situation was judged to be acceptable because there was an alternative drain point. Unfortunately, the analysis did not recognise that the volume.

[storage tanks, flow restriction]

---

**Lessons**

[None Reported]

---

**Source :** ICHEME**Location :** ,**Injured :** 1     **Dead :** 0

---

**Abstract**

A contractor sustained six fractured ribs and bruised legs when brick fire insulation around the skirting of a redundant visbreaker column collapsed on top of him.

The immediate cause of the accident was the collapse of unsafe brickwork during the demolition process due to the following causes:

1. The removal of bricks from the bottom of the skirt making the structure unsafe.
2. No formal plan and risk assessment of the job.
3. Inadequate control of the proposed method for the job.

[design or procedure error]

---

**Lessons**

1. Never undertake demolition work without a detailed plan which has been scrutinised through a risk or task analysis.
  2. Ensure full-time supervision during demolition work and control each part of the job with a work permit.
-



Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

During the removal of a 42 inch blind (after maintenance) on an overhead vapour line, fuel gas from the opened flange ignited, resulting in a flash fire.

Fortunately, seven contractors working at the scaffolding platform at the time escaped without injury.

Fuel gas had entered the tower from the flare and overhead drum. The source of ignition was considered to be the hot surface of the temporarily fixed halogen lights located directly

downwind. Steam was injected into the base of the tower to extinguish the flange fire.

The immediate cause of the flash fire was the removal of an isolation blind when there was flammable gas present (reverse flow of fuel gas from the flare system) with potential sources of ignition nearby.

The basic causes were:

1. Inadequate control and coordination of the various activities that were being carried out simultaneously by the maintenance contractors and operations personnel.
2. Changes to plant conditions after the issue of a hot work permit for the removal of the blind (work on desalters, increase in fuel gas flow to flare).
3. Failure to thoroughly check the unit to identify potential remaining hazards for the deblinding tasks (tower open to flare, use of temporary non-flameproof equipment).
4. Failure to recognise the risks and prepare a written procedure in accordance with in-house rules.

[fire - consequence, design or procedure error]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A large oil spill (approximately 175 m<sup>3</sup>) occurred in a crude oil tank farm from two failed joints/gaskets. The failed joints/gaskets were at pipeline flanges on a 10 bar/150 psig section of the crude oil transfer line from the offshore production platform to crude tank at the refinery.

The flange joints/gaskets failed due to the transfer line being overpressured. The motorised inlet valve to the tank automatically closed following a spurious extra high tank level trip and this subjected the line to the maximum full discharge pressure of the offshore platform's main oil line pump. The line was not designed for the shut-in pressure.

The resultant spill of crude oil in the pipe trench was recovered using water and vacuum trucks.

The crude oil on the pig receiver slab was recovered in the oily/water sewer systems.

[joint failure, gasket failure, material transfer, refining]

---

**Lessons**

The report stated:

The implementation and continued integrity of process safety management systems must be assured through auditing and planned inspections

---

106021998

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

The failure of a crude tower re-circulating pump's mechanical seal assembly flange caused the escape of oil above its auto-ignition temperature. The resultant fire burned for over an hour before it was extinguished. Fire damage amounted to \$340,000 (1998) with additional \$670,000 (1998) for lost business opportunity.

The mechanical seal assembly flange is attached to the pump's casing by four nuts and studs.

Due to frequent start-up and shutdown of the hot oil pump (heating/cooling cycles) and the ambient to high temperature variant across the seal over a long period, the flange had loosened releasing oil to atmosphere.

[mechanical equipment failure, fire - consequence, high temperature, low temperature]

---

**Lessons**

1. Pumps handling hot oil above the auto-ignition temperature require high integrity mechanical seal arrangements and frequent vibration monitoring.
  2. Remotely operated, emergency isolation valves and shutdown arrangements minimise damage/losses from hot oil pump fires.
-

Source : LLOYDS LIST, 31 DEC, 1997.

Location : , USA

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred whilst drillers obtaining soil samples ruptured a pipeline carrying natural gas. Nearby business were evacuated and the road was closed off.  
[exploration, sampling, fire - consequence, evacuation, transportation]

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , TAIWAN

**Injured :** 2      **Dead :** 3

---

**Abstract**

An explosion and fire destroyed an LPG tank and nearby gas oil and fuel oil pipelines. Cigarettes and a bottle of wine were found at the site.  
[storage tanks, fire - consequence, fatality]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , POLAND

Injured : 0      Dead : 0

---

**Abstract**

A small fire occurred on the joint/gasket of a heat transfer oil line.

The fire was extinguished, the damage was estimated at \$7,000 (1998). There were no injuries, product spillage or escalation of the fire.

It was later found that the joints/gaskets on the system were of the incorrect material for the hot oil duty.

Investigations into the cause of the incident confirmed that the fire started from a leaking joint/gasket on the ring side flange of a 20mm (three quarter inch) branch valve. This caused hot oil at 260 degrees C and 1.5 bar pressure to soak the insulation on the main heat transfer line.

Spontaneous ignition had most likely occurred as a result of oxidation of the heat transfer oil that had dispersed into the process insulating material.

[fire - consequence, heat transfer, damage to equipment, incorrect equipment installed, joint failure, gasket failure]

---

**Lessons**

It is not uncommon for oil soaked insulation to reach the auto-ignition temperature due to the oxidation and exothermic reaction. In this case, the auto-ignition temperature of the oil was 350 degrees C with a flash point of 208 degrees C.

---

Source : LOSS CONTROL NEWSLETTER, 1997.

Location : , CANADA

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred when natural gas leaked from a 36 inch pipeline. Shutoff valves isolated the affected section and the gas fire burnt itself out. The fire also ignited a small secondary stubble fire in a nearby field. The cause of the line break is thought to have occurred due to corrosion.  
[fire - consequence, transportation]

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , INDIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

An explosion occurred on a crude oil pipeline, which led to a spill and subsequent ignition.

It is thought the incident occurred due to a terrorist assault on the pipeline. Explosions occurred at three different locations, some 120 km apart. Three refineries were affected by the incident.

[terrorism, transportation]

---

**Lessons**

[None Reported]

---



**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A 24 inch natural gas pipeline was punctured by a maintenance work crew. The damaged section was closed down and repairs initiated. Flow was curtailed for a day.

[damage to equipment, human causes, transportation, gas / vapour release]

---

**Lessons**

[None Reported]

---

1120121 October 1997

Source : ICHEME

Location : , USA

Injured : 3      Dead : 0

---

#### Abstract

H<sub>2</sub>S (hydrogen sulphide) was released while a relief valve was being replaced. The pipe fitters working on the valve were wearing air supplied breathing apparatus and were not injured. However, other nearby workers were exposed to H<sub>2</sub>S, three of which were hospitalised overnight.

The incident occurred during schedule maintenance on a hydrodesulphurization and regeneration unit. Eight relief valves had been removed from various parts of the units and two had already been replaced prior to the incident. Battery limit blinds had been installed on the majority of key lines. As a result, turnaround personnel believed they could cover all maintenance work on a single work permit. Therefore, no specific work permits were prepared authorising the replacement of the relief valves. The relief valves were located in the line going into the 24 inch blowdown header to flare. The 24 inch blowdown valve had been open throughout the turnaround. The 8 inch valve in the line to the blowdown header was also open since it was inoperable and could not be closed. On the 21 October 1997, two contractor pipe fitters had removed the 6 inch and 8 inch blind flanges and began to replace the west side safety relief valve. During this sequence of work, H<sub>2</sub>S was released.

[gas / vapour release, flare line, flare system, blind/spade/slip plate, safety relief valve, isolation inadequate, maintenance procedure error, injury]

---

#### Lessons

The following recommendations were made:

1. A hazard analysis must be carried out before commencing any work involving opening a flare line.
  2. Work on a live flare system requires special dispensation from a senior manager.
  3. A detailed procedure covering isolation, draining and purging requirements must be prepared prior to maintenance work.
  4. Detailed safety instructions for the opening of any pipeline must be included in the work permit.
-

**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A crack occurred in a flange on an undersea pipeline, which led to a spillage of 30 tonnes of crude oil. The line was shutdown when the leak was detected. The spillage was contained.  
[environmental, transportation]

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , RUSSIA

**Injured :** 21    **Dead :** 0

---

**Abstract**

Natural gas compression station was completely destroyed by an explosion during start-up operations despite warnings that the pipeline was in poor condition.  
[transportation]

---

**Lessons**

[None Reported]

---

**Source :** LLOYDS LIST, 16 SEP, 1997, 2 OCT, 1997,; OIL AND GAS JOURNAL, 22 SEP, 1997,; THE CHEMICAL ENGINEER, 25 SEP, 1997,; THE GUARDIAN, 18 SEP, 1997.

**Location :** , INDIA

**Injured :** 20    **Dead :** 60

---

**Abstract**

A leak of LPG occurred on a pipeline whilst unloading a marine tanker causing an explosion and igniting six storage tanks, some containing kerosene. The fire burned for two days and damaged 19 tanks, a two storey office block and five other buildings. The smoke caused the port to be shut down and 100,000 people evacuated.

[fire - consequence, damage to equipment, fatality, evacuation]

---

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN, 1997, NOV. REUTER.

Location : , TAIWAN

Injured : 0      Dead : 0

---

**Abstract**

An explosion occurred on a gas pipeline which was accidentally ruptured by workers. The leaking gas ignited by sparks from passing motorcycles.  
[human causes, transportation]

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , TAIWAN

**Injured :** 21    **Dead :** 7

---

**Abstract**

An explosion occurred during maintenance work involving moving an LPG pipeline.

It is thought the explosion occurred due to sparks from nearby motorcycle engines. The fire lasted 12 hours.

[fire - consequence, fatality]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , USA

Injured : 0      Dead : 0

**Abstract**

During the changing over of vacuum bottoms pumps due to cavitation problems, an electrical switchboard tripped out. This was due to a failure of the vacuum bottoms pump motor windings. The electrical outage caused the shutdown of most pump-around circuits. Loss of pump-around caused the vacuum tower off-gas effluent separator to overflow liquid to the off-gas burner in the furnace. This caused fire within the furnace. Although the fuel gas was shut off, the vacuum tower off-gas supply is separate from the fuel gas system and continued to burn. Feed through furnace coils was continued using turbine driven pumps, but the naphtha preheat convection coils flow was shutdown and a tube in this section burst adding to the fire. Shortly after 17:00 hrs. the South vacuum bottoms pump began cavitating slightly. This continued off and on until approximately 19:45 hrs. when the decision was made to swing to the North pump. The operator pushed the switch to start the North pump and sparks came out of the conduit junction box at the motor. Immediately the call came from the inside operator that the other pumps on the crude and vacuum unit had failed. The operator immediately started the turbine driven raw crude charge and vacuum charge pumps, maintaining flow through the heater coils. Flow of naphtha through the convection section and vacuum bottoms rundown were not lost since these particular pumps motors came from a different electrical supply. When the pumps shutdown, the inside operator reduced the crude rate. Some steam was also cracked open to the furnace passes to maintain velocity. The furnace temperature controllers were left on automatic during this time. The individual motor circuit breakers on the unit's main switch rack were all switched off and attempts were made to reset the switch rack's feeder breaker at the electrical substation without any success. At approximately 20:05 hrs., fire was reported under the furnace and smoke was coming from the stack. The operator checked the fuel gas knock out drum and finding no liquid level shut off the fuel gas to the furnace, including the pilots. Shortly thereafter the crude overhead line was opened to the flare to control the tower pressure. Snuffing steam was put into the furnace and the pass steam was opened fully and the crude and vacuum charge pumps were shutdown. The naphtha charge pump feeding convection back coils was shutdown at approximately 20:10 hrs. The fire continued burning and at 20:30 hrs. a "pop" was heard coming from the furnace, which was the naphtha coil rupturing. At this time the Emergency Response Team was called out. The Vac 2 System effluent off gas was blocked in at the separator at 21:00 hrs. The fire was extinguished at 22:30 hrs. This incident was initiated by the failure of the North Vacuum Bottoms pump motor and the tripping out of the CrudeVac Unit's primary electrical switch rack. However, the heater fire that followed was caused by the continual combustion of the Vacuum Tower off-gases after the main fuel gas was shut-off and the heater blocked in. The switch to divert this stream was not located near the fuel gas valves and was not activated until later. In addition, the loss of pump-around cooling in the Vacuum Tower resulted in carry over of heavy oil to the heater via a full separator drum. (The high level alarm is located in a satellite control station which was not manned in the emergency and the pumps for discharging the separator were out of action due to the power failure). Fuel was also added to the heater due to back flow from the gas oil stripping tower due to a connection downstream of the main fuel gas emergency isolation valves. A previous safety review had identified a number of shortcomings in instrumentation design and process piping design. This resulted in the emergency fuel shut off valves being relocated in the 1994 turnaround to keep the operator further away from the furnace during emergencies. However, the HAZOP which formed part of the Management of Change procedure did not cover process considerations focusing only on mechanical and installation issues. The rupture of the naphtha convection coil provided considerable additional fuel to the fire. The naphtha charge pump kept operating because its electrical supply is taken from a separate switch rack, but was shut down 25 minutes after the other pumps lost power. The line ruptured 20 minutes later causing major damage to the heater. After the incident decoking of the radiant bank coils in crude service was required, even though some steam was cracked into the furnace passes, with the charge rate reduced, due to the furnace temperature controllers being left on automatic.

[refining, electrical equipment failure, fire - consequence, furnace, damage to equipment, operation inadequate, mechanical equipment failure]

**Lessons**

The following recommendations were made:

1. Emergency shutdown procedures must cover the actions for all types of breakdowns/failures.
2. Operator/instrumentation interfaces must be thoroughly evaluated during HAZOPs or safety reviews that form part of the Management of Change procedure.
3. P&IDs must be field checked prior to a HAZOP in case of non-recorded, past modifications.
4. Refresher training must cover all aspects of safe furnace operations including emergency response plans.
5. All fuel sources to be isolated in an emergency to be clearly identified.

The following corrective actions were taken in the refinery:

1. Relocate the vacuum effluent off-gas diversion switch to a position near the emergency fuel gas shut-off valves for the furnaces.
2. As part of an Instrument Upgrade Project, re-route the diversion switch into the Central Control Center.
3. Provide alarms for the vacuum effluent system to the North Inside Operator as part of the Instrument Upgrade Project.
4. Disconnect two tie-ins to the fuel gas line between the emergency shut off valves and the furnace burners. Provide an alternative source of fuel gas for these two existing users that includes the connection with the gas oil stripping tower.
5. When management of change reviews are held for the purpose of relocating process piping, the HAZOP and the P&IDs should be reviewed along with a field check for verification of other process tie-ins and potential process consequences.



**Source** : HAZARDOUS CARGO BULLETIN, 1997, NOV. LLOYDS LIST.

**Location** : Siberia, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A leak on a pipeline caused over 700 tonnes of oil to leak into two rivers, three rows of booms were used. Polluted area covering 11 hectares.  
[pollution, transportation]

---

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN, 1997, NOV. LLOYDS LIST.

Location : , NIGERIA

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred on a spilling several million litres of gasoline. Fire fighters battled blaze for three days, the spill was possibly due to vandalism.  
[fire - consequence, transportation]

---

**Lessons**

[None Reported]

---

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

Location :

Injured : 0      Dead : 0

---

**Abstract**

A leak in a trichlorosilane pipe occurred in a silicone manufacturing plant causing 5600 lbs of hydrogen chloride to be released. It took about four hours to locate and contain the leak because of the location of the pipe.  
[processing, spill]

---

**Lessons**

[None Reported]

---

Source : LOSS CONTROL NEWSLETTER, 1997.

Location : , JAPAN

Injured : 0      Dead : 0

---

**Abstract**

A fire broke out when heated residue oil leaked from a pipe extending from the crude distillation unit and caught fire. The leakage occurred when workers were checking a flowmeter in the pipe.

[fire - consequence, inspection]

---

**Lessons**

[None Reported]

---

1261909 August 1997

Source : ENVIRONMENTAL TIMES, VOLUME 6, ISSUE 3, SPRING 2000.

Location : Portsmouth, UK

Injured : 0      Dead : 0

---

**Abstract**

A 16-inch subterranean pipeline was being cleared ready for decommissioning when a large quantity of oil was noticed to be floating on the surface of a creek.

The incident occurred when using a method, which would force any residual oil out at low pressure, allowing the pipe to then be flushed with seawater.

No booms or pollution prevention measures had been deployed.

The company was fined £7,500 and costs of £5,438.

[pollution, design or procedure error]

---

**Lessons**

[None Reported]

---

9069 22 July 1997

**Source :** ICHEME

**Location :** Indianapolis, USA

**Injured :** 1      **Dead :** 1

---

**Abstract**

A gas pipeline exploded and touched off a fire, destroying six houses and damaging 50 others in an affluent subdivision.

Construction workers using a backhoe apparently punctured the gas 20 inch main and left 10 to 15 minutes before the explosion. One person suffered burns.

[damage by backhoe, fatality]

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , UK

**Injured :** 0      **Dead :** 0

---

**Abstract**

A gas release occurred when workers ruptured a gas main. The leak was quickly repaired. People in nearby houses were forced to evacuate. The gas was dispersed using high pressure water spray.

[gas / vapour release, evacuation, pipeline, maintenance]

---

**Lessons**

[None Reported]

---

1136406 July 1997

**Source :** LLOYDS LIST, 2 JUL, 1997.

**Location :** , COLOMBIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A spillage of crude oil occurred due to an attack on a pipeline, which caused it to rupture. The crude oil field which serves the pipeline was shut down until repairs were carried out.

[terrorism, transportation]

---

**Lessons**

[None Reported]

---



8916 05 July 1997

Source : HAZARDOUS CARGO BULLETIN, 1997, SEP. REUTER.

Location : , GERMANY

Injured : 3      Dead : 6

---

**Abstract**

A rail transportation. A poorly secured pipe, 1.2m diameter, 15m long, weighing 6 tonnes broke loose from a freight train slicing open a passing passenger train.  
[fatality, human causes, injury]

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Power failure due to lightning caused a plant to shut down for approximately one hour. Safety valves, which opened automatically when the plant shut down, released large plumes of gas over the plant. These were not toxic.

[power supply failure, plant shutdown, gas / vapour release, safety relief valve, operational activities]

---

**Lessons**

[None Reported]

---

Source : CNN INTERACTIVE, US NEWS STORY PAGE, JULY, 1997, ASSOCIATED PRESS, INTERNET, (<http://www.cnn.com>).

Location : Indiana, USA

Injured : 0      Dead : 1

---

**Abstract**

A gas pipeline exploded causing a fire which destroyed four houses killing one person.

Construction workers apparently punctured the gas main, they left the area ten to fifteen minutes before the explosion which caused flames to burn out of control for more than half an hour.

[transportation, human causes, fatality]

---

**Lessons**

[None Reported]

---

Source : LLOYDS LIST, 7 JUNE, 1997.

Location : , RUSSIA

Injured : 5      Dead : 0

---

**Abstract**

A fire on the crude oil pipeline was started during repair and maintenance work and was probably caused by the failure or misuse of welding equipment. The oil leaking from the damaged pipe was channelled into a special reservoir dug into the ground. The fire was extinguished in 2 days.  
[fire - consequence, design or procedure error, transportation, injury]

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A crude oil fire occurred due to failure or careless use of maintenance welding equipment. The situation was aggravated by the high pressure gas pipeline located nearby. The fire was extinguished by foam.  
[fire - consequence, design or procedure error]

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , BELARUS

**Injured :** 0      **Dead :** 0

---

**Abstract**

Pollution occurred over 70 hectares of marshland when 500 tonnes of crude oil spilled due to the rupture of a nearby pipeline. The damaged section has been blocked off and work is being carried out to pump out the spillage of oil.

[material of construction failure, transportation]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , TURKEY

Injured : 0      Dead : 1

**Abstract**

A shift supervisor received severe burns and later died after a flexible hose used to transfer hydrogen to the catalytic reformer was overpressured and caught fire.

Hydrogen is supplied from three modules each consisting of 12 x 1m<sup>3</sup> cylinders at 150 bar (2205 psig) pressure. Each cylinder is fitted with a needle valve and the twelve are connected together with steel tubing. Each module has a filling connection (with no pressure regulator) and a discharge connection equipped with a pressure regulator and a pressure safety relief valve set at 14 bars (206 psig) pressure. The Cat Reformer has two hydrogen connecting points to the recycle gas compressor's discharge line which is normally used to charge the unit. Only one of these connecting points is fitted with a pressure relief valve in addition to the PSVs fitted to the individual modules. Each hydrogen module is connected to the Cat Reformer's injection points with 1 inch flexible steel hoses from the outlet of the H<sub>2</sub> module's pressure regulator. On June 9, 1997, No. 1 and No. 2 hydrogen modules were connected to the recycle gas compressor using the correct outlet points after the pressure regulators. No.1 module was emptied and replaced by No.3 module. Hydrogen from No.2 module was still connected to the injection without the PSV and 3 cylinders had emptied into the unit. The normal sequence of hydrogen injection is to open the block valves starting at the recycle gas compressor downstream from the injection point and then open the valve on the hydrogen module after the regulator. Whenever the operation is stopped these block valves are closed in the reverse sequence. On June 10, the process operators continued to empty No.2 module (9 cylinders were left). They noticed that the pressure in the unit was building up too slowly. The Shift Supervisor decided to switch the flexible hose from the end, after the regulator on the module, to the module's filling line which is not equipped with a regulator. The switch over was authorized under a cold work permit and carried out by maintenance department personnel who warned the Shift Supervisor against it. Six cylinders were then emptied one by one by the area operator in 35 minutes and the unit was pressured up to 7 bars (103 psig) . The area operator then closed the cylinder needle valve at the hydrogen module followed by the three block valves on the filling line to the recycle gas compressor. As the Cat Reformer's pressure decreased and as the area operator had other tasks in hand, the Shift Supervisor decided to discharge the remaining three cylinders alone. Failing to remember that the block valves downstream to the compressor were shut, he opened a cylinder discharge needle valve and the module's filling valve. The flexible steel hose was subjected to the full cylinder pressure of 150 bar. The hose connection flew off and hit the Shift Supervisor causing him to faint from a broken shoulder bone. The hydrogen immediately ignited whereupon the Shift Supervisor became exposed to flames.

It was discovered that process operators had used the module's filling line connection before whenever they had difficulty with the pressure regulator at the module's proper discharge connection.

The pressure regulator and some needle valves were dismantled. Broken pieces of Teflon seats from the needle valves were blocking the pressure regulator's passage ways. The needle valves were damaged due to over tightening with wrenches. The shift supervisor was wearing a cotton shirt with trousers (pants) made of special material at the time. Although these suits (jacket and trousers) are issued to all process personnel, many complain about wearing the complete suits in hot weather.

There is no operating procedures manual covering the discharge of hydrogen from the modules to the plant. Only one of the connection points to the recycle gas compressor has a PSV fitted upstream of the block valves.

Flexible hoses used for the transfer of hydrogen from the modules to the plant had been tested to 70 barg (4 times their normal working pressure) when they were originally received from the supplier. They had not been tested since. These hoses were placed in store when not being used for hydrogen transfer.

The immediate cause of the accident was the use of the wrong connection at the hydrogen module which bypassed the pressure regulator.

Major contributory factors to the accident were the absence of a pressure relief valve at the recycle compressor's injection point upstream of the isolation valve and failure to operate the system valves in the correct sequence

[material transfer, overpressurisation, fire - consequence, fatality, operation inadequate]

**Lessons**

The following recommendations were made:

1. Non routine (startup, shutdown, etc.) and maintenance activities must be included in the periodic hazard analysis (e.g., HAZOPS) of process units.
2. Stepwise operating instructions must be available for all high risk activities.
3. Changes to normal operating practices must be subject to a formal "Management of Change" review with the appropriate level of management approval.
4. The failure to apply the Management of Change to the bypassing of any critical safety device (in this case the pressure regulator) without the appropriate level of authority in writing should be identified as a "Near Miss" and investigated in respect of its potential severity.

**Source :** HAZARDOUS CARGO BULLETIN, 1997, AUG. LLOYDS LIST.

**Location :** , BELARUS

**Injured :** 0      **Dead :** 0

---

**Abstract**

500 tonnes of oil spilt from a pipeline, all of the oil was recovered and 8 meter length of line replaced. Agricultural land to be recultivated.  
[spill, transportation]

---

**Lessons**

[None Reported]

---



**Source :** LOSS CONTROL NEWSLETTER, 1997.

**Location :** , RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A spillage of 386 tonnes of crude oil occurred following the rupture of a pipeline. 17 tonnes spilt into the Black Sea. Clean up operations involved removing 500 tonnes of contaminated earth. About 700 persons involved in the clean up operations.

[pollution]

---

**Lessons**

[None Reported]

---

**Source :** HAZARDOUS CARGO BULLETIN, 1997, AUG. LLOYDS LIST.

**Location :** , RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

386 tonnes of oil was spilt when a pipeline burst over adjacent land and a main road, 13 tonnes escaped into the sea. 318 tonnes was collected in clean-up operations.

[spill, transportation]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1997, AUG. OGJ.

**Location** : Lousiana, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A pipeline carrying oil from wells ruptured causing a spillage of 700 tones.

---

**Lessons**

[None Reported]

---

**Source** : CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

**Location** : Texas, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

An explosion and fire occurred in an alkylation unit releasing a mixture of propane, isobutane and HF (hydrofluoric acid/hydrogen fluoride) from a ruptured feed line. The HF was dispersed into the atmosphere by the fire's updraft. An estimated 20 barrels of HF was diluted by fire fighters.

Tests did not indicate an HF release in the surrounding neighbourhood.

[fire - consequence, leak, spill]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1997, AUG. OGJ.

**Location** : Texas, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Approximately 715 tonnes of oil spilt over 10 acres from a ruptured pipeline, earthen trenches were built and vacuum trucks were used in the clean-up.  
[transportation, spill]

---

**Lessons**

[None Reported]

---

**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

**Location :** , USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

An oil pipeline ruptured spilling 5000 bbl of crude oil into a lake. About 2500 bbl was moped up with absorbents. Inspection revealed a 34 inch gash in the damaged segment of pipe.  
[crack]

---

**Lessons**

[Noen Reported]

---

1134823 April 1997

Source : THE CHEMICAL ENGINEER, 8 MAY, 1997.

Location : , UK

Injured : 9      Dead : 0

---

**Abstract**

An explosion occurred at a gasworks burned for 10 hours when nine men were searching for a natural gas leak thought to be escaping from an 18 inch pipeline.

[exploration, maintenance]

---

**Lessons**

[None Reported]

---

**Source :** HAZARDOUS CARGO BULLETIN, 1997, NOV. OGJ.

**Location :** , TAIWAN

**Injured :** 0      **Dead :** 0

---

**Abstract**

A rupture occurred in a pipeline resulting in the spillage of 500 bbl of oil. Serious pollution occurred to crop land, freshwater and fishing.  
[ecological damage, transportation]

---

**Lessons**

[None Reported]

---



4057 10 April 1997

Source : ICHEME

Location : , SOUTH KOREA

Injured : 0      Dead : 0

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**Abstract**

An explosion occurred when construction workers dug up a pipeline. Flames shot 50 ft into the air. Telephone lines and part of a subway under construction were destroyed as a result. A crane is believed to have sparked the blast when it hit a gas pipe left standing in the centre of the work site. 500 firefighters were involved in the incident.

[drilling/digging/ploughing vehicles, natural gas, leak, fire - consequence]

---

**Lessons**

[None Reported]

---

Source : ENDS REPORT, APR, 1997.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

One hundred and fifty tonnes of chloroform leaked from a ruptured filter on a pipeline supplying a fluorochemicals plant. The leak continued for four hours before it was detected and halted. Most of the chemical soaked into the ground but a small amount was recovered from an interception trench and by dredging of the nearby canal.

[operational activities]

---

**Lessons**

[None Reported]

---

Source : LOSS CONTROL NEWSLETTER, FEB, 1997.

Location : , JAPAN

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred when ethylene was released from safety valves after pressure built up inside a reactor. The fire was controlled within 5 minutes.  
[fire - consequence, safety relief valve, high pressure, operational activities]

---

**Lessons**

[None Reported]

---

Source : LOSS CONTROL NEWSLETTER, FEB, 1997.

Location : , USA

Injured : 0      Dead : 0

---

**Abstract**

A fire resulted from ignition of a natural gas leak from a 4 inch pipeline on the platform which was linked to a drilling rig. Two supply vessels equipped with water cannons fought the fire. All personnel were evacuated prior to the fire. No environmental damage occurred.  
[fire - consequence, evacuation]

---

**Lessons**

[None Reported]

---

Source : LOSS CONTROL NEWSLETTER, FEB, 1997.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Six hundred litres of hydrofluoric acid, sulphuric acid and phosphoric acid was spilt from a tank. A drain to the local water supply had to be blocked off as a result of the incident.

[spill, pollution, operational activities]

---

**Lessons**

[None Reported]

---

2202 23 March 1997

Source : LOSS CONTROL NEWSLETTER, FEB, 1997.

Location : , UK

Injured : 0      Dead : 0

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**Abstract**

A pipeline was ruptured by a mechanical digger involved in road surfacing operations. It took about 6 hours to contain the leak.

[drilling/digging/ploughing vehicles, spill, natural gas]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , FRANCE

Injured : 1      Dead : 0

### Abstract

A mechanic was exposed to H<sub>2</sub>S (hydrogen sulphide) during maintenance work on a slops/drain tank at a de-sulfurizer unit. The maintenance work involved the removal of a submerged pump followed by the installation of a full face flange cover at the pump entry nozzle on the top of the vessel. The nozzle is 27 inch diameter and the blind flange contained 28 bolts. Four out of the 28 bolts had been fitted to the full face blind/cover when plant operations agreed with a mechanic to recommission the vessel. However, in order to engage the remaining 24 bolts, the flange seal had to be adjusted which required the loosening/unfastening of the existing four bolts. It was during this task that the mechanic who was assisting others on the job was exposed to H<sub>2</sub>S as it escaped from the released flanged cover. The mechanical supervisor (Team Leader) was unaware that the vessel had been recommissioned. A number of the systems drain into the vessel including liquid from a compressor's suction side knockout pot. The level controller on this knockout pot initiated a H<sub>2</sub>S rich hydrocarbon liquid discharge into the vessel just at the time the flange cover seal was loosened. The mechanic, after a brief period of unconsciousness, was transferred to hospital for treatment and observation which resulted in 10 lost workdays.

The basic cause was a breakdown in the planning, communication, coordination and control of the job particularly related to the effectiveness of the work permit system and associated safety rules.

A number of contributory factors were associated with the incident:

1. There was a requirement to keep this vessel in operation because it collected drains from critical equipment, e.g., the liquid from the knock out drum on the suction side of a compressor.
2. The tasks suffered too many delays which required the vessel to be put back in service each time these occurred.
3. The delays related to planning (scaffolding not completed, crane not available, cover plate in poor condition, size of bolts) and the breakdown of equipment (pneumatic bolting machine)  
[leak, asphyxiation, management system inadequate]

### Lessons

The effective application of a permit-to-work prevents:

1. Tasks being undertaken at the wrong time.
2. Ignorance of the risks involved.
3. Ignorance of the necessary precautionary measures to be followed.
4. Possibility for miscommunication on matters associated with the job between the parties involved.

Source : ENDS REPORT, MARCH 1997.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Staff were attempting to clear a blocked feed pipe at a plant making green pigments when a release of aluminium chloride occurred. Works emergency plan activated when the molten aluminium chloride and salt was released and reacted with water to form hydrogen chloride gas. The roads around the site were closed for two hours and local residents evacuated.

[flow restriction, gas / vapour release, evacuation, processing]

---

**Lessons**

[None Reported]

---



Source : ICHEME

Location : , USA

Injured : 0      Dead : 0

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**Abstract**

The 10 inch natural gas liquids (NGL) pipeline ruptured 50 ft below a creek bed while a construction crew were laying a parallel pipeline. Blow-down valves closest to the rupture were opened to de-pressurise an 8 mile section of the line. While repairs were being carried out, product was diverted to a nearby pipeline. The local community was evacuated as a result of the incident and release.  
[material of construction failure, evacuation]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

### Abstract

A minor explosion was heard in the crude unit area of this refinery. Smoke was seen from the vacuum tower overhead pipe.

On March 2, 1997, shutdown for maintenance turnaround commenced. The vacuum unit was depleted of oil, water washed/flushed and steam purged according to the shutdown/steam out checklist. A hydrant hose was connected to the suction side of the light vacuum gas oil pump ready for water wetting of the vacuum column. On March 4, 1997, the vacuum tower was steamed out. On March 5, 1997, the vacuum tower steaming was cut off. No water wetting was carried out immediately on the vacuum tower as the average tray temperature was still high around 90 degrees C (194 degrees F). At 8:20 am a cold work permit was issued for the installation of system blinds on the vacuum tower. At 8:30 am: A cold work permit was issued for installation of blinds on a number of heat exchangers, removal of the covers and the pulling of tube bundles. At 2:45 p.m. the vacuum tower overhead condenser (shell side) piping spool piece (40 inch) was taken out so as to facilitate the removal of the shell. At 3:15 pm a minor explosion was heard. Smoke was seen from the open flange on the tower's overhead line. All turnaround work was stopped. The Fire Brigade was alerted to stand by on site. Nitrogen was injected into the overhead line within a few minutes of the incident as it was thought there was a fire in the tower's overhead line. The tower top temperature started to fall immediately after the N2 injection. A water hoses were connected to the B-structure foam line at ground level and at the top platform of the condensers and water was injected into the open end of the tower's overhead line. At 3:45 pm It was observed that the vacuum tower (151E) tray temperatures continued to rise. Water was then injected via the top light vacuum gas oil reflux line through the pump suction. The tray temperatures dropped immediately after the water was introduced. At 4:00 pm The tower condenser overhead line temperature showed signs of increasing. A steam hose was connected to the inhibitor pump discharge bleeder and steam was introduced through the three quarter inch line to the overhead line. The overhead line temperature dropped after the steam was introduced. At 6:00 pm arrangements were made to install a 40 inch end flange to the overhead pipe's open end.

The following are the findings from an investigation of the incident:

- As per normal operating practice, water wetting of the column would only have commenced after the average tray temperature had cooled to below 60 degrees C.
- The planned column wetting arrangement (water was connected to the suction side of the light vacuum gas oil pump to be injected via the reflux line) was adequate.
- A cold work permit was issued for a number of heat exchangers including the vacuum tower's, overhead condensers 159CA/CB for installation of blinds, removal of heat exchanger covers, and the pulling of tube bundles. The 40 inch blinds should have been installed at the inlet nozzle on the shell side of the heat exchangers before any work on the heat exchangers had be carried out.
- No specific permit was issued for the removal of the shell side of heat exchanger 159CB or associated inlet piping spool piece. According to a mechanical technician, it was verbally communicated.
- The spool piece was taken off to facilitate the removal of the shell side of condenser/heat exchanger 159CB.

The open end of the 40 inch overhead line after the spool piece was removed was not fitted with a full face blind. This resulted in large ingress of air into the vacuum tower. The immediate cause of the minor explosion and fire in the vacuum tower was the autoignition of the pyrophoric iron sulfide from the ingress of air prior to the column wetting procedure.

[fire - consequence]

### Lessons

The following recommendations were made

1. Both the Issuing Authority and the Performance Authority for the Work Permit System must discuss and understand in detail the exact job scope so that blinding is undertaken in the correct sequence of the maintenance preparations.
2. Operations Department should carry out the water wetting of the vacuum column as soon as practical.
3. Safety briefings on "Pyrophoric Iron Sulfide" should be carried out just prior to turnarounds.

### Lessons Learned

A preparation of plant for maintenance procedure (a controlled document) must be strictly followed.

All parties involved in preparation of equipment for maintenance must be aware of the exact sequence of tasks to avoid auto ignition of pyrophoric iron sulfide.

9010 March 1997

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, SEP.

Location :

Injured : 0      Dead : 0

---

**Abstract**

A leak of molten aluminium and salt. About 100 kg of aluminium chloride mixture was released. The incident occurred whilst staff were attempting to clean a blocked feed pipe. The molten material reacted with atmospheric water from a toxic vapour cloud of hydrogen chloride gas.  
[cleaning, unwanted chemical reaction, gas / vapour release]

---

**Lessons**

[None Reported]

---

9009 March 1997

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, SEP.

Location :

Injured : 0      Dead : 0

---

**Abstract**

An acidic effluent was released into a local river causing serious pollution and disabling a local sewage treatment plant. The discharge flowed through a pipe which had been out of operation since 1960s.

[spill, chemical, leak, ecological damage, unknown chemicals]

---

**Lessons**

[None Reported]

---

Source : LLOYDS LIST, 18-21 FEB, 1997, LOSS CONTROL NEWSLETTER, JAN, 1997.

Location : , RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

A spill occurred of about 1,500 tonnes of crude oil of which 400 tonnes went into the Volga after pipeline ruptured while under repair. A 60 ft section of the pipeline was replaced.

[transportation, pollution, material of construction failure]

---

**Lessons**

[None Reported]

---

Source : LOSS CONTROL NEWSLETTER, 1997.

Location : , USA

Injured : 0      Dead : 0

---

**Abstract**

A break in a 26 inch natural gas pipeline sent a huge fire ball visible 30 miles away. There was also an apparently unrelated break in the pipe 220 miles away. The ruptures were caused by stress on the pipeline created by land movement.  
[fire - consequence, earth movement, transportation]

---

**Lessons**

[None Reported]

---

**Source :** ICHEME**Location :** , UK**Injured :** 2     **Dead :** 0**Abstract**

A company technician and an instrument/electrical contractor were preparing to install a local capillary sealed differential pressure indicator to a catalyst filter. The men had been issued with a permit to work which requires full personal protection equipment and self contained breathing apparatus to be worn. On arriving at the location a nitrogen hose, connected to the catalyst system, was restricting access to the workplace.

To improve access, the hose, previously used to purge the filter from the system and valve isolated at either extremity, was disconnected. This operation released a small quantity of the filter which created a cloud of 10 to 12 inch length to which both men were exposed. At the time of this activity neither of the men had their breathing mask fitted since they were not aware that the disconnection constituted a break of containment for which breathing apparatus had to be worn.

Immediately after this event the contractor, who had been closer to the release than the technician, went to the control room for treatment (water wash and application of catalyst anti-dote gel), after which he received further treatment at the Medical Centre.

The technician was not aware that he had been affected until about an hour later, after this delay he too washed and applied anti-dote in the control room and went for treatment at the Medical Centre.

Both men were taken to hospital where they were kept overnight for observation. They were released in the morning and returned to work that day.

[maintenance, burns, safety procedures inadequate, gas / vapour release, injury]

**Lessons**

Recommendations following the accident included the following:

Reinforce to Production Teams that connecting and disconnecting of hoses is breaking containment with associated personal protection equipment /control of work requirements.

Operating Instructions to be updated in detail. Infrequent operations require a greater level of detail.

All personnel should be made aware that all injuries, no matter how apparently trivial, should be reported to the Medical Centre for immediate treatment to avoid a more serious condition developing.

Source : LOSS CONTROL NEWSLETTER, 1997.

Location : , RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

An explosion of natural gas sent flames 30 metres into the air. The fire took 5 hours to extinguish. A similar fire occurred on the same stretch of pipeline six days earlier. Investigations suggest both incidents were caused by faulty pipeline construction.  
[fire - consequence, transportation, human causes]

---

**Lessons**

[None Reported]

---



**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, JUL.

**Location :** , NETHERLANDS

**Injured :** 3      **Dead :** 1

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**Abstract**

An explosion occurred in a pipeline. The pipe which was used for transporting titanium tetrachloride, was undergoing maintenance work when the accident occurred, the pipe was being pumped with water following aeration with nitrogen. Extensive damage was caused and the installation will be out of action for a considerable period.

[transportation, damage to equipment, fatality]

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**Lessons**

[None Reported]

---

1197415 January 1997

**Source :** ICHEME

**Location :** , GERMANY

**Injured :** 0      **Dead :** 0

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**Abstract**

4m3 of sodium hydroxide and sodium sulphide solution escaped from a plant. Of this, 50 litres were released into the site drainage system, reaching a nearby river.

[spill, environmental, leak]

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**Lessons**

[None Reported]

---

Source : ICHEME

Location : , FRANCE

Injured : 2      Dead : 0

---

**Abstract**

A fire broke out at gas oil hydrodesulfurization unit. The fire was caused by a leak of gas oil and gaseous products from the flange of a temperature control valve. The fire, restricted to the reactor section, was put out within 35 minutes by the refinery fire brigade. Two operators were injured while manoeuvring an extinguisher, but did not incur a lost time accident. The incident occurred following gasoil feed upset in the late morning, heavy rain in the afternoon and a hailstorm at about 22:30 hrs. The fire resulted in damage to control valves, piping, cables and associated heat exchangers.

[flange, valve, refining, rain, design inadequate, inspection inadequate, fire - consequence, flange failure, injury]

---

**Lessons**

Wafer type valves which, by design, are installed by "insertion" are unreliable and liable to leak.

All wafer valves to be identified and a risk assessment carried out to review their continued suitability in service.

Critical flanges need to be identified and regularly inspected, following an established procedure.

The investigation team concluded that the incident was caused by the following factors:

1. Inherent design weakness of the wafer type valves.
  2. The poor condition of the flanges on the valves and piping.
  3. Thermal shock imposed on the valves due to severe weather conditions (rain and hailstorm) and process upset earlier on in the day.
-

**Source :** HAZARDOUS CARGO BULLETIN, 1997, NOV.

**Location :** Zambia, AFRICA

**Injured :** 0      **Dead :** 0

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**Abstract**

A rupture occurred on a crude oil pipeline causing pollution. A recent evidence of further leakage results from split oil filtering down from the pipeline trench and through to the ground water. The pipeline was in a poor state of repair due to the lack of maintenance.

[human causes, spill]

---

**Lessons**

[None Reported]

---

**Source** : CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

**Location** : Cambridgeshire, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Heavy rainfall caused a failure in a surface water drainage system, resulting in the overflow of oil into a roadside drain and then into a canal.  
[ecological damage]

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**Lessons**

[None Reported]

---

**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

**Location :**

**Injured :** 0      **Dead :** 0

---

**Abstract**

A spillage of a herbicide (fluroxypyr) occurred contaminating a water course. A leaking container of fluroxypyr had been stored in an area which had been thought to be isolated from surface water drains. This was not the case and the drains fed to a nearby stream. Levels of 21,5 mg/l of fluroxypyr were detected in the water.

[storage, drainage system, ecological damage, leak]

---

**Lessons**

[None Reported]

---

124321997

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

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**Abstract**

A gas release occurred through the body of a non-return valve on a process unit. The non-return valve shaft blew out causing the release and subsequent fire.

[gas / vapour release, fire - consequence, mechanical equipment failure]

---

**Lessons**

[None Reported]

---

114961997

**Source :** CHEMICAL HAZARDS IN INDUSTRY, JUNE 1999.

**Location :** , USA

**Injured :** 46    **Dead :** 1

---

**Abstract**

A leak of flammable mixture of hydrocarbons and hydrogen from a ruptured pipeline occurred resulting in an explosion and fire. One person was killed and forty six injured.

An investigation into the incident found that management and supervisory staff did not make sure that emergency procedures were followed.

[fire - consequence, fatality, management system inadequate, injury]

---

**Lessons**

[None Reported]

---



**Source :** CHEMICAL HAZARDS IN INDUSTRY, 1997, SEP.

**Location :**

**Injured :** 1      **Dead :** 0

---

**Abstract**

A located in a drain line of a diluent dryer at a polyethylene plant, blew out whilst the dryer was being prepared for registration. The operator was showered with glass and liquid isobutane, receiving minor cuts, a scratched eye and cold burns to the face. Possible causes of the incident were overpressure of the drain line or failure of the sight glass below its rated pressure. Neither of these was established as the cause of the accident.

[overpressurisation, blowout, draining]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

### Abstract

During the removal of redundant piping as part of a demolition program, a contractor cut into a live propane line. The system was isolated immediately. The contractor had been issued with a general hot work permit to demolish piping at a molecular sieve treater by cutting with a band saw. Two cuts had been completed on two separate lines and cutting had commenced on a third when propane began to escape from the pipe. A safety review had been held with the contractor on the safety procedures to be followed. This included the marking with orange and blue paint those pipes that may be removed. The line in question was not marked for removal. Subsequent investigations showed that the refinery's safe work practices for issuing the permit and the requirements for lock out/tag out had not been followed, specifically:

1. Safe work practices for isolation including lock out/tag out were not followed by the operator or the contractor.
2. Procedures agreed to in the contractor safety meeting had not been followed.
3. The agreed procedure between the contractor and operator had not been followed.

[contractor error, safety procedures inadequate, spill]

### Lessons

A number of immediate actions were taken including:

1. Ensuring that employees have sufficient knowledge to ensure compliance with the refinery's safe practices.
2. Tightening job safety analysis and procedures prior to issuance of permits.
3. Weekly meetings between the contractor and operations with special focus on planned job tasks and procedures to be followed were re-established.

In addition the removal of any redundant piping requires:

1. Careful planning.
2. Preparations, including specific task written procedures.
3. Stringent work permit control.
4. Good communication arrangements between the parties involved.
5. Site visits with clear identification of the piping to be removed.

107291997

Source : THE SACRAMENTO BEE, P. HECHT, 22 SEP, 1997.

Location : , USA

Injured : 0      Dead : 0

---

**Abstract**

1,500 gallons of chemicals spilled into a creek from a leaking pipe at a water treatment pumping station.

Hazardous materials crews constructed earthen dams to contain the spill of the ferric chloride solution, an acid used to control odour in the waste treatment process, which leaked from a pipe and entered a storm drain feeding the creek.

Fish within the area of the spill were killed, however, the spill was contained and there was no danger to fish downstream.

[pollution, waste water treatment, separation, ecological damage]

---

**Lessons**

[None Reported]

---

**Source :** ICHEME

**Location :** , UK

**Injured :** 0      **Dead :** 0

---

**Abstract**

Approximately 6 tonnes of cold glacial acetic acid leaked from a pump gland for up to an hour. The leak went directly to the site drain and into the site effluent system.

[mechanical equipment failure, spill]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A benzene production plant had been restarted after a three day shutdown, and had been on line for approximately 5 hours, when there was a loss of containment at the inlet flange on the top of the reflux drum as plant production rates were being increased. The released material comprised about 500 Kg of a mixture of 75% benzene and 25% other hydrocarbons.

Increases in production immediately before the release had initiated 2-phase flow in line, leading to severe hammer as alternate slugs of vapour and liquid impacted a pipe bend near the reflux inlet. This hammer caused the nuts on the reflux inlet flange to loosen by vibration, with subsequent leakage. The risk of such hammer from the specific combination of pressure, temperature and flow had not been anticipated, and was not covered in the plant operating instructions.

[gas / vapour release, excessive vibration]

---

**Lessons**

1. Engineering changes were made to the design and operating envelope of the plant to prevent the combination of pressure, temperature and flow giving rise to the hammer phenomenon.
  2. Additional temperature alarms and flow indicators were provided.
  3. Operating instructions were reviewed and revised.
-

1197104 December 1996

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

930 kgs of flammable liquid, a mixture of acetic acid, ethyl acetate, benzene and water was released when a pipeline flange joint failed, during a plant start-up. This mixture was released to dirt drains.

[joint failure, spill]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

During the start-up of an anhydride unit a flange leak occurred resulting in the loss of approximately 5 tonnes of a mixture of acetic acid, acetic anhydride and smaller quantities of benzene. The leak spilt into a dirty drain and was contained on site by being diverted to a containment pit. An incident response team was on standby throughout.

[flange failure, spill, near miss]

---

**Lessons**

[None Reported]

---

**Source :** ICHEME

**Location :** ,

**Injured :** 0      **Dead :** 0

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**Abstract**

A spillage of approximately 2100 litres of highly flammable recovered solvent occurred. Of this approximately 1500 litres was spilled into the drains. No one was injured by the spill. The exact cause of the spill is not known.

---

**Lessons**

[None Reported]

---



Source : ICHEME

Location : , NEW ZEALAND

Injured : 0      Dead : 0

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**Abstract**

A dangerous occurrence at a coatings plant.

An operator was obtaining a sample of solvent from a room on the third floor of a production building. On completion, he left the drain valve to the manifold open to drain the manifold, but had not realised that the xylene valve into the manifold was not fully closed.

Xylene was seen to be running down through the building and outside past an adjacent administration block.

Approximately 700 to 900 litres of xylene were thought to have been lost. Clean up of the spill required the site electrical system to be turned off.

[operation inadequate, sampling,

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**Lessons**

[None Reported]

---

Source : ICHEME

Location : , SWEDEN

Injured : 0      Dead : 0

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**Abstract**

A dangerous occurrence at a coatings plant.

An operator was removing a plug that was attached to a ball valve, in order to decant water from a toluene storage tank. The operation was being carried out at night in a poorly lit area. The operator did not realise that he was inadvertently disassembling the valve.

The ball valve started to pass and 18 tonnes of toluene spilt into the tank bund. This was later pumped away to containers.

[maintenance, storage tanks, spill, maintenance inadequate]

---

**Lessons**

The following recommendations were made:

1. Engineering measure to change drainage system 2. implemented.
  3. Spillage procedures to be improved.
  4. Improved instruction for weekend responsible supervisors.
-

**Source** : NATIONAL TRANSPORTATION SAFETY BOARD, 1999, (<http://www.nts.gov>),; LOSS PREVENTION BULLETIN 155, 16-17.

**Location** : Murfreesboro, Tennessee, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

An incident occurred whilst preparing for maintenance on an 8-inch pipeline containing diesel fuel. The incident occurred during isolation and purging when approximately 84,700 gallons of diesel fuel was released due to overpressure rupture. The line section containing the leak was isolated. Fortunately the incident did not cause a fire or explosion and no one was injured.

[overpressurisation, operator error, spill, near miss, preparation for maintenance, operation inadequate]

---

**Lessons**

[None Reported]

---

6057 26 October 1996

Source : EUROPEAN CHEMICAL NEWS, 1996, NOV, 4.

Location : Ludwigshafen, GERMANY

Injured : 0      Dead : 0

---

**Abstract**

Two tonnes of formaldehyde flowed into a river after a pipe leaked. Leakage occurred when a rubber seal linking two pieces of pipework failed when pumping the material.

[seal failure, spill, material transfer]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , USA

Injured : 0      Dead : 0

**Abstract**

A 6 inch untreated/raw naphtha line failed catastrophically near the base of the vacuum tower and the outflow autoignited. Both the reformer and the naphtha hydrotreater depressured in less than 15 minutes through the ruptured pipe. The resultant torch fire and subsequent fires from leaking flanges and pipe failures burned for approximately 10 hours. Two flare connections failed which contributed significantly to the duration of the fire as the plant was being shutdown and depressured to the flare system. Property damage is estimated at \$10 million (£5.9 million) (1996). Commercial loss is estimated at \$20 million (£11.9 million) (1996) as units, not directly affected by fire, were shutdown for weeks and the vacuum tower was down for over two months. An environmental release of FCC catalyst affected areas outside the plant, as the various units were shut down.

Untreated naphtha from the crude units were combined into a single stream prior to introduction into the naphtha hydrotreater. The failure occurred in the line from one of the crude units, downstream of the last exchanger and prior to the point where the two streams join. The naphtha line was at normal conditions prior to the incident at approximately 450 psig and 600 degrees F (317 degrees C). There were no indications from any of the alarms or any of the nearby employees that there was any problem with the line immediately prior to the fire. The piping was originally installed in 1965 and specified as aluminised (or "Alonised" as it is referred to) carbon steel piping. "Alonising" is an old process, no longer in common use for process piping, performed mainly to enhance the resistance of steels to high temperature, high sulfur environments. Although this piping was in service for over 30 years, sections of this same line near the failure had experienced only slight-to-moderate pitting and had retained nearly its original wall thickness.

[pipeline failure, fire - consequence, damage to equipment, autoignition, processing]

**Lessons**

The following recommendations were made:

1. Ensure that potential corrosion problems are adequately addressed with appropriate expertise and level of management.
2. Develop an action tracking system for all recommendations resulting from investigations, HAZOPS, audits, etc.
3. Re-evaluate piping inspection program.
4. Consider outside review of mechanical integrity program to share and incorporate best practices.
5. Replace alonized carbon steel pipe in high temperature/high sulfur services.
6. Consider amending emergency response plan to include call-out of personnel to assist in operational shutdown of units in major emergencies.
7. Emergency response drills should consider shutdown and isolation procedures and review of location of valves and switches.
8. Review the procedures in place for the emergency operation center and staging area including the need for a checklist and registration of first responders.
9. Develop a site specific plan for industrial hygiene exposure assessment on and off site during emergencies.
10. Review the adequacy of stationary fire protection in heavily congested areas.
11. Review the location, identification and accessibility of emergency isolation valves and switches.
12. Review the adequacy of existing emergency communication and notification systems within the refinery.
13. Make certain inspection thickness monitoring locations are sufficient to detect localized corrosion.
14. Conduct external audits of inspection programs and associated data management systems every 5 years to ensure continual mechanical integrity improvement and sharing of best practices.
15. Review adequacy of fire protection systems in congested areas and particularly for flare lines.
16. Check drainage in plant areas to remove expected quantity of fire water.
17. Ensure that all emergency systems are clearly identified and accessible.
18. Additional operational assistance is required in major emergencies to secure the safe shutdown or operation of other units.

8638 29 August 1996

Source : LLOYDS LIST, 1996, SEP, 12.

Location : Turov, BELARUS

Injured : 0      Dead : 0

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**Abstract**

Transportation. Up to 400 tonnes of oil leaked from pipeline following rupture.

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**Lessons**

[None Reported]

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Source : LLOYD LIST, 1996, AUG, 28.; NATIONAL TRANSPORTATION SAFETY BOARD, 1998, (<http://www.nts.gov>).

Location : Lively, Texas, USA

Injured : 0      Dead : 2

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**Abstract**

A transportation incident. An 8-inch diameter steel LPG pipeline transporting liquid butane ruptured sending a butane vapour cloud into a nearby residential area forcing an evacuation.

Two residents were killed when they entered the vapour cloud in a vehicle sparking off an explosion.

Loss of product occurred worth approximately \$217,000, (1996).

It is thought the incident occurred due to corrosion.

[explosion, evacuation, fire - consequence, fatality, product loss]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Spill during the transfer of tank bottoms at a refinery.

During a planned transfer of tank bottoms from one tank to another, the hose attached to the pump outlet separated from its flanged connection, releasing a significant amount of tank bottoms. It was found that the non-return valve was fitted in the line the wrong way which created a pressure build-up and led to the hose separating from the flange. In addition, the equipment was not operated in the manner in which the designers and suppliers had intended, and there was no pressure relief in the system using positive displacement pump. The cause was due to the incomplete training of the labour crew since tank bottoming practice had changed requiring flanged fittings and assembly of reducers and a non-return valve onto the tank valve flanges. No training was provided on the set up and operation of the compressor/pump facility. Inadequate policies, procedures, evaluation of loss exposures, specification of design criteria, and evaluation of changes also contributed to this incident.

[material transfer, valve failure, refining]

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**Lessons**

The scenario demonstrates clearly how one wrong item in a chain of events, i.e., the reverse fitting of an NRV led to the incident.

There are probably lessons that all sites can learn; essentially better communication and control of contractor operations.

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8630 09 August 1996

Source : LLOYDS LIST, 1996, AUG, 13.

Location : , GREECE

Injured : 0      Dead : 0

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**Abstract**

Loading of oil at a terminal resulted in a spillage when loading pipe ruptured during a storm.

The spillage of 300 tonnes of oil occurred when hose broke during routine unloading of marine tanker causing pollution. The company blamed the accident on the weather but they were fined \$650,000 (1996) due to the vessel not being safely docked and delay in shutting off the loading valve. The master and first mate have been charged with causing the pollution and the refinery director and loading manager have also been indicted over the incident.

[weather effects]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , USA

Injured : 0      Dead : 0

---

**Abstract**

As a result of the change over of desalted crude tower feed pumps, a vacuum tower, on this refinery, became pressured. Vacuum tower bottoms back flowed into the 10 psi steam line and out of the relief vent stack, spraying across private and public property. The total loss is estimated at \$900,000 (£539,000) (1996), of which the clean-up cost was \$800,000 (£479,000) (1996).

[gas / vapour release, backflow, product loss, overpressurisation, operational activities, pump, line]

---

**Lessons**

The following recommendations were made:

1. Major operational changes should be carried out preferably on day shift when more people are available and avoiding the weariness of night shift. Such changes need to be carefully planned, and if possible rehearsed.
  2. Operating at rates that require flow controller bypasses to be open implies that the flow rates are beyond design capacity which may put the system at a control risk. This should be reviewed under "Management of Change".
  3. Pressure controllers are very difficult to operate on manual and this should be recognized.
  4. Compound gauges should always clearly indicate a state of vacuum or pressure to avoid error.
  5. A non-return/check valve and upstream bleed are required for all stripping steam connections to hydrocarbon service.
  6. Steam lines can achieve vacuum and the pressure in some process systems can rise above the design of some low pressure steam lines.
  7. When fractionator tower charge rates are increased or reduced there should be a plan which also sets the product draw-off rates to avoid tower flooding or pumparound loss.
-

8627 04 August 1996

Source : LLOYDS LIST, 1996, AUG, 5.

Location : , BULGARIA

Injured : 6      Dead : 3

---

**Abstract**

A fire occurred in a refinery which was caused by a leak in pipe. Fatality  
[fire - consequence, refining]

---

**Lessons**

[None Reported]

---

8624 27 July 1996

Source : LLOYDS LIST, 1996, AUG, 1.

Location : Texas, USA

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred in an ethylene pipeline which damaged the pipeline and electrical installations on ethylene plant.

[fire - consequence, damage to equipment, processing]

---

**Lessons**

[None Reported]

---

8628 18 July 1996

Source : LLOYDS LIST, 1996, AUG, 9.

Location : Texas, USA

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred at a refinery due to a failed flange and relief valve .

[flange failure, valve failure, fire - consequence, refining]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 1      Dead : 0

---

**Abstract**

A pipeline connecting 3rd and 4th stage suction drums on a cracked gas compressor on an ethylene plant was being modified as part of a series of wider plant modifications, using contractors. After new pipework had been prepared and positioned a welder struck an arc to complete welding, when there was a detonation. The source of the fuel for the explosion was gasoline from residual pockets of hydrocarbons which had evaporated from the cracked gas system and migrated into the line under modification. The total mass of fuel estimated to have been in the line was 48 grams. the welder was only slightly injured, and others working in the vicinity were unharmed.

Investigation showed that there had been failure to observe fully the permit to work and hot work systems in the factory; and that there had also been a failure to ensure that the part of the plant on which welding was to take place had been effectively isolated and purged.

[permit to work system inadequate, injury]

---

**Lessons**

The following lessons were learnt:

1. This incident classically illustrates the risks associated with hot work on plant and vessels in which flammable substances might be found, and emphasises the need for rigorous observance of adequate operational precautions.
  2. Although there were clear operational failures in this case, investigation of the incident led to analysis and modification of the company permit to work systems, with the objective of increasing the protection afforded by them.
-

8614 12 July 1996

**Source** : LLOYDS LIST, 1996, JUL, 15. LOSS CONTROL NEWSLETTER, ISSUE 3, 1996.

**Location** : Sormenovo, RUSSIA

**Injured** : 0      **Dead** : 2

---

**Abstract**

An explosion occurred at a gas pipeline formed a crater more than 2 metres deep and 8 metres across.

The explosion occurred after a bulldozer hit the pipeline

[drilling/digging/ploughing vehicles, excavation, fatality]

---

**Lessons**

[None Reported]

---

Source : ENVIRONMENTAL INFORMATION BULLETIN, 1997, JUL.; THE CHEMICAL ENGINEER, 10 APR, 1997

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

320 kg of 1,2-dichloroethane spill from vinyl chloride plant during recommissioning operations. The DCE was used during the decommissioning stage to flush out to remove water and iron, then flushing with nitrogen to remove the DCE. Operators failed to close a valve which allowed DCE into the nitrogen system. Pressure built up and a flexible hose blew off, releasing a jet of DCE. Operators stopped the flow within 2 minutes and covered drains but 29 kg reached the canal.

The company was fined £15,000 (1996).

[spill, design or procedure error]

---

**Lessons**

[None Reported]

---



**Source** : LLOYDS LIST, 1996, JUL, 3, JUL, 9.

**Location** : South Carolina, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Pipeline spillage of 420,000 gallons of diesel fuel, some into a river. Pipeline was operating at reduced rate after inspection by an smart pig leak detection system. Later it was estimated that at least 1 million of No. 2 diesel spilled from the pipeline. 900,000 gallons were recovered by skimmers and vacuum trucks.

---

**Lessons**

[None Reported]

---

8625 22 June 1996

Source : LLOYDS LIST, 1996, AUG, 3.

Location : , NIGERIA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. A leak occurred on a southern swamp pipeline causing a spillage of 600,000 to 800,000 barrels of oil.

---

**Lessons**

[None Reported]

---

8602 18 June 1996

**Source** : LLOYDS LIST, 1996, JUN, 24.

**Location** : Rostov, RUSSIA

**Injured** : 0      **Dead** : 1

---

**Abstract**

Oil leaking from a broken seam on a pipeline spilt onto an electric welding apparatus and consequently sparked a fire during repair work. 70,000 cubic feet of oil spillage. Fatality.  
[fire - consequence]

---

**Lessons**

[None Reported]

---

8609 14 June 1996

**Source** : LLOYDS LIST, 1996, JUL, 5.

**Location** : Samara Region, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Oil in two settling tanks attached to pipeline caught fire.

[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source :** ICHEME**Location :** ,**Injured :**      **Dead :****Abstract**

Light ends from the FCC main fractionator were being recovered using a wet gas compressor. Two casing drains from this compressor had thinned through internal corrosion. Engineered box enclosures injected with special sealant had been installed to avoid an untimely shutdown of the compressor. Within 3 weeks of the temporary repair being installed, one of the box enclosures failed releasing high pressure hydrocarbon vapours to the atmosphere. Fortunately, there was no ignition but production losses amounted to \$56,000 (£33,433 (1996)).

Inspection of the temporary enclosure device revealed that the strongback tongue had failed. The tongue (see Figure 6) is designed to hold the leak repair device in position during the sealant injection process and during operation. The tongue is a necessary part of the leak repair device since there exists an unequal axial thrust generated during the sealant injection operation. The tongue is also vital during normal operation because the unequal axial thrust remains after the sealant injection operation is completed. This is due to the physical characteristics of the sealant material that was used. The selected sealant for this application was a thermosetting type which exhibits the characteristic of very little or no shrinkage after hardening. Therefore, whatever forces are introduced into the box enclosure by the sealant injection including the enclosed piping and fittings themselves remains as long as the device is installed. These forces can be significant due to the high injection pressures typically applied during the sealant injection process. Typically, injection pressures are in the order of 1000 to 2000 psig. This pressure is exclusive of the static pressure necessary to create sealant flow through the injection gun.

Representatives of the leak repair contractor responsible for the job were brought in to assist with the investigation into the incident. Both the leak repair contractor representative and a refinery engineer performed independent reviews of the leak repair device configuration, design calculations, material selection and design conditions used. The conclusion from both parties was that the box enclosure was properly designed. The box enclosure with the enclosed flange and piping still intact were sent back to the leak repair contractor's manufacturing facility for further inspection and testing. In addition, a full review of the installation procedure used for this specific application was carried out. According to the leak repair contractor's design calculations for the tongue, an injection pressure of 1300 psig was used to calculate the generated hydraulic thrust. The allowable working load of the tongue was calculated and shown to be 1 1/2 times the hydraulic thrust thus indicating an acceptable design. However, the leak repair contractor's review of the installation procedure used for this job revealed that an injection pressure of 2500 psig was inadvertently used for this application. Given this injection pressure, the generated hydraulic thrust due to sealant injection exceeded the allowable working load of the tongue by a factor of 1.3. The leak repair contractor representative also indicated that there was a sharp transition from the box enclosure to tongue. The excessive hydraulic thrust introduced during the sealant process, the minimal shrinkage characteristic of the type of sealant selected, in combination with a stress riser due to the sharp transition between the tongue and the box enclosure most likely resulted in a fatigue failure in the transition area. This was consistent with visual observations of the failure.

[mechanical equipment failure, gas / vapour release, competency lacking, cracking, pipe, drain]

**Lessons**

The justification for undertaking this type of temporary repair must be weighed against the potential consequences of failure. Such justifications should be endorsed by senior management on advice from a professional mechanical engineer. When there is justification for such a repair, all aspects of the job must be carefully examined, controlled and implemented by competent personnel.

The following corrective actions were taken:

1. The Leak Repair Contractor has reviewed the injection procedures and trained their technicians to ensure their understanding of the differences in injection mechanics associated with the various types of sealant. This will ensure that the correct sealant injection pressure is applied in future.
2. The Leak Repair Contractor's Engineering Department has reviewed high stress concentrations at the enclosure to tongue transition specifying a minimum radius.
3. Other similarly designed clamps installed have been inspected to ensure that a similar failure will not occur.
4. Inspection will continue to monitor the first and second stage drain piping at 6-month intervals or until a corrosion rate is established for each stage.

8605 02 June 1996

Source : LLOYDS LIST, 1996, JUN, 5, JUN, 6.

Location : , INDIA

Injured : 0      Dead : 0

---

**Abstract**

A river transportation incident. Spillage of several tonnes of petroleum products into water at jetty when oil barge overflowed her pipeline during loading operations. 358,000 litres of diesel spilt.

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location :** West Bengal, INDIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

364,000 litres of diesel spilt when a marine tanker's pipeline overflowed during loading operations on a jetty.

[spill, marine transport]

---

**Lessons**

[None Reported]

---

8596 01 June 1996

**Source** : LLOYDS LIST, 1996, JAN, 3.

**Location** : Sant Celoni, SPAIN

**Injured** : 0      **Dead** : 0

---

**Abstract**

A storage tank holding 6,000 litres of bleach broke. A toxic cloud formed when the bleach leaked into connecting pipes carrying hydrochloric acid.  
[storage tanks, gas / vapour release]

---

**Lessons**

[None Reported]

---



**Source** : LLOYDS LIST, 1996, JUN, 24.

**Location** : Kola Peninsula, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. A spillage from a leak from a pipeline covered 30,000 sq. m. of lake and swamp with 400 tonnes of kerosene.

[environmental]

---

**Lessons**

[None Reported]

---

**Source** : LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location** : Louisiana, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. 310,000 gallons of gasoline were lost in marshland following the rupture in a pipeline from the refinery. The rupture occurred under a small tributary of a nearby river and led to the isolation of sections of local highway to avert the potential for ignition.  
[material of construction failure, pollution]

---

**Lessons**

[None Reported]

---

8600 20 May 1996

**Source** : LLOYDS LIST, 1996, JUN, 22.

**Location** : Shenzen, CHINA

**Injured** : 19    **Dead** : 1

---

**Abstract**

A gas pipeline explosion shook 20 floor building. Fatality.

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Fuel gas release causes refinery plant shut-down. A contractor erroneously opened the body of a valve which was located in the live main fuel gas line beyond the battery limit. Hydrogen-rich gas escaped, and the refinery lost its fuel gas main pressure and all units had to be shut down. This resulted in product loss. It was found that the instruction that consultation should be carried out if any valve was to be opened was ignored.

The cause of this incident was that the work order did not specify the number and location of the valves to be checked and repaired. The valves were, apparently, not tagged. In addition, the work order had not been cleared.

[labelling incorrect, operator error, refining, plant shutdown]

---

**Lessons**

Work orders must be specific in job and location description.

---

**Source :** LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location :** Honolulu, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. Up to 400 bbl of heavy fuel oil leaked into the bay from a pipeline leading from a refinery to a Power Plant. Preventative measures included closing the Arizona Memorial, stopping vessel traffic and using three local response vessels and seven US Navy skimmers in the spill area.  
[pollution]

---

**Lessons**

[None Reported]

---

8593 14 May 1996

Source : LLOYDS LIST, 1996, MAY, 23.

Location : Hawaii, USA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. A pipeline spillage of 8,400 gallons of heavy fuel oil near power plant leaked into the harbour.

---

**Lessons**

[None Reported]

---

**Source** : LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location** : Lisichansk, UKRAINE

**Injured** : 0      **Dead** : 0

---

**Abstract**

Shifting soil caused a break in an oil pipeline an a spillage of 500 tonnes of crude oil.

[excavation, damage to equipment, drilling/digging/ploughing vehicles]

---

**Lessons**

[None Reported]

---

8786 22 April 1996

**Source** : EUROPEAN CHEMICAL NEWS 6, 1996, 5, DEC.

**Location** : Ludwigshafen, GERMANY

**Injured** : 0      **Dead** : 0

---

**Abstract**

Some 1.5 ton of gaseous butadiene escaped through a ruptured pipe at an 80,000 tonne per year plant. There were no injuries and damage was confined to a 30 cm long crack in the affected pipe.

[damage to equipment, leak]

---

**Lessons**

[None Reported]

---



**Source** : LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location** : Winnipeg, CANADA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. A rupture in a 34 inch pipeline sent a fireball over 100 ft high. The cause has been attributed to faulty welding on the pipe.  
[weld failure, fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location** : Permovayskoye, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. The explosion destroyed a 450 metre section of the pipe. It is thought that it will be very difficult to repair and may take more than one month.  
[pipeline]

---

**Lessons**

[None Reported]

---

Source : LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

Location : Texas, USA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. A 30 inch, 550 million scfm natural gas pipeline and compression station were shutdown due to an explosion. Operation is expected to resume at 80% rate in the short term until compression can be restored.

[compressor]

---

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location :** Rostov, RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. Approximately 500 tonne of crude oil leaked from the 700 mm pipeline into the nearby river.

[spill, pollution]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Hydrotreater recycle hydrogen line failure at a refinery.

Localised corrosion of a FCCU (Fluid Catalytic Cracking Unit) feed hydrotreater recycle hydrogen line by-pass around a hydrogen pre-heat exchanger led to an explosion and fire. The failed part of the line had been identified by inspection as a dead leg. After investigation it was found that the mechanism of corrosion was ammonium chloride under deposit corrosion. The source of chloride has not been traced, but hydrogen from the catalytic reformer was strongly suspected. Inspection inadequate of the dead leg was identified as the cause of this incident. There was damage to equipment, material loss and product loss. [refining, fluid cracker]

---

**Lessons**

Localised corrosion mechanisms are difficult to detect with fixed point UT, and dead leg corrosion can have several different corrosion mechanisms.

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

An explosion and fire occurred at a refinery. This was caused by pipe failure at the gasoline hydrometer unit. The pipe failure caused hydrocarbons to be released, which led to the explosion and fire which burned for more than three hours. No injuries were reported.

[fire - consequence, refining, vapour cloud explosion, mechanical equipment failure]

---

**Lessons**

[None Reported]

---

8666 29 March 1996

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Spillage of 20 gallons of sulphuric acid occurred from a leak in a pipe. The acid was contained within a protective wall and was pumped out by fire-fighters.

**Lessons**

[None Reported]

---

**Source :** LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location :** Tyumen, RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. The fire followed a natural gas leak when the 1,200 mm pipeline ruptured. Several dozen metres of pipeline had to be replaced.  
[fire - consequence, pipeline failure]

---

**Lessons**

[None Reported]

---



8587 23 March 1996

**Source** : LLOYDS LIST, 1996, MAR, 25.

**Location** : Bashkortostan Region, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. About 600 tonnes of oil spillage after a pipeline leaked.

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 1      Dead : 0

---

**Abstract**

A fitter was sprayed with hot quench oil when he was carrying out maintenance work on an ethylene plant. The oil leaked from a flange when a control valve was being removed to allow a blocked line to be steamed out. A valve, isolating the work area from the live process, was passing. The fitter received minor burns and the jet of oil sprayed over adjacent equipment and pipework. Approximately one tonne of oil was released.

Site emergency services were called to the scene. The quench oil pumps were switched off. Sandbags were successfully employed to mop up oil and to prevent oil entering effluent drains. Technicians, wearing protective suits and hoods, rebolted the leaking flange and stopped the oil leak. Members of the fire service, who had been called to the site, were not required to deploy water or foam during the incident.

Following the incident, a site enquiry was instigated. The investigating team examined the plant and concluded that it was safe to continue in operation.

[spill, flow restriction, injury]

---

**Lessons**

1. A review of the availability (across the site) and the standards for protective suits.
  2. Controls for breaking containments and for temporary modifications generally. The site engineering standards, instructions and training programmes should be looked at, bearing in mind this incident and it's causes.
  3. Site specific improvements to emergency response, communication and dealing with injured personnel etc.
-

8584 20 March 1996

**Source** : LLOYDS LIST, 1996, MAR, 21.

**Location** : Orenburg region, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. A break in a major pipeline caused spillage of 500 tonnes of oil onto the ground.

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location :** Lagos, NIGERIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. An explosion and fire occurred on a petroleum pipeline for 4 hours was caused by sabotage.

[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location** : Bintulu, MALASYIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A road transportation incident. A spillage of crude oil occurred following a hose line burst while a road tanker was on its way to the terminal.  
[mechanical equipment failure]

---

**Lessons**

[None Reported]

---

8705 11 March 1996

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location** : Bintulu, MALAYSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A marine transportation incident. Spillage of crude oil occurred following a hose line burst during loading. The accident occurred while the oil marine tanker was making fast to the terminal.

---

**Lessons**

[None Reported]

---

8579 10 March 1996

Source : LLOYDS LIST, 1996, MAR, 12.

Location : Dagestan, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Explosion in section of 1020 mm natural gas pipeline.

---

**Lessons**

[None Reported]

---

**Source** : LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location** : Tyumen, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. A total of some 12,400 tonne of crude oil leaked from the ruptured pipeline. Pollution had reached areas up to 7.5 km away.  
[environmental]

---

**Lessons**

[None Reported]

---



**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location** : Komi Republic, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. 60 cum (cubic metres) of crude oil spillage due to faulty seal.

[seal failure]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location** : Ibadan, NIGERIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Explosion on pipeline is attributed to sabotage.

---

**Lessons**

[None Reported]

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : Chelyabinsk, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. An explosion blew away a large piece of the 1200 mm pipeline.

---

**Lessons**

[None Reported]

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : , NIGERIA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. A gasoline pipeline blew up at km 64 caused by sabotage.

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location** : Antioquia, COLOMBIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Explosion on pipeline caused by sabotage was the third on this pipeline this year. 6500 bbl of crude oil spillage.

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location** : Chechnya, Dagestan, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. A fire occurred following an explosion on part of a natural gas pipeline. There was a second on the 2nd March.

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

**Location** : Mylkivskyy, Chernigov, UKRAINE

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. A pipeline rupture resulted in a fire.

[fire - consequence]

---

**Lessons**

[None Reported]

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : Perm, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

An explosion and fire on a pipeline occurred after a leak of gas.

[fire - consequence]

---

**Lessons**

[None Reported]

---



8685 18 February 1996

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : Remedios, COLOMBIA

Injured : 0      Dead : 0

---

**Abstract**

An explosion tore through a section of the 150,000 barrel per day crude oil pipeline caused by sabotage.

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location** : Arauquita, COLOMBIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. The explosion in the 220,000 bpd pipeline, the tenth this year, caused a 6500 bbl spillage of crude oil into the surrounding area. Sabotage is the most likely cause.

---

**Lessons**

[None Reported]

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : Lugansk, UKRAINE

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Explosion in a section of the north gas pipeline, led to the combustion of the gas. An 8 km section of the pipeline was isolated and the 100 metres high flame engulfed several houses, destroying four and seriously damaging seven. The fire was put out within hours.  
[fire - consequence, damage to equipment]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Fire at compressor suction drum at a terminal during maintenance. The drain valve of the interstage liquid drum was inadvertently opened, releasing hydrocarbons into the open drain system below the suction drum. Within seconds, the hydrocarbons were ignited. There was damage to equipment and material loss. The most likely source of hydrocarbon release was from the inadvertent operation of a level gauge drain cock by insulation technicians working in the relatively confined work area. In addition the drain cock could easily be partially opened by body contact. Also the control of the work was insufficient to prevent the incident occurring.

[fire - consequence, product loss]

---

**Lessons**

The control of maintenance/installation work adjacent to running plant needs very careful consideration as to the degree of control needed to prevent incidents.

The atmospheric drainage of "light ends" on process units can be hazardous if not carefully controlled. Wherever practicable, drain valves should be double valved, locked off or otherwise protected when not in use.

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : Lugansk, UKRAINE

Injured : 1      Dead : 0

---

**Abstract**

Transportation. Explosion in natural gas pipeline sending flames 100 metres high.

---

**Lessons**

[None Reported]

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : California, USA

Injured : 0      Dead : 0

---

**Abstract**

Explosion and fire occurred after a hydrogen gas pipe broke.

[fire - consequence]

---

**Lessons**

[None Reported]

---

8578 01 February 1996

Source : LLOYDS LIST, 1996, MAR, 11.

Location : , TRINIDAD AND TOBAGO

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Oil spillage halted in 30 inch concrete covered pipeline in harbour.

---

**Lessons**

[None Reported]

---

**Source** : LLOYDS LIST, 1996, FEB, 2.

**Location** : Southern Urals, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Explosion in 50 inch natural gas pipeline.

---

**Lessons**

[None Reported]

---



**Source** : LLOYDS LIST, 1996, JAN, 27, JAN, 30.

**Location** : GULF OF MEXICO,

**Injured** : 0      **Dead** : 0

---

**Abstract**

Natural gas offshore platform burned out of control after explosion when pipe was being attached to one of several wells feeding into platform. 45 workers safely evacuated.

[fire - consequence, evacuation]

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location :** Tyumen, RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. Fire damaged 60 metres of the 1,200 mm pipeline causing a stoppage at a gas pumping facility.  
[fire - consequence, damage to equipment]

---

**Lessons**

[None Reported]

---

8415 20 January 1996

**Source** : LLOYDS LIST, 1996, JAN, 22.

**Location** : River Giaga, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Safety valve broken by thieves in pipeline sending 300 tonnes of oil into frozen river.

[vandalism, spill]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location** : Krasnodar, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Damage to the pipeline is believed to have occurred during an illegal attempt to siphon off the oil. The pipeline has now been repaired. Spillage of 350 - 400 tonnes of oil.

[sabotage]

---

**Lessons**

[None Reported]

---

1100 16 January 1996

**Source** : LLOYDS LIST, 1996, JAN, 26.

**Location** : Samara region, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. An oil slick discovered in the nearby river indicating a leak from the underwater section of the pipeline.

---

**Lessons**

[None Reported]

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : , RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

1,220 mm oil pipeline damaged by bulldozer carrying out excavation. 242 tonnes oil spillage over an area of 650 sq. metres.  
[excavation damage, bulldozer/JCB/digger]

---

**Lessons**

[None Reported]

---

8570 11 January 1996

**Source** : LLOYDS LIST, 1996, JAN, 13.

**Location** : Saratov, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. An oil pipeline ruptured causing 650 ft by 160 ft wide spillage only 4 miles from a river. The break was caused by construction of a by-pass route onto the main pipeline.

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location** : North Central, COLOMBIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Rebels detonated two explosive devices on the pipeline carrying crude oil. Some 6,000 bbl of oil spillage, polluting agricultural land and some lagoons.

[explosion, pollution, sabotage]

---

**Lessons**

[None Reported]

---



Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : California, USA

Injured : 0      Dead : 0

---

**Abstract**

A workman severed a gas pipe causing the transmission pipeline to crack resulting in gas release.

[gas / vapour release, operator error]

---

**Lessons**

[None Reported]

---

Source : THE CHEMICAL ENGINEER, 25 JAN, 1996.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Up to one tonne of concentrated sulphuric acid leaked into a beck (river) at a plant after a spill by-passed the site's treatment system. A metal tank filled with the acid was being moved into position at the site, when it toppled onto its side and ruptured. The spilt acid entered the site's drain which should have taken it to the treatment unit. But the drain was later discovered to have collapsed causing the drainage line to fill up and overflow into a storm water drain and hence discharged into the stream.

[processing, pollution]

---

**Lessons**

All drains to be surveyed on a six monthly period.

---

8626 1996

**Source** : LLOYDS LIST, 1996, AUG, 5.

**Location** : , KAZAKHSTAN

**Injured** : 0      **Dead** : 2

---

**Abstract**

A gas pipeline explosion. Fatality.

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Catalytic poly sample cooler failure and fire. A piping coil at the water to air interface of a sample cooler, off a depropanizer reboiler in the Cat Poly Unit, failed. Hydrocarbons were released which ignited resulting in a substantial fire. The sample cooler was used only occasionally to draw samples. There was damage to equipment and material loss. It was found that aqueous corrosion of the carbon steel pipe had occurred. During normal operation, the block valves were to be in the closed position for all sample coolers; on the day of the failure, all the block valves were in the open position. This incident was caused by inadequate inspection frequency.

[inspection inadequate, fire - consequence, cooling equipment, mechanical equipment failure, processing]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

The failure of a crude oil bypass line at a refinery. The crude oil bypass line on the CO1 exchangers on a crude unit failed, and there was a release of crude oil. There was damage to equipment. It was found that there had been severe localised chloride induced under deposit corrosion. Contributing to this was an incorrect unit throughput set point caused by an abnormal increase in line pressure. The area of failure was not easy to access/monitoring and in fact, the line had been leaking for a period of time prior to failure. There was a stagnant area, dead end between the isolation block valve and the main line (as it was not self draining), which allowed the build-up of crude sludge.

[refining]

---

**Lessons**

Corrosion to the point of failure in stagnant sections of pipelines is not always easy to detect at early stages and HAZOP and inspection procedures need to assess requirements.

Control limits on operating parameters may need to be fixed to avoid entering potentially hazardous zones in error.

---

Source : ICHEME

Location : ,

Injured : 1      Dead : 0

---

**Abstract**

During the lifting/moving of a dock hose, the person tasked with guiding the hose through the dock structure had two of his fingers partially amputated when they were caught between the dead leg of the two-part tag line and the sheave in the load block. This accident was caused by the structural design of the dock which resulted in a very hazardous job task; the open load block design created a severely hazardous pinch point to employees/contractors. In addition there was a lack of awareness on the worker's part as to the hazard of placing a body part in a pinch point.

[operator error, design inadequate]

---

**Lessons**

There is a need to ensure that personnel are aware of the hazard of "pinch points" in machinery, lifting equipment, etc.

It is a hazardous practice to manually handle a load line while a lifting operation is in hand.

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location :** Yokkaichi, JAPAN

**Injured :** 0      **Dead :** 1

---

**Abstract**

Two 50,000 tpa HIPS lines at the 200,000 tpa facility were closed following explosion. Substance involved: polystyrene. Fatality.  
[processing]

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

**Location :** Bashkortostan, RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. Following a spillage in a pipeline, estimated to be between 468 - 2400 tonnes, oil has polluted a river. The oil was set on fire in an effort to clear up the spillage. The damaged pipeline which runs underneath the river is to be raised to the surface for inspection and repair when the precise location of the leak is found.

[pollution, fire - consequence]

---

**Lessons**

[None Reported]

---



**Source** : LLOYDS LIST, 1996, JAN, 13, JAN, 26.

**Location** : Komi Region, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Pipeline ruptured causing spillage of 2,800 barrels of crude oil. The rupture was attributed to corrosion. Oil polluted river.  
[pollution]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

**Location** : Pulau Merlimau, SINGAPORE

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire occurred in the crude distillation unit due to a damaged gasket in a furnace.

[fire - consequence, damage to equipment]

---

**Lessons**

[None Reported]

---

Source : OIL AND GAS JOURNAL.

Location : Denver, USA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Pipeline rupture caused release of gas that caught fire and forced the evacuation of 150 persons.  
[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

**Location** : Mstislavl, BELARUS

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. An explosion on the section of a natural gas pipeline due to high pressure.

---

**Lessons**

[None Reported]

---

8247 05 December 1995

Source : NEWSGRID

Location : Middletown, Ohio, USA

Injured : 14    Dead : 0

---

**Abstract**

Three explosions occurred in a gas pipe associated with a stove which preheats air to support blast furnace operations. The blast furnace had been shut-down for maintenance at the time of the explosion.

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 6      Dead : 3

---

**Abstract**

Ball valve blow-out on propylene system. A ball valve failed and released liquid propylene, which lead to an explosion. The incident was caused by the ball valve being fitted in the wrong direction. There was damage to equipment damage and material loss. Fatality.  
[valve failure, installation inadequate, product loss, maintenance]

---

**Lessons**

Maintenance workers must be trained not to attempt to work on any item with which they are not 100 percent familiar as to its construction, and when necessary to seek information before starting, if they have any doubts. Supervision must play a vital part in ensuring that those instructed to do a job are provided with the correct information to avoid incidents. Manufacturers drawings unfortunately sometimes leave much to be desired, which means that someone with first-hand experience of the item is very valuable in preventing incidents.

---

8233 01 December 1995

Source : LLOYDS LIST, 1995, DEC, 4.

Location : Venice, ITALY

Injured : 0      Dead : 0

---

**Abstract**

Transportation. An 11 km long underwater pipeline ruptured and caused a spillage of about 1 tonne of gasoline into lagoon causing moderate amount of pollution.

---

**Lessons**

[None Reported]

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

Location : , SINGAPORE

Injured : 2      Dead : 0

---

**Abstract**

A gas release occurred when 2 contractors were inserting metal plates, blanks, into a pipe to isolate a tower.

[maintenance, gas / vapour release]

---

**Lessons**

[None Reported]

---



8235 22 November 1995

Source : LLOYDS LIST, 1995, DEC, 7.

Location : Tyumen Region, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. A gas explosion and subsequent fire occurred at a pipeline causing damage of Roubles 4.3 billion. Accident caused by the erosion of a 500 mm pipe. A total of 240 metres of pipeline and an engine room were wrecked.  
[fire - consequence, damage to equipment]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

**Location** : Sao Bernardo do Campo, Sao Paulo, BRAZIL

**Injured** : 5      **Dead** : 1

---

**Abstract**

A fire broke out in a valve box when staff were cleaning the pipeline which was not in use at the time. Fatality.

[fire - consequence]

---

**Lessons**

[None Reported]

---

**8215 16 November 1995**

**Source :** LLOYDS LIST, 1995, NOV, 18.

**Location :** Langbank Area, Saskatchewan, CANADA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. World's longest 34 inch pipeline ruptured for the second time in five months causing the spillage of 7,500 barrels of crude oil.

---

**Lessons**

[None Reported]

---

8234 13 November 1995

**Source** : LLOYDS LIST, 1995, DEC, 4.

**Location** : Vladimir region, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A gas fire occurred as a section of pipeline was ruptured. Fire put out in 3 hours. Accident caused by soil shifting in the area.  
[fire - consequence, earth movement]

---

**Lessons**

[None Reported]

---

8213 12 November 1995

Source : LLOYDS LIST, 1995, NOV, 13, NOV, 15.

Location : Vladikavkaz, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. An explosion damaged a gas pipeline, halting gas supplies. Supplies were rerouted. Sabotage suspected.  
[damage to equipment]

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

**Location :** Yekaterinburg, RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. An explosion occurred when gas pressure built up to 30 atmospheres when valves at the station were shut off. The cause of the explosion was originally attributed to sabotage but later suggested that it was caused by corrosion of the pipeline.

---

**Lessons**

[None Reported]

---

8251 26 October 1995

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

Location : Ventspils, LATVIA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. A spillage of more than 50 tonnes of crude oil from a pipeline when there was an illegal attempt to tap into the line.  
[sabotage]

---

**Lessons**

[None Reported]

---

8205 19 October 1995

Source : HAZARDOUS CARGO BULLETIN, 1995, DEC.

Location : Cul de Sac, ST. LUCIA

Injured : 0      Dead : 0

---

**Abstract**

A marine transportation incident. Leaking pipe onboard 150,000 dwt marine oil tanker caused 11,000 litres of crude oil to flow to sea and harbour. Small beach pollution.

---

**Lessons**

[None Reported]

---



Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1996.

Location : , KUWAIT

Injured : 0      Dead : 0

---

**Abstract**

One of two strings of hoses parted during loading of 350,000 dwt tanker. Up to 800 tonne crude oil spillage occurred.  
[hose failure]

---

**Lessons**

[None Reported]

---

8204 17 October 1995

**Source** : HAZARDOUS CARGO BULLETIN, 1995, DEC.

**Location** : Mina Al Ahmadi, KUWAIT

**Injured** : 0      **Dead** : 0

---

**Abstract**

A marine transportation incident. One of 2 strings of flexible hoses parted during loading of 350,000 dwt marine oil tanker at single buoy mooring. Spillage of 800 tonnes of oil.

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

**Location** : Ras Tannurah, SAUDI ARABIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire occurred when a maintenance worker was carrying out some welding work on a pipe.

[fire - consequence]

---

**Lessons**

[None Reported]

---

8227 09 October 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

**Location** : Immingham, Humberside, UK

**Injured** : 3      **Dead** : 0

---

**Abstract**

A spillage from a leak of liquid ammonium nitrate through a drainage pipe on a 3500 tonnes static tank.

---

**Lessons**

[None Reported]

---

8184 04 October 1995

Source : LLOYDS LIST, 1995, OCT, 5.

Location : Tobolsk area, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Crude oil pipeline closed after spillage over 600 sq. metres.

---

**Lessons**

[None Reported]

---

8208 04 October 1995

Source : HAZARDOUS CARGO BULLETIN, 1995, DEC.

Location : Tobolsk Area, Siberia, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Major crude oil pipeline closed after being damaged. Crude oil spillage spread to an area of 600 sq. metres.  
[damage to equipment]

---

**Lessons**

[None Reported]

---

8219 October 1995

Source : THE OBSERVER, 1995, OCT, 29.; GUARDIAN, 1995, OCT, 30.

Location : Koscise, SLOVAKIA

Injured : 170 Dead : 11

---

**Abstract**

11 killed after a gas pipeline containing carbon monoxide ruptured. Leak. Fatality.

---

**Lessons**

[None Reported]

---

Source : ENDS REPORT 261, OCT, 1996.

Location : Ruabon, UK

Injured : 0      Dead : 0

---

**Abstract**

Release of 3 x 10 kg over 30 seconds of hydrogen sulphide occurred from a safety relief valve when a pressure built up in a sodium mercaptobenzothiazole unit. 17 complaints occurred. The release was caused by a blocked pressure line. Company fined £15,000 (1996) and ordered to pay costs of £22,000 (1996).

[high pressure, gas / vapour release, processing, flow restriction]

---

**Lessons**

[None Reported]

---



**Source** : HAZARDOUS CARGO BULLETIN, 1995, NOV.

**Location** : Brisbane, Queensland, AUSTRALIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A marine transportation incident. Hose coupling on marine tanker failed during discharge at wharf during unloading. Small spillage of oil due to prompt shut down of pump.

[coupling failure]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , USA

Injured : 4      Dead : 2

**Abstract**

An incident in a vertical sulphur converter vessel involving six contract maintenance personnel resulted in two fatalities and four injuries. The personnel were removing residual catalyst and refractory debris from the lower converter when the inner baffle failed under pressure. The failure of the inner baffle fatally injured one of the two workers in the lower converter and injured the other. A second fatality occurred when one man outside the manhole of the lower converter was blown from the working platform and fell to the ground. Two other workers outside the lower converter on the platform, were also injured. (A third worker reported injury the following day). The Refinery general alarm was sounded immediately after the incident and the advance call-out system activated. External emergency services were also notified. The injured inside the vessel were pulled out and lowered to grade level where emergency first aid was provided. Entry into the vessel for the other worker could not be immediately carried out due to low oxygen level and high hydrogen sulphide and sulphur dioxide concentrations. The three injured were transported to hospital.

The sulphur converter vessel involved was located in one of two sulphur recovery units. The vessel was lined with refractory and was divided into two converters by a steel wall, referred to as an inner baffle. The vessel was about 0.5 m I.D. and 9.1 m overall length, was fabricated in 1954 and had a name plate pressure rating of 65 psi. The vessel as a whole had been designed to withstand this pressure but the inner baffle was not.

An investigation found that the vessel O<sub>2</sub> and H<sub>2</sub>S levels were tested on the morning of September 6 and found to be within permissible limits. An entry permit was issued for the removal of catalyst from both top and bottom converters and the task was completed by about 19:00 hrs. the same day. Another gas test at 19:10 hrs. for the job order to remove residual catalyst and refractory debris from under the screen grids of the lower converter indicated a H<sub>2</sub>S concentration of 50 ppm. High H<sub>2</sub>S continued to be detected in the top converter despite attempts at steam purging, air purging and nitrogen purging. A decision was then made to seal the upper converter and to introduce nitrogen into it from a utility header with a pressure of about 60 psig. An entry permit was issued for the lower converter. The nitrogen flow was initiated at about 01.45 hrs., September 7, and maintenance contractors began work in the lower converter at about 02.00 hrs. The job was carried out by a two man entry crew and a four man crew assisting the cleaning effort by handling the residual materials as they were removed from the lower converter. At about 02:35 hrs. the inner baffle which separated the lower converter from the upper converter failed under the differential pressure built up between the two converters, resulting in the above fatalities and injuries.

The following corrective actions were carried out after the incidents:

1. modified the internal baffle design of the replacement vessel.
2. reviewed Process Safety Information to identify the existence of any similar vessel designs so that future maintenance procedures can address any comparable over-pressure issues.
3. modified refinery policies such that any new or unique situations that arise during the course of operation or maintenance will require a high level of management participation prior to the implementation of any actions to address the said situations.
4. reviewed the Confined Space Entry procedure to determine if further practical improvements can be made, even though all regulatory requirements were met.

[high pressure, fall, explosion / pressure release, entry into confined space, fatality, design or procedure error, injury]

**Lessons**

All parts of a vessel must be designed to withstand the pressures that may be required during maintenance activities.

Departures from normal operational or maintenance practices must be subjected to a Management of Change review.

Rescue of trapped personnel in confined spaces should be included in the emergency procedures and rehearsed in drills.

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Failure on new gas compressor. A valve cover on the suction side of a recently commissioned reformer blew off. Process technicians who were working in the area were alerted by the noise of escaping gas. Their prompt investigation quickly identified the cause of the gas release; and the unit was shut down by activation of the emergency shutdown system in central control. It was found that the studs on the valve cover failed in fatigue, the result of not having all be torqued to the specified level. The cause of the accident was the manufacturer not communicating the criticality of even torquing of valve cover studs and not including the checking of valve cover studs in its "field installation checklist".

[metal fatigue, inspection inadequate, processing]

---

**Lessons**

The need for stud/bolt torquing on flanges and other closures requires engineering assessment at installation and subsequent maintenance actions, taking account of system parameters and criticality.

---

**Source** : LLOYDS LIST, 1995, SEP, 16,; HAZARDOUS CARGO BULLETIN, 1995, NOV.

**Location** : Saldanka Bay, SOUTH AFRICA

**Injured** : 0      **Dead** : 0

**Abstract**

A marine transportation incident. 25,000 litres of crude oil spillage into harbour during unloading of marine oil tanker probably due to a burst pipe.

**Lessons**

[None Reported]

**1926 25 August 1995**

**Source :** LLOYDS LIST, 1995, 28 AUG.

**Location :** , SINGAPORE

**Injured :** 0      **Dead :** 0

---

**Abstract**

55 tonnes of heavy fuel oil spillage into the sea from a refinery pipeline leak.

[pollution, refining]

---

**Lessons**

[None Reported]

---

**1938 25 August 1995**

**Source** : LLOYDS LIST, 1995, AUG, 29.

**Location** : Gulf of Mexico, USA

**Injured** : 0      **Dead** : 2

---

**Abstract**

Two men were working to depressurise piping around a platform by bleeding down a 16 inch pipeline and were killed when it ruptured.

[fatality]

---

**Lessons**

[None Reported]

---

8241 25 August 1995

Source : LLOYDS LIST, 1995, DEC, 27.

Location : , SINGAPORE

Injured : 0      Dead : 0

---

**Abstract**

300 tonnes of oil spillage into the sea from the refinery when a valve on a pipe was left open after maintenance work.  
[operator error, refining]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1995.

**Location** : Wurtland, Kentucky, USA

**Injured** : 20    **Dead** : 0

---

**Abstract**

A gas leak occurred when a pipe break released sulphuric acid. The leak resulted in a dense white cloud. Residents from four local towns were evacuated. Following the incident the company made modifications to pipes and storage tanks throughout the plant.  
[gas / vapour release, evacuation, processing]

---

**Lessons**

[None Reported]

---



1723 18 August 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1995.

**Location** : Sverdlovsk, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. A natural gas pipeline rupture led to an explosion and fire.

[fire - consequence]

---

**Lessons**

[None Reported]

---

**1965 16 August 1995**

**Source :** LLOYDS LIST, 1995, AUG, 28.

**Location :** Perm, RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Oil leaked from damaged pipe onto hot machinery and spilled over an area of 300 sq. metres. Hot surface.

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, 3 RD QUARTER, 1995.

**Location :** Nagaoka, JAPAN

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. The 350 mm, 23.5 km liquefied natural gas (LNG) pipeline was ruptured by a landslide caused by heavy rains in the area. A four hour fire resulted.

[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 3, 1995.

**Location** : La Chira, PERU

**Injured** : 0      **Dead** : 0

---

**Abstract**

Spillage of 18,000 gallons of oil occurred when unloading at a facility. Rough seas caused a hose to break loose during the unloading, resulting in an oil slick of 15 km. The shore line for approximately 13 km was affected.  
[pollution, weather effects]

---

**Lessons**

[None Reported]

---

1887 06 August 1995

**Source** : LLOYDS LIST, 1995, AUG, 11, AUG 16.

**Location** : Conchan, La Chira, PERU

**Injured** : 0      **Dead** : 0

---

**Abstract**

Marine transportation. Hose on marine tanker broke during unloading of oil causing spillage of 18,000 gallons to sea. 13 km of shore line affected.  
[pollution]

---

**Lessons**

[None Reported]

---

1615 04 August 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3 RD QUARTER, 1995.

**Location** : Penza, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. An 18 year old pipeline ruptured along its seam and spilled diesel which contaminated at least 3,000 sq.m of land.  
[contamination]

---

**Lessons**

[None Reported]

---

Source : LOSS PREVENTION BULLETIN, 128, 7-10.

Location : , FINLAND

Injured : 0      Dead : 0

---

**Abstract**

This incident occurred between August and September 1995.

15,000 litres of detergent leaked into sewers, passed through a water treatment plant and seriously polluted a 60 km stretch of river. Damage to the river was extensive and very large numbers of fish and surface life were killed, partly by asphyxiation but many of the fish showed signs of severe bleeding in the gills, probably caused by the high levels of ammonia and surfactants in the water.

[pollution, ecological damage]

---

**Lessons**

1. All plant modifications, however apparently trivial, must be subject to a change control procedure involving a safety review by qualified personnel.
  2. Because a substance is a common household item, it does not mean that it is not capable of causing widespread damage if released in sufficient quantity and at a sufficient concentration.
  3. Frequent small releases are often a sign of a big one waiting to happen.
  4. All organisations should have a disaster plan with lines of communication clearly defined.
-

**1892 August 1995**

**Source :** LLOYDS LIST, 1995, 12 AUG.

**Location :** Kama River, RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

25 tonnes of black oil spillage into a river from broken pipe.

---

**Lessons**

[None Reported]

---



1700 29 July 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1995.

**Location** : Rapid City, Manitoba, CANADA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Escaping natural gas from a pipeline break caught fire and burned itself out after the break was isolated by closing valves either side of the break. Stress corrosion cracking was possibly a cause.

[fire - consequence, leak]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 4, 1995.

**Location** : Westville, New Jersey, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A marine transportation incident. Strong winds caused marine tanker to move away from terminal during unloading operations. Flexible hose parted and spillage of 130 tonnes of crude oil occurred into the river causing pollution.

---

**Lessons**

[None Reported]

---

1516 17 July 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1995.

**Location** : Samotlor Field, Tyumen, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Explosion in field was caused by the rupture of a pipeline due to corrosion. Spillage of oil covered 500 sq. metres.

---

**Lessons**

[None Reported]

---

1714 12 July 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1995.

**Location** : Ukhta, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Gas pipeline explosion sent flames to a height of 10,000 to 20,000 ft scorching an estimated 12 acres of forest and leaving a crater of 16 ft by 50 ft wide. Pipeline is 56 inches in diameter.

[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 3, 1995.

**Location** : Ozochi, NIGERIA

**Injured** : 0      **Dead** : 3

---

**Abstract**

Transportation. Fire at a leaking oil pipeline. 15 members of the community tried to stop the oil gushing out of the pipeline when it caught fire. Three fatalities and three missing.

[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : LLOYDS LIST, 1995, JUL, 1.

**Location** : Dunlin A, North Sea, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

A fire occurred in a generator room which was caused by a lubricating oil leak from a turbine gasket.

[fire - consequence, processing]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Residue hydrocracker fire. A 6 inch schedule 40, carbon steel elbow ruptured; and a fire resulted. It was found that the pipe failed due to erosion/corrosion. The cause was due to failure to apply management of change procedures to the decanted oil injection that identified erosion as a possible consequence of the decanted oil injection. No metallurgy upgrades or additional inspections were recommended as a result. Loses \$2.5 million (1995) (£1.59 million) (1995), including damage to equipment.  
[fire - consequence, cracking, management system inadequate]

---

**Lessons**

The cumulative impact on the materials of construction from gradual changes in process conditions, e.g., flow rate, temperature, sulphur content, can, unfortunately, be overlooked if the threshold values are not established to provide a base line for comparison.

---

**Source** : LLOYDS LIST, 1995, JUN, 17,.; HAZARDOUS CARGO BULLETIN, 1995, AUG.

**Location** : Anzhero-Sudzhensk, Siberia, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Fire at pumping station of pipeline ignited 20,000 tonnes of crude oil.

[fire - consequence]

---

**Lessons**

[None Reported]

---



2721 16 June 1995

**Source** : HAZARDOUS CARGO BULLETIN, 1995, AUG.

**Location** : Saskatchewan, CANADA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Rupture of 860 mm diameter Line 3 of 4 pipeline caused spillage of 2,600 tonnes of crude oil to a farm field. Flow shut off within 4 minutes.

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 1      Dead : 0

---

**Abstract**

Injury at steam condensate sump. While assisting with the modification of some pipework in the steam generation area, a process technician lost his balance, and his right foot and lower leg were submerged into a steam condensate sump. There were no guards or barriers around the sump. In addition there was generally poor housekeeping in the area, including temporary scaffolding and numerous hoses in the vicinity and a lack of suitable warning signs. The site regulations relating to sumps and pits were not followed. There was also a lack of awareness by personnel working in the area of the severe hazard presented by the open sump. A more rigorous safety assessment of the area prior to the issue of permits should have identified the hazard.  
[inadequate guarding, safety procedures inadequate, permit to work system inadequate]

---

**Lessons**

Holes left by the removal of equipment, however temporary, must not be tolerated. Either securely cover the opening or provide guards/warning signs.  
Work permit issue requires actual work site evaluation to consider the potential hazards that may be generated by the work to be done.  
Supervisors need to monitor work being done to spot potential hazards.

---

**Source** : LLOYDS LIST, 1995, 20 JUN.; HAZARDOUS CARGO BULLETIN, 1995, AUG.

**Location** : Qua Iboe, NIGERIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A rupture occurred on a 42 inch diameter, loading pipeline on a terminal, causing shut down of the loading operations.

---

**Lessons**

[None Reported]

---

---

**Source :** ICHEME**Location :** ,**Injured :** 0    **Dead :** 0

---

**Abstract**

Natural gas pipeline system overpressure. A pilot diaphragm in a metering station supplying the plant with natural gas failed. Due to several other compounding issues, the pilot failure caused the stand-by let-down station to go wide open, and resulted in a serious overpressure of the plant's natural gas distribution system. The incident was caused by failure of a diaphragm on the second stage PCV pilot which sent natural gas to the pilot vent line; the pressure equalising across the diaphragm simulated a low sensing pressure and caused the second stage PCV to go wide open, creating overpressure in system. There was no regularly scheduled programme of servicing and testing on meter station valves and instrumentation. Servicing was sporadic and minimal. The pilot diaphragms were not replaced according to manufacturer's recommendations, based on minimum expected life. Near miss.

[overpressurisation, operation inadequate]

---

**Lessons**

For utility supplies entering petrochemical plants:

1. Don't assume that they are adequately protected. Analyse the risks and assess the safeguards associated with these interfaces.
  2. Ensure there is ongoing maintenance of equipment and instrumentation whose reliability impacts on your plant.
-

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Oil spill at a dock at a refinery. During the transfer of lube oil back into the refinery for reprocessing, the discharge hose compression fitting at the flanged connection to the existing pipework failed, resulting in a major loss of oil containment. It was found that the hose, supplied by a third party, contained a fabrication defect. The cause was due to the failed fitting ferrule not being tight enough and the swaging dolly was too small.  
[material transfer, refining, flange failure]

---

**Lessons**

If necessary to use hoses supplied by third parties, they should only be used when their history is known and the hose tested before use.

---

1502 01 June 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3 RD QUARTER, 1995.

**Location** : Java Sea, INDONESIA

**Injured** : 1      **Dead** : 2

---

**Abstract**

Fire balls spread from gas pipes on platform Uniform F/S. Offshore.

[fire - consequence, fatality]

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUES 2, 1995.

**Location :** Surgut, Tyumen, RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. A 700 mm diameter oil pipeline ruptured and a fire occurred. The fire shutdown 2 power transmission lines.

[fire - consequence, plant shutdown]

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 2, 1995.

**Location :** , GEORGIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. A gas pipeline damaged by an explosion was repaired and recommissioned within a week. Fire brought under control in 2 hours.  
[fire - consequence, damage to equipment]

---

**Lessons**

[None Reported]

---



**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 2, 1995.

**Location :** Usinsk, Komi Republic, RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Major pollution occurred in this marsh area following failure of a corroded pipeline in 1994. During May 1995, clean up operations, an attempt to burn off excess oil, resulted in an uncontrolled fire, which spread over 10 hectares of the 25 hectares spillage area. Significant environmental impact is anticipated when the Spring thaw arrives.

[pipeline failure, fire - consequence, corrosion, spill]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

During discharge of solid flake from a bulk tanker, sparks were observed on the outside of the discharge flexible hose. The discharge was stopped immediately and the vehicle disconnected and sent away part discharged. There were no other consequences. The hose was translucent plastic with internal carbon steel wire armouring. Continuity had been lost between this and the metal coupling on the end of the hose. The hose had been supplied as having anti static properties but was not subject to regular continuity testing. This was because it belonged to the transport department and not the production plant. The SOP for the operation was also out of date, being for a "walking floor" type of vehicle. This had not been used for between 18 months and two years at this site. The operation had been carried out many times without incident.

The main recommendations were:

1. Procure two new anti-static hoses to be the property of the Plant.
2. Include earth continuity checks in the engineering department schedule.
3. Revise and re-issue the SOP.
4. Circulate Company guidance note on "Rules and Procedures for Sources of Ignition" to all relevant businesses in Group.

[unloading, road tanker, near miss]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Isocracker explosion at a refinery. While pressure testing discharge valves on an out-of-service reciprocating compressor, 2100 psig process pressure blew out a gasket at the blinded flange in the system. A vapour cloud was released and subsequently ignited. It was found that the temporary compressor side blank failed due to pressure above its design capability. Operations personnel conducting the pressure testing were not familiar with the pressure limitations of the blind that was in place.

[vapour cloud explosion, overpressurisation, refining]

---

**Lessons**

Need to ensure that correct blinding is always used to meet the maximum pressure capability of the system. Need to ensure that Operations personnel are knowledgeable of the application limitations of various blinding systems which may be used.

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUES 2, 1995.

**Location :** Port Harcourt, Rivers State, NIGERIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. Gas supply interrupted by explosion on pipeline which carries liquefied petroleum gas (LPG). It was reported that the fatalities were saboteurs who were killed by the unexpected force of the explosion.

[sabotage]

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 2, 1995.

**Location :** Ukhta, Komi, RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. Possible sabotage caused a major explosion on a 55 inch diameter pipeline and a crater 5 metres deep and 15 metres across. The associated fire resulted in flames over 100 metres high and illuminated the local town for 2 hours at night. Automatic shutdown valves were reported to have functioned correctly and isolated a 40 km section of the line.

[fire - consequence]

---

**Lessons**

[None Reported]

---

8113 24 April 1995

**Source** : LLOYDS LIST, 1995, APR, 27

**Location** : Megion Region, Western Siberia, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. A tractor ploughed into a pipeline causing its rupture and the spillage of 250 cum (cubic metres) of crude oil into the nearby river.

---

**Lessons**

[None Reported]

---

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

#### Abstract

Isocracker heat exchanger flange leak at a refinery. An Isocracker Unit was shutdown due to a small pinhole leak found in the first stage feed/effluent exchanger outlet piping. After disassembly of the piping system, the flange revealed extensive cracking.

Losses including damage to equipment, product loss, and materials and labour amounted to \$1.3 million (1995). It was found that chloride stress corrosion cracking caused the incident. All four criteria for chloride stress corrosion cracking were present: Material of cracked flange was austenitic type stainless steel, known to be vulnerable to chloride cracking. Flanges were overcompressed and the joints had not been hydraulically torqued during previous turnaround. Even low overall concentration of chlorides got into grooves and pits during cycling and went undetected for many years/cycles.

[refining, cracking]

---

#### Lessons

Chloride stress corrosion cracking propagates during start-up and shutdown periods, even in low overall concentrations of chloride, concentrating in grooves and pits.

---

8096 21 April 1995

Source : THE GUARDIAN, 1995, APR 28,; THE TIMES, 1995, APR 28,; NEWSGRID 4-27

Location : Ukhta, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Rupture in a gas pipeline caused a huge fire ball. Cause attributed to the worn out state of the pipeline.  
[fire - consequence]

---

**Lessons**

[None Reported]

---



**Source** : CHEMICAL HAZARDS IN INDUSTRY, 1995, DEC.; FIRE ENGINEERING, 1995, DEC.; HAZARDOUS CARGO BULLETIN, 1995, JUN.

**Location** : Lodi, New Jersey, USA

**Injured** : 0      **Dead** : 5

---

**Abstract**

An explosion severely damaged a plant. Problems occurred when mixing 1000 lbs of aluminium powder and 8000 lbs of sodium hydrosulphite. When benzaldehyde was added, a pipe that fed the chemical clogged. Workers tried to clear the blockage with water and some reacted with the sodium hydrosulphite and caused the mixture to smoulder. Nitrogen was added to smother the reaction and some material was being drummed off when the explosion occurred.

[damage to equipment, processing, batch reaction, fatality]

---

**Lessons**

[None Reported]

---

8112 19 April 1995

**Source** : LLOYDS LIST, 1995, APR, 26.; HAZARDOUS CARGO BULLETIN, 1995, JUN.

**Location** : Near Megion, Tyumen Region, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Corrosion in pipeline caused a spillage of 1,000 tonnes of crude oil covering an area of 30 hectares.

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , USA

Injured : 0      Dead : 0

---

**Abstract**

A release of about 6,500 lbs (as 100%) of 50% caustic soda occurred on a rayon plant. The material leaked on to the ground from the soda connection point to the sewers feeding the waste water treatment plant. The connection was isolated and blanked pending repair or replacement of the line. A contractor was called in to pump the free liquid to the waste water treatment plant and to excavate the contaminated earth.

There were no injuries or external environmental consequences but because of the size of the spills they were reported to the appropriate local, State and national bodies.

[spill, material transfer, mechanical equipment failure]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Contractors were carrying out excavation tasks associated with improvements to a road pipe track. Foundations were being laid for retaining walls and to improve the drainage system.

A mechanical excavator damaged the external sheath on three of the four 11kV power cables feeding a plant at the chemical facility. The damage occurred close to where the cables entered a sub-station.

Following the incident it was identified that the damage was superficial and that a simple sheath repair was required.

[damage to equipment, excavation damage, drilling/digging/ploughing vehicles]

---

**Lessons**

1. One excavation certificate had been raised for the job, which was to be undertaken in two distinct phases. The first, covering trial digs to locate cables was to be carried out using hand-digging methods only. The second, for subsequent tasks, allowed for mechanical digging, subject to appropriate permission and only in areas free of cables. Two permits to work were raised and it was incorrectly assumed that these were applicable to any part of the job.
  2. The Contractor had not prepared a method statement for the workscope.
  3. Hand-over between Contractor personnel had failed to identify the location of the cables.
-

8108 06 April 1995

**Source** : LLOYDS LIST, 1995, APR, 7,; EUROPEAN CHEMICAL NEWS, 17-23 APRIL 1995.

**Location** : Lillebonne, Rouen, FRANCE

**Injured** : 0      **Dead** : 0

---

**Abstract**

An explosion and fire badly damaged a vinyl acetate plant. Initial reports indicated high pressure in ethylene pipe initiated blast.  
[fire - consequence, damage to equipment, processing]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN, 1995, JUN.

**Location** : Silver Bay, Minnesota, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Burning oil sprayed from pipe destroyed electrical cables following pelletiser bearing failure. Two furnaces shut down for up to 3 weeks.  
[damage to equipment, processing]

---

**Lessons**

[None Reported]

---

8104 28 March 1995

**Source** : LLOYDS LIST, 1995, APR, 5.; HAZARDOUS CARGO BULLETIN, 1995, MAY.

**Location** : Brass River, NIGERIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Oil pipeline ruptured near production facility. 85,000 tonnes of crude oil spillage over 2 weeks. Sabotage by local community blamed but local community claiming \$32 million (1995) compensation.

---

**Lessons**

[None Reported]

---

8130 28 March 1995

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 2, 1995.

**Location** : Neftegorsk, Sakhalin Island, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Earthquake 7.5 on the Richter scale caused extensive damage to the oil production operation. A 53 cm pipeline had 15 breaks. 11 pumping stations, 230 wells and 3 oil and gas gathering stations were damaged.

[damage to equipment, processing]

---

**Lessons**

[None Reported]

---



8519 25 March 1995

Source : LLOYDS LIST, 1995, MAR, 28.

Location : Texas, USA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Pipeline ruptured causing spillage of 100 barrels of crude oil.

---

**Lessons**

[None Reported]

---

8103 23 March 1995

**Source** : LLOYDS LIST, 1995, APR, 8,; HAZARDOUS CARGO BULLETIN, 1995, MAY.

**Location** : Dikson, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Pipeline ruptured at storage tank under weight of snow at airport. 1,800 tonnes of jet fuel poured over snow and ice, and then in the sea.  
[storage tanks, weather effects, spill]

---

**Lessons**

[None Reported]

---

8518 22 March 1995

Source : LLOYDS LIST, 1995, MAR, 25.

Location : , Trinidad

Injured : 0      Dead : 0

---

**Abstract**

Transportation. A rupture in the main 30 inch gas pipeline caused by a tractor clearing land resulted in the evacuation of people.  
[excavation damage]

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 2, 1995.

**Location :** Chipola, Louisiana, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. 36 inch gas pipeline ruptured. Leak caught fire and damaged a reported 300 feet section near the Mississippi border. No impact on deliveries as the gas had been re-routed to two parallel lines. Fire lasted 2.5 hours.  
[fire - consequence, damage to equipment]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A 'near miss' potentially major environmental incident occurred when contractors excavated a trench (3 metres deep) 20 metres north of a major underground ethylene pipeline running between England and Scotland.

It was estimated that, if the pipeline had been ruptured, serious property damage within a radius of 5 km, and a flash fire of approximately 500 metre span, would have occurred.

[excavation, human causes]

---

**Lessons**

[None Reported]

---

8100 07 March 1995

**Source** : HAZARDOUS CARGO BULLETIN, 1995, MAY.

**Location** : Udmurt Republic, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Natural gas pipeline ruptured causing massive explosion and fire. 4 sq. km. area burnt out. Soil subsidence due to melting snow suspected as cause.

[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location :** Castle Rock, Washington, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A 26 inch pipeline ruptured. The fire ball was seen 8 miles away.

[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location** : Gardaban Region, GEORGIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A main gas supply pipeline was blown up.

[sabotage, gas / vapour release]

---

**Lessons**

[None Reported]

---



**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location** : Veracruz, MEXICO

**Injured** : 0      **Dead** : 0

---

**Abstract**

A small fire was extinguished within 15 minutes, following a pipeline failure.

[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 2, 1995.

**Location** : El Carmen, Norte de Santander, COLOMBIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Another explosion occurred on a 220,000 bbl/day crude oil pipeline at kilometre 465 section.

---

**Lessons**

[None Reported]

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

Location : Chiapas, MEXICO

Injured : 22    Dead : 1

---

**Abstract**

Transportation. Flames leapt 50 m in the air following an LPG pipeline explosion, causing knock-on damage and secondary explosions at two other pipelines.

Fatality.

[fire - consequence, damage to equipment]

---

**Lessons**

[None Reported]

---

8509 17 February 1995

Source : LLOYDS LIST, 1995, FEB, 18,; NEWSGRID.

Location : Tabasco, MEXICO

Injured : 17    Dead : 0

---

**Abstract**

An explosion occurred on gas pipeline 11 miles outside state capital.

---

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN, 1995, APR.; EUROPEAN CHEMICAL NEWS, 1995, FEB, 27.

Location : Tabasco, MEXICO

Injured : 23    Dead : 1

---

**Abstract**

Transportation. Explosion in gasoline pipeline and secondary blasts in parallel natural gas pipeline and LPG pipelines supplying port. Fatality.

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN, 1995, APR.; EUROPEAN CHEMICAL NEWS, 1995, FEB, 27.

Location : Essen, GERMANY

Injured : 4      Dead : 1

---

**Abstract**

An explosion and fire occurred at a chemical plant applying silicone coatings. The blast occurred when some polymethyl hydrogen siloxane was accidentally fed into a reactor, together with the correct feedstock, allyl glycidyl ether. The two epoxides reacted, overheated and hydrogen burst out of a ruptured pipe into the building, where it mixed with air and exploded. The 5 workers were caught in the resulting fire. According to the Company, the police believe that human error is to blame. Although both chemicals were labelled, they were stored in drums of the same colour. Damage is put at DM 10m \$6.7m (1995). Fatality.

[fire - consequence, human causes, damage to equipment, identification inadequate, overheating, chemicals added incorrectly, charging reactor, reactors and reaction equipment]

---

**Lessons**

[None Reported]

---

**Source :** HSE NEWS RELEASE.**Location :** Sutherland, UK**Injured :** 0     **Dead :** 0**Abstract**

During operations at a residue recovery plant the radiation monitors went into alarm. The plant was shut down and the area evacuated. A detailed survey of the area was made where no significant contamination was found and the plant restarted. The pressure in the main glovebox was then found to be increasing gradually and air activity monitors went into alarm and the plant was shut down and evacuated for the second time. It was subsequently confirmed that the pressurisation of the glovebox had been caused by a leak in the compressed air hoses of a centrifuge drive combined with a blockage in the glovebox filter.

[radioactive, evacuation, plant shutdown, processing]

**Lessons**

[None Reported]

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location** : Marneulskiy, GEORGIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A 30 metre section of pipeline was destroyed supplying natural gas.  
[sabotage]

---

**Lessons**

[None Reported]

---



8504 07 February 1995

Source : LLOYDS LIST, 1995, FEB, 9.

Location : Perama, GREECE

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Fire broke out when a fuel oil pipeline running from a storage tank to a loading terminal sprung a leak and ignited.  
[storage tanks, fire - consequence]

---

**Lessons**

[None Reported]

---

**8506 04 February 1995**

**Source :** LLOYDS LIST, 1995, FEB, 9.

**Location :** Vermillion Bay, CANADA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. Explosion created two craters along natural gas pipeline that hurled lengths of pipe into the air.

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location** : Vermilion Bay, Ontario, CANADA

**Injured** : 0      **Dead** : 0

---

**Abstract**

100 metres of pipeline torn up by explosion and fire involving 45 million scfd of natural gas.

[fire - consequence]

---

**Lessons**

[None Reported]

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

Location : Shandong Province, CHINA

Injured : 57    Dead : 10

---

**Abstract**

Transportation. A massive gas pipeline blast destroyed a busy city intersection and neighbouring power transmission lines as city commuters were returning home. Extensive damage to roadside buildings. Fatality.  
[damage to equipment]

---

**Lessons**

[None Reported]

---

8498 23 January 1995

**Source :** LLOYDS LIST

**Location :** Usinsk, Komi Republic, RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. 300 tonnes of oil was spilt from corroded pipeline.

[corrosion, spill]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location** : Komi, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. A 720 mm break in a pipeline resulted in a spill of about 300 tonnes of crude oil covering 1.5 hectares. Second incident this year.

**Lessons**

[None Reported]

---

Source : HSE NEWS RELEASE.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

During routine operations associated with a storage tank for highly active liquor, a small quantity of contaminated water, cooling water, leaked to a sump outside the tank. During subsequent recovery operations some of this contamination was flushed into a connecting trench and then to a drain which led to the outside of the building. As a result it was necessary to remove some contaminated asphalt and to decontaminate an external wall.

The incident was classified as an anomaly at level 1. Prompt recovery action was taken by the plant management to restore conditions to normal. The source of the leak is known and a programme of work has been established to prevent a recurrence.

[radioactive, storage tanks]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location** : Gardabani District, GEORGIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A 200 metre section of the 1,000 diameter gas pipeline was blown up causing disruption of gas flow.

[gas / vapour release, sabotage]

---

**Lessons**

[None Reported]

---



**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location** : Convencion, Norte de Santander Province, COLOMBIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Spillage of 7,500 bbl of crude oil following the blowing up of a 220,000 barrels per day pipeline. Repairs expected to take 2 days.  
[sabotage]

---

**Lessons**

[None Reported]

---

1023 15 January 1995

**Source** : LLOYDS LIST, 1996, JAN, 26.

**Location** : Angarsk Region, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. About 350 cum (cubic metres) of kerosene spillage from ruptured 300 mm pipeline.

---

**Lessons**

[None Reported]

---

8489 03 January 1995

Source : LLOYDS LIST, 1995, JAN, 7.

Location : Shandong Province, CHINA

Injured : 57    Dead : 10

---

**Abstract**

Transportation. A gas blast destroyed a busy road intersection as a gas pipeline ruptured. Fatality.  
[explosion]

---

**Lessons**

[None Reported]

---

**Source :** HSE NEWS RELEASE

**Location :** Hunterston, UK

**Injured :** 0      **Dead :** 0

---

**Abstract**

During pressure repair work on a reactor to seal a leaking valve flange on the low pressure feed system, the emergency feed and backup cooling system on three separate dates were isolated.

[cooling equipment]

---

**Lessons**

[None Reported]

---

124231995

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred in a high vacuum unit. The fire was caused by the melting of the body gasket of a stainless steel non-return valve in high temperature service, followed by the release of hydrocarbons above autoignition temperature.

Fortunately no one was injured in the fire and damage to equipment was limited.

An investigation into the incident revealed that the gasket of the non-return valve, provided by a stockist, was made of teflon rather than spiral-wound as specified in the requisition. Subsequent inspection showed that, in spite of a written compliance confirmation from the supplier, all non-return valves and gate valves installed during maintenance had been supplied with the wrong gaskets.

[fire - consequence, modification procedures inadequate, gas / vapour release, incorrect equipment installed]

---

**Lessons**

[None Reported]

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

Location : North Sea, UK

Injured : 0      Dead : 0

---

**Abstract**

Production was halted from this 75000 bpd production platform following storm damage to safety, pipeline and fire detection equipment. Repairs to electrical equipment on the Floating Storage Unit were disrupted, due to bad weather.  
[offshore, damage to equipment, weather effects, product loss]

---

**Lessons**

[None Reported]

---

6796 28 December 1994

Source : LLOYDS LIST, 1994, 29 DEC.

Location : Maturin; Monogas, VENEZUELA

Injured : 15    Dead : 30

---

**Abstract**

A road transportation incident. Bus collision caused it to crash into two 12 inch fuel pipelines setting off an explosion. Fatality.

---

**Lessons**

[None Reported]

---

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

Location : Gazli, UZBEKISTAN

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Flow of gas was interrupted following pipeline blast. Terrorism suspected.

[spill]

---

**Lessons**

[None Reported]

---



8451 20 December 1994

**Source** : HAZARDOUS CARGO BULLETIN, 1995, FEB.; LLOYDS LIST, 1995, JAN.

**Location** : Louisiana, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Pipeline ruptured in a river between two other rivers. 320 tonnes of gasoline spilt from 20 inch line.  
[pipeline failure, spill]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location** : Louisiana, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. 2000 barrels of gasoline escaped following a failure of a 20 inch gasoline product pipeline which runs across the USA.  
[pipeline failure, spill]

---

**Lessons**

[None Reported]

---

**Source :** SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location :** Urals, RUSSIA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Transportation. A gas pipeline rupture resulted in fire breaking out in an isolated forest region.

[fire - consequence]

---

**Lessons**

[None Reported]

---

1196219 December 1994

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A gasket failure occurred on a pipeline supplying acetone to a plant, releasing approximately 300 kilos of liquid into the workplace. The spill was contained and residual liquors collected for safe disposal.

---

**Lessons**

[None Reported]

---

8486 18 December 1994

Source : LLOYDS LIST, 1995, JAN,; HAZARDOUS CARGO BULLETIN, 1995, MAR.

Location : Tyumen Region, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Leaked oil from pipeline ignited and covered 600 sq metres of land. Power lines damaged and 43 wells closed.  
[spill, damage to equipment]

---

**Lessons**

[None Reported]

---

6791 18 December 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1994.

**Location** : Martinez; California, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Small fire in hydrocraker at a refinery resulting from gasket failure in lubricating oil system.

[fire - consequence, refining]

---

**Lessons**

[None Reported]

---

6790 16 December 1994

Source : LLOYDS LIST, 1994, 17 DEC.

Location : Binh Dinh, VIETNAM

Injured : 0      Dead : 0

---

**Abstract**

A hose from a marine tanker to a storage tank broke off causing a spill of 37000 litres of diesel into the sea.

[hose failure, material transfer]

---

**Lessons**

[None Reported]

---

6788 14 December 1994

Source : LLOYDS LIST, 1994, 31 DEC.

Location : , TURKEY

Injured : 0      Dead : 0

---

**Abstract**

Bomb explosion damaged crude oil pipeline.

[sabotage]

---

**Lessons**

[None Reported]

---



**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location** : Chechnya, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. A gas pipeline burst, reducing gas supply from Azerbaijan and cutting gas supplies industry in the Chechen capital.  
[rupture, damage to equipment]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , USA

Injured : 0      Dead : 0

---

**Abstract**

During testing of a new polyester resin reactor, a line ruptured releasing about 50 to 100 US gallons of heat transfer oil. Four employees on site were evacuated and no one was injured. The oil did not ignite but the fire department was called as a precaution.

[reactors and reaction equipment, evacuation, spill, near miss, mechanical equipment failure]

---

**Lessons**

[None Reported]

---

6783 05 December 1994

Source : LLOYDS LIST, 1994, 8 DEC.

Location : Acajutla, EL SALVADOR

Injured : 0      Dead : 0

---

**Abstract**

Blockage in pipes going to sludge separation tanks caused oil spillage and pollution to 1.5 km of beach which is severely oiled. Oil did not go into sea.  
[flow restriction]

---

**Lessons**

[None Reported]

---

6781 02 December 1994

Source : LLOYDS LIST, 1994, 3 NOV., & 12 NOV.

Location : Off New Orleans, USA

Injured : 7      Dead : 1

---

**Abstract**

Self propelling offshore drilling platform while spudding down (jacking up) hit 16 inch natural gas pipeline causing an explosion and fire. Fatality.  
[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

**Location** : Monogas, VENEZUELA

**Injured** : 0      **Dead** : 27

---

**Abstract**

A road transportation incident. A bus ploughed into two buses on the side of a mountainous road, one of which had broken down, resulting in a collision with a 12 inch oil pipeline. The ensuing fire led to fatality. Oil supply to refining centres disrupted.  
[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JAN.

**Location** : Krasnoturinsk, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Explosion, spill and fire in major natural gas pipeline in isolated area. 20 km section damaged.

[fire - consequence]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

During a plant shutdown, on an isobutene plant, a new section of pipework was connected into the wrong line. The error was disconnected during a check carried out before re-commissioning so the fault was rectified before any incident occurred.

[modification, flange, blank, pipeline, plant / property / equipment, design or procedure error, near miss]

---

**Lessons**

1. The specific modification, itself, had not been included in the overall shutdown work list. Thus a detailed "job preparation" had not been made out.
2. The wrong line was selected, and marked up, for modification by the project team personnel.
3. Plant personnel did not notice the error.
4. The workers carrying out the work did not react to the fact that they were issued with the wrong type of "blank" for fitting to the line that should have been modified.
5. The blanks issued to them fitted the wrong line.

The following recommendations were stated:

1. Plant personnel to physically check proposal mods.
  2. Full details of all mods to be specified, with supporting diagrams.
  3. Personnel to be reminded to stop and review when something unexpected arise (in this case, issue of the wrong size blanks).
-

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1995, JAN.

**Location** : Fawley; Hampshire, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Faulty coupling on loading arm at jetty caused spill of fuel oil.

[coupling failure]

---

**Lessons**

[None Reported]

---



6771 21 November 1994

**Source** : LLOYDS LIST, 1994, 22 NOV.

**Location** : Off Galveston, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

An offshore platform was towed to 18 miles south south east of galveston and put down legs onto a pipeline causing its rupture. Other report said that anchor was dragged.

[damage to equipment]

---

**Lessons**

[None Reported]

---

6765 16 November 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1994.

**Location** : Cucuta, COLOMBIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

4000 bbl of crude oil spilled into a river after bombing of a pipeline.

[terrorism]

---

**Lessons**

[None Reported]

---

6759 10 November 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1994.

**Location** : Krasnoturinsk; Yekateringburg, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Leak in pipeline caused a fire and explosion and damaged 20 km of the pipeline.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6756 07 November 1994

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1994.

Location : White Tiger, VIETNAM

Injured : 0      Dead : 0

---

**Abstract**

A marine transportation incident. The anchor of a vessel damaged an undersea gas pipeline.  
[marine vessel snagged pipeline]

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1995, JAN.

**Location** : Baltimore; Maryland, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A marine transportation incident. Terminal struck by berthing vehicle, pier part submerged and pipeline cracked. 16 000 litres of oil spillage.

---

**Lessons**

[None Reported]

---

6751 02 November 1994

Source : LOYDS LIST, 1994, 5 NOV.

Location : Karachi, PAKISTAN

Injured : 0      Dead : 0

---

**Abstract**

Crude oil pipeline ruptured, causing a spill, when workers were digging close to it and hit it with a pick axe of a digger.  
[drilling/digging/ploughing vehicles]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Catalytic cracker vapour line deformation. During start-up of the reduced crude conversion unit (a heavy oil cracker), the reactor vapour line was heated up to a temperature sufficient to ignite coke in the line, resulting in overheating and deformation of the line. There was damage to equipment. It was found that the line was heated beyond its maximum capability. The cause was due to inadequate instructions, concerning operating limits, in the start-up procedure for the operators. In addition an air line heater outlet temperature indicator was not properly calibrated to read above the maximum allowable temperature.

[faulty instructions, cracking]

---

**Lessons**

Start-up procedures should include consequences of deviation as well as procedural steps to take to control temperatures and quench the reactor.

---

6741 24 October 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1994.

**Location** : Serpukhov, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Natural gas pipeline damaged by explosion.

---

**Lessons**

[None Reported]

---



**Source :** NEWSGRID

**Location :** Houston; Texas, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

Debris coming down a swollen river caused 3 breaks that spewed about 1.2 million gallon of gasoline and oil into the burning river. Probably 5 pipelines ruptured.

[spill, explosion, fire - consequence, flood]

---

**Lessons**

[None Reported]

---

**6739 21 October 1994**

**Source :** LLOYDS LIST, 1994, 22 OCT., 25 OCT, & 4 NOV.

**Location :** San Jancinto River; Houston; Texas, USA

**Injured :** 0      **Dead :** 0

---

**Abstract**

A 40 inch gasoline pipeline ruptured in morning and a 36 inch fuel oil pipeline shortly afterwards. Fire burnt out. Failure of pipeline believed to be due to flood water loosening anchor points or heavy object released by flood striking pipeline.

[spill]

---

**Lessons**

[None Reported]

---

8488 21 October 1994

Source : LLOYDS LIST, 1995, JAN, 7.

Location : Texas, USA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Pipeline ruptured during floods was restarted at end of December.

[weather effects]

---

**Lessons**

[None Reported]

---

6733 19 October 1994

Source : OIL & GAS JOURNAL, 1994, 26 DEC., 27.

Location : Torrance; California, USA

Injured : 21    Dead : 0

---

**Abstract**

LPG pipeline was being brought back on line after maintenance work when there was a leak at a flange which ignited.

[flange leak, fire - consequence, start-up, inspection inadequate]

---

**Lessons**

[None Reported]

---

6727 14 October 1994

**Source** : LLOYDS LIST, 1994, 8 NOV, & 19 NOV.

**Location** : Vung Tau, VIETNAM

**Injured** : 0      **Dead** : 0

---

**Abstract**

An anchor of a vessel damaged a 67 mile undersea gas pipeline. Rupture occurred between 14th and 22nd october.  
[marine vessel snagged pipeline]

---

**Lessons**

[None Reported]

---

6713 01 October 1994

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, NOV.

**Location** : Athens, GREECE

**Injured** : 0      **Dead** : 0

---

**Abstract**

Products marine tanker damaged pipeline after loading at a refinery. Causing a spill of 500 tonnes of oil into the sea.  
[damage to equipment]

---

**Lessons**

[None Reported]

---

6711 October 1994

**Source** : LLOYDS LIST, 1994, 25 OCT., 27 OCT., 28 OCT., 5 DEC., & 27 DEC.

**Location** : Usinsk Area, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Major pipeline ruptured, due to corrosion, causing a spill of crude oil over 14400 sq m area. 120 000 tonnes of oil spilt over tundra causing river pollution.

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Thermowell failures in de-bottlenecked unit. Following a number of failures over a period of 2 years, a design review of existing thermowells in all process units was undertaken. All of the failures occurred at the base of the thermowell stem at its junction with the mounting flange. Equipment failure could result in material release, fire and injuries. Parts of the thermowell and temperature element could also be ejected into the plant as projectiles which could further damage or injure personnel. The basic cause was vibrations from modified process which caused thermowell to resonate at its vortex shedding frequency to ultimate failure. Inadequate assessment of structural adequacy under new operating conditions. There was also inadequate monitoring of thermowells operating in a new environment.

[mechanical equipment failure]

---

**Lessons**

Thermowells must be checked for potential resonance under new operating conditions. Locations and nozzle arrangements, element types, changed thermal response characteristics, and transient and alternative operating conditions should also be considered.

---



Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.; LLOYDS LIST, 1994, 12 OCT.

Location : Toledo, USA

Injured : 0      Dead : 0

---

**Abstract**

A spill of 63000 gallons of asphalt occurred when transferring from barge to inland storage tank. A weld had split in the underground pipeline contaminating ground and drains and then a river. 4200 gallons (other report 24000 gallons) solidified in river bed.  
[material transfer, weld failure]

---

**Lessons**

[None Reported]

---

**6703 21 September 1994**

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.; TASS, 1994, 21 SEP.; LLOYDS LIST, 1994, 22 SEP.

**Location** : Lisichansk, UKRAINE

**Injured** : 10    **Dead** : 3

---

**Abstract**

A blocked coil or pipe in a furnace caused 5 explosions and a large fire at this oil refinery. Fatality.

[fire - consequence, refining]

---

**Lessons**

[None Reported]

---

6700 16 September 1994

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.

**Location** : Chao Phya River; Bangkok, THAILAND

**Injured** : 4      **Dead** : 1

---

**Abstract**

Explosion after pipe leaked during loading of ethyl alcohol to a marine tanker. Lighter destroyed. Fatality.

---

**Lessons**

[None Reported]

---

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.

**Location** : Usink; Komi, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. Series of leaks in badly corroded pipeline led to a spill of crude oil and pollution.

[corrosion]

---

**Lessons**

[None Reported]

---

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.; LLOYDS LIST, 1994, 8 NOV.

Location : , HONOLULU

Injured : 0      Dead : 0

---

**Abstract**

A man in charge of monitoring fuel oil transfer via a pipe to a barge left his post and barge overflowed spilling 1300 gallons into harbour.  
[material transfer, pollution, operator error, marine transport]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

**Location** : Ellesmere Port, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Dowtherm escaped from a leaking flange in heating equipment on a dye plant. No damage.

[spill]

---

**Lessons**

[None Reported]

---

6686 05 September 1994

Source : LLOYDS LIST, 1994, 9 SEP.

Location : North Sea, NORWAY

Injured : 0      Dead : 0

---

**Abstract**

Oil leaks reported from cracked crude oil pipeline.

[spill]

---

**Lessons**

[None Reported]

---

6679 28 August 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.; LLOYDS LIST, 1994, 30 AUG.

Location : Pugachev, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

A rupture of a 41 inch crude oil pipeline caused 1000 ton of oil to be sprayed into a ravine and field.

[spill]

---

**Lessons**

[None Reported]

---



Source : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

Location : Grangemouth, UK

Injured : 0      Dead : 0

### Abstract

At 05.00 hrs. on April 8, 1994, a leak on the main fractionator column of this crude distillation unit at a refinery resulted in a fire and shutdown of the unit. At the time of the incident the unit was in the process of starting up after a short shutdown. Feed had previously been removed from the unit at 02.00 hrs. on April 5 and the unit put on warm circulation. This was to repair leaking tubes in the kero/stabilizer feed exchangers. Since the shut-down was as the result of a conscious decision to carry out maintenance work, temperatures were reduced relatively slowly when the unit was taken off-stream. Similarly, during the start-up process temperatures were brought up again relatively slowly. At the time of the incident the unit had just been streamed, with base stripping steam in commission, and the fired heater almost up to normal operating temperature.

Taken from data in the PI computer system, it appears that conditions in the column were steady before the incident. The only difficulty reported by the operator was difficulty picking up flow on the bottom pump-around, which was confirmed by PI data which showed irregular flow through the flow controller. Two peaks of large flow (for this stage of the start-up) were indicated at 05.10 and 05.13 hrs., close to the time of the incident. At 05.10 hrs. the temperature of the pump-around was 15 degrees C, rising to 50 degrees C over the next few minutes. The majority of the material entering the column at this time would have been around 15 degrees C. The temperature of that section of the column was 267 degrees C. Operators reported that irregular flow from the bottom pump-around is not unusual.

A few minutes before the incident, when checking the repaired kero exchangers, an operator noticed a cloud of vapour coming from the direction the main fractionator. Initially he thought it was a steam leak, but on investigation, suspected it was hydrocarbon vapour. As he moved to further investigate, the vapour ignited. The operator immediately informed the operator, who activated the plant Emergency Shutdown System (ESD), and contacted the fire service.

The seat of the fire was at the location of nozzles N7, 8, 15, and 15A, located at platform 9 of the column.

An inquiry found that the operators were following normal start-up procedures; and that, from log books, it appears that the correct sequence of actions was followed. The PIB (Plant Inspection Branch) report indicates that the vapour leak probably came initially from the 6 inch blanked nozzle N8, as indicated by fire markings on the column, supported by the fact that the flange showed significant leakage when tested subsequent to the incident, with the column under a nitrogen blanket. Another flange, N7, also showed slight leakage; but this could have been caused by radiant heat from the fire at the N8 flange. PIB confirm that the materials used for the flange joints were suitable for the duty, and that the gaskets and bolts appeared to have been correctly fitted.

During inspection of the main fractionator column, the inquiry team noticed that redundant HGO pipework was not adequately supported; e.g., one of the HGO lines which terminates at a block valve at platform 8 (the level below the fire) was lashed with wire to the platform above and further supported by a block of wood resting on platform 8. It is believed that the fire caused the lashing to relax; and the additional weight of the pipework on to platform 8 caused, or contributed to, the platform distortion which occurred.

[fire - consequence, flange, nozzle, material of construction failure, leak, gas / vapour release, start-up]

### Lessons

Recommendations:

1. Operating procedures for the unit start-up should be amended, to minimize fluctuations of flow during the initial introduction of cold material from the bottom pump-around system.
2. Refinery guidelines should be issued regarding routine checking of flanges (particularly those at high level) during normal operation and unit start-ups. Checks to be recorded.
3. The refinery should review their present capability to deal with high level fires and the risk represented, and determine whether facilities should be upgraded.
4. Redundant HGO pipework on the unit should be properly supported.

Lessons:

The incident also demonstrated the difficulties in fighting fires located at an elevated location on processing units, with the need for pre-planning on simulated fire situations to assess adequacy of fire fighting equipment, fixed and mobile.

Processing plant operating procedures should be the subject of regular review to ensure that thermal shocks to equipment are minimized at every point in procedures.

Redundant equipment/pipework on plant is best removed completely; if not, it must be adequately supported.

Operator routine walks through plants should include checking for flange leaks, especially during condition changes, also during dramatic weather condition changes; e.g., heavy rain may produce thermal stress on hot flanges sufficient to cause relaxation.

6665 15 August 1994

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.; LLOYDS LIST, 1994, 18 AUG, & 24 AUG.

**Location** : Baton Rouge; Louisiana, USA

**Injured** : 4      **Dead** : 0

---

**Abstract**

Explosion on a marine transport barge of toluene led to a fire at the hall buck marine terminal. Lack of an earth on the flexible hose probably ignited flammable vapours during cleaning of the barge.

[lack of earthing, static, fire - consequence]

---

**Lessons**

[None Reported]

---

6658 08 August 1994

**Source** : LLOYDS LIST, 1994, 12 AUG., & 25 AUG.

**Location** : Balmoral Platform; North Sea, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Spillage of 1.8 tonnes of crude oil seen on surface around offshore platform. Leakage identified as from rubber hose on seabed.  
[hose failure]

---

**Lessons**

[None Reported]

---

6649 05 August 1994

Source : CIVIL PROTECTION, 1994, AUTUMN.; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994 OCT.

Location : Avonmouth, UK

Injured : 1      Dead : 1

---

**Abstract**

A port worker was killed in a fire at a fuel pipeline at dock. Fire spread to Kerosene in tanks at the storage depot and burned for 18 hours. Fatality.  
[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source :** ICHEME**Location :** ,**Injured :** 0     **Dead :** 0

---

**Abstract**

Fire at crude unit pump on a refinery. During flushing of the coil in a cooler box, a coupling associated with a temporary pump installation, failed, and resulted in release of LGO. A fire started before any action could be taken to stop the release. There was damage to equipment and product loss. It was found that previous attempts to use the pump had resulted in failure, these were repaired but not reported. The cause was the pump being run beyond its design capabilities. In addition the maintenance leader had no intimate knowledge of the equipment to be used consequently inadequate instruction was provided, suppliers were aware that this equipment had not been used on this duty before on a "live" process unit; but they did not discuss this aspect.

[coupling failure, design or procedure error, fire - consequence, refining, temporary equipment]

---

**Lessons**

Use of temporary equipment (such as pumps) needs careful consideration and approval as to its design, suitability, and any risk it could present as a potential ignition source.

---

Source : ENDS REPORT, 1996, JUN.

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

Gas oil mist released from a temporary pump caught fire after coming into a contact with a pipe at 300 degrees C. The damage was estimated at £750,000 (1994) and cost £2,000,000 (1994) in lost production.

[fire - consequence, damage to equipment, product loss, hot surface]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A fire occurred on an absorber tower piping. After an equipment modification, there was a severe surge created, with major vibration. Flange leaks, loss of containment, and fire followed. There was damage to equipment. It was found that the control valve was oversized which led to surge condition within piping.

The basic cause was that the management of change system did not require engineering specialist reviews for control valve changes.

[maintenance inadequate, fire - consequence, management system inadequate]

---

**Lessons**

Management of change processes should include clear requirements for the various types of equipment, and, as a minimum, should cover the following: pertinent documentation, relevant calculations, and special reviews by engineering.

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

**Abstract**

A leak of 500 kg of (CS<sub>2</sub>) from a flange in a pump house into a water filled containment sump over a period of time. Detector systems alarmed and the leak was contained. The area was hosed down following the leak and a pipe fitter stripped down the pipe upstream of a CS<sub>2</sub> metering station, once the system had been isolated. A 1 inch flange gasket was found to be in very poor condition and replaced. Production restarted but within a matter of hours a second meter station flange developed a similar leak. The system was cleaned down and all flanges in the metering station pipework had new gaskets installed as a precaution. Subsequent investigation showed that the meter station filters had been replaced 6 days before the incident, which involves replacing the gaskets. The correct gasket was specified for the duty. Further investigate showed that the suppliers supplied acid specification gaskets instead of acidit gaskets. These were of a lower specification not suitable for CS<sub>2</sub> duties. This fault was not picked up by the site prior to fitting.

[gasket failure, spill, installation inadequate, maintenance]

---

**Lessons**

Improvement required in goods inwards procedures to confirm that correct materials have been supplied as ordered.

---



**Source :** LLOYDS LIST, 1994, 25 JUL., 26 JUL., 27 JUL., 28 JUL., & 30 JUL.; THE GUARDIAN, 1994, 25 & 26 JUL.; OIL AND GAS JOURNAL; 1994, 1 AUG.; THE CHEMICAL ENGINEER, 1994, 11 AUG.; PROCESS ENGINEERING, 1994, OCT.; THE EXPLOSION AND FIRE AT THE TEXACO REFINERY..., HEALTH AND SAFETY EXECUTIVE, 1997, ISBN 0717614131.; LOSS PREVENTION BULLETIN, 138, 3-10.

**Location :** Milford Haven; Dyfed, UK

**Injured :** 26    **Dead :** 0

### Abstract

On Sunday 24 July at 13:23 an explosion, followed by a number of fires, occurred at a cracking plant on a refinery. The series of the events that led to the explosion can be traced to a severe electrical storm prior to 9:00 am, which caused plant disturbances which affected the vacuum distillation, alkylation, and butamer units as well as the Fluid Catalytic Cracker Unit (FCCU). A fire resulted from a lightning strike in the crude distillation unit that provided feed to the cracking units. This unit was then shut down, with all but the FCCU being shut down during the remainder of the morning. However, the direct cause of the explosion that occurred some five hours later was a combination of failures in management, equipment and control systems during the plant upset. These led to the release of about 20 tonnes of flammable hydrocarbons from the outlet pipe of the flare knock-out drum of the FCCU. The explosion caused a major hydrocarbon fire at the flare drum outlet itself and a number of secondary fires. The company emergency response team and the county fire brigade effectively contained these fires and prevented escalation by cooling nearby vessels that contained flammable liquids. Fires were allowed to burn, under the supervision of the fire brigade, for over forty eight hours. This being the safest course of action as the flare relief system had been incapacitated by the explosion.

The incident was caused by flammable hydrocarbon liquid being continuously pumped into a process vessel that had its outlet closed. The only means of escape for this hydrocarbon once the vessel was full was through the pressure relief system and then to the flare line. The flare system was not designed to cope with this excursion from normal operation and failed at an outlet pipe. The outlet pipe was known to be corroded, however the investigation concluded that as the line was not designed for liquid transfer, and as such would most probably have failed regardless of condition. This released 20 tonnes of a mixture of hydrocarbon liquid and vapour which subsequently exploded.

The situation was caused by a combination of events, including:

1. a control valve being shut when the control system indicated it was open;
  - This was due to poor control room displays.
2. a which had been carried out without assessing all the consequences;
  - The knock-out drum was altered from pumping to slops automatically, to recycle and manual pumping to slops. This modification was carried out for environmental and efficiency reasons, and had the effect of altering an automatic plant protection system to a manual system.
3. control panel graphics that did not provide necessary process overviews;
  - Again due to poor control room displays, and poor alarm management.
4. attempts were made to keep the unit running when it should have been shut down.

[gas / vapour release, spill, management system inadequate]

### Lessons

The official report makes 14 recommendations which are split into five headings:

#### Safety management systems

1. Safety management systems should include means of storing, retrieving and reviewing incident information from the history of similar plants.
2. Safety management systems should have a component that monitors their own effectiveness.

#### Human factors

3. Display systems should be configured to provide an overview of the condition of the process including, where appropriate, mass and volumetric balance summaries.
4. Operators should know how to carry out simple volumetric and mass balance checks whenever level or flow problems are experienced within a unit.
5. The training of staff should include:
  - (a) assessment of their knowledge and competence for their actual operational roles under high stress conditions;
  - (b) clear guidance on when to initiate controlled or emergency shutdowns, and how to manage unplanned events including working effectively under the stress of an incident.

#### Plant design

6. The use and configuration of alarms should be such that:
  - safety critical alarms, including those for flare systems, are distinguishable from other operational alarms; alarms are limited to the number that an operator can effectively monitor; and ultimate plant safety should not rely on operator response to a control system alarm.
7. Safety-critical plant elements on which the safety of a process relies, ie whose failure could lead to hazardous events, should be identified. Any safety system used to protect against hazardous events should be specified, and subsequently designed, based on an appropriate hazard and risk analysis so that the functions to be carried out and the necessary level of integrity are systematically determined.
8. In new build, or re-equipment, projects and in reviews of existing plant layouts, a risk assessment should be carried out with regard to the location, and suitability of construction, of buildings and plant.
9. In processes that employ a flare system, there should be effective arrangements for the removal of slops from a flare knock-out drum that ensure that the removal is promptly initiated and at an adequate rate to prevent overfilling the drum.

#### Plant modification

10. There should be a formal, controlled procedure for hazard identification and operability analysis for modifications (including emergency modifications) that ensures that all safety issues identified at the design stage are reflected in how the modification is constructed and used.

#### Inspection systems

11. All safety critical parts of plant should be included by companies in comprehensive inspection programmes.
12. Inspection programmes for corrosion should err on the side of caution, with regard to the number and location of measurement sample points, concentrating on measurement sample points where greater (or less uniform) metal loss is foreseeable.
13. All foreseeable operational conditions, not just pressure, should be taken into account when setting the minimum acceptable thickness for pipe and vessel walls.

#### Emergency planning

14. Fire brigades, in consultation with appropriate major hazard installations, would be wise to look at emergency plans particularly in respect of the availability of adequate water supplies for fire-fighting and vessel cooling, to deal with the worst case scenario.

Source : ICHEME

Location : , UK

Injured : 2      Dead : 0

---

**Abstract**

A fire occurred when a hydrogenation reactor was being prepared for operation after a routine regeneration. The fire occurred when gas escaped as a flange was being unbolted to remove a blank on the process inlet line. The fire burned for one minute before being extinguished, either by the efforts of the personnel on the spot or when it ran out of fuel, it is not clear which. One man was burned on the arm, face and neck. He was treated in hospital and sent home after an hour, returning to work six weeks after the incident. A second man suffered from the effects of either smoke or extinguisher powder inhalation. He was treated on site and returned to work immediately. Some signal cables suffered external charring but were still functional.

The internal enquiry blamed failure of the normal purging procedures to eliminate all residual hydrocarbon. It was not clear whether this material was on the reactor or feed manifold side of the blank. On balance the reactor side was thought more likely as that material would have been richer in hydrogen and hence easier to ignite. On the other hand leaking 14 inch valves on the manifold side were cited as a possible cause.

Immediate improvements in the purging procedure were implemented to eliminate the possibility of residual hydrocarbon on both sides of all blanks.

Improvements in the dismantling procedure were also made. In the long term changing to double block and bleed to eliminate the need for dismantling flanges was recommended. As an interim measure the pipework was altered to allow more direct purging to flare.

[fire - consequence, reactors and reaction equipment, leak, burns, maintenance, design or procedure error]

---

**Lessons**

1. The existing procedures for purging to remove hydrocarbon were inadequate on both sides of the blank being removed.
  2. The dismantling procedure was also in need of improving to reduce the risk of fire.
  3. The reliance on dismantling and fitting and removing blanks was in itself less desirable than a permanently installed double block and bleed system for carrying out the regeneration.
-

6631 15 July 1994

**Source** : LLOYDS LIST, 1994, 3 AUG.

**Location** : Laguna De Bay, PHILIPPINES

**Injured** : 0      **Dead** : 0

---

**Abstract**

7000 barrels of oil spilled from a broken tanker fuel hose at a power plant.

[material transfer]

---

**Lessons**

[None Reported]

---

6626 11 July 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER 3RD QUARTER, 1994.

**Location** : Agdeya, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A high pressure natural gas pipeline explosion burnt for 16 hours

---

**Lessons**

[None Reported]

---

6625 10 July 1994

**Source** : CHEMICAL HAZARDS IN INDUSTRY, 1994, OCT.

**Location** : Delfzijl, NETHERLANDS

**Injured** : 0      **Dead** : 0

---

**Abstract**

Methanol plant seriously damaged by fire after a natural gas pipeline leaked and ignited.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6624 09 July 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

**Location** : Pt Arun, INDONESIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Plant shutdown following a break in a pipeline leading to liquefied natural gas (LNG) plant.

[gas / vapour release]

---

**Lessons**

[None Reported]

---

6619 06 July 1994

**Source** : ENDS REPORT, 1994, AUG.

**Location** : Runcorn; Merseyside, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Substantial leak of vinyl chloride monomer (VCM) occurred during the unloading of a road tanker. A vapour lock in the coupling arrangement interrupted the unloading and the operator opened a valve to release the blockage. The valve was not closed once the vapour lock was cleared and the release continued for an hour. 5 tonnes of VCM released.

[gas / vapour release]

---

**Lessons**

[None Reported]

---

6618 05 July 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

**Location** : Antwerp, BELGIUM

**Injured** : 0      **Dead** : 0

---

**Abstract**

A marine transportation incident. An LPG marine tanker destroyed a jetty during berthing and damaged pipelines. Gas escaped but did not ignite.  
[collision, damage to equipment]

---

**Lessons**

[None Reported]

---



6614 01 July 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

**Location** : Mississippi River, USA

**Injured** : 2      **Dead** : 1

---

**Abstract**

Drilling barge spudded down and ruptured natural gas pipeline. Fatality.

---

**Lessons**

[None Reported]

---

6616 01 July 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

**Location** : Laguna Bay, PHILIPPINES

**Injured** : 0      **Dead** : 0

---

**Abstract**

Hose broke at a fuel storage tank at a power plant. 950 tonnes of fuel oil were spilled into catchment area.

---

**Lessons**

[None Reported]

---

Source : OIL AND GAS JOURNAL, 1995, JUL, 10.

Location : Komi, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

Transportation. Persistent leaks in the 32 mile pipeline of crude oil into the creeks and rivers has been aggravated by rains. About 580,000 bbl of oil has been spilt. The failure of the 20 year old pipeline was likely caused by poor foundations, inadequate pressure control, substandard water crossings and progressive internal corrosion.

[pipeline failure, pollution]

---

**Lessons**

[None Reported]

---

6606 27 June 1994

**Source** : LLOYDS LIST, 1994, 30 JUN.

**Location** : Bastian Bay; Louisiana, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A natural gas pipeline rupture and caught fire.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6602 24 June 1994

**Source** : LLOYDS LIST, 1994, 29 JUN.

**Location** : Acajutla, EL SALVADOR

**Injured** : 0      **Dead** : 0

---

**Abstract**

Crude oil spill off pacific coast near refinery from 24 inch pipeline while it was being used.

---

**Lessons**

[None Reported]

---

6598 22 June 1994

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, AUG.

**Location** : Tatarstan, RUSSIA

**Injured** : 3      **Dead** : 8

---

**Abstract**

Helicopter surveying gas pipeline crashed after engine fire. Fatality.

---

**Lessons**

[None Reported]

---

6595 18 June 1994

Source : ICHEME

Location : , USA

Injured : 65    Dead : 0

---

**Abstract**

During unloading of trichlorosilane a pipe broke and aerial humidity ignited the material which reacts strongly with water. Led to the evacuation of thousands of people.

[unwanted chemical reaction]

---

**Lessons**

[None Reported]

---

6588 11 June 1994

Source : LLOYDS LIST, 1994, 15 JUN.

Location : , BAHAMAS

Injured : 0      Dead : 0

---

**Abstract**

Oil leak from underground 42 inch pipeline buried 8 ft.

[spill]

---

**Lessons**

[None Reported]

---



6586 07 June 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

**Location** : North Sea, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

An offshore platform was shutdown following discovery of an oil leak on the oily drain system.

[spill]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

A fire and fatalities occurred at crude unit on a refinery. During major overhaul work, a fire developed in the main fractionating tower. It was found that there was inadequate isolation and hydrocarbon freeing of tower prior to hot work, and the approval to carry out work in tower was granted without knowledge of hot work to be performed. After investigation it was found that the hot work was authorised because the agent did not recognise the liquid in pipeline as gas oil, he was also unaware that absence of explosive atmosphere did not mean hydrocarbon free. In addition. Inadequate work planning, matching of experience with task, no knowledge of work being simultaneously carried out also contributed to this accident. Fatality.

[operator error, fire - consequence, testing inadequate, refining]

---

**Lessons**

1. Testing and inspection of equipment must encompass checks for materials which could produce flammable/toxic vapours upon heating, or other hazards such as pyrophoric deposits or lack of oxygen.
  2. Gas testers and those involved in issuing permits must have sufficient technical background to understand the complexities of ensuring safe permit conditions, especially when entry and hot work is involved.
-

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

**Location** : Pasadena; Texas, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A small fire broke out on oil soaked insulation in a delayed coker unit.

[lagging fire, processing]

---

**Lessons**

[None Reported]

---

6557 17 May 1994

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JUL.

**Location** : Caraguat Atuba, BRAZIL

**Injured** : 0      **Dead** : 0

---

**Abstract**

Spillage of 34000 litres of gasoline at a beach resort pumping station. Accident occurred as pipeline system was being pressurised.

---

**Lessons**

[None Reported]

---

6555 15 May 1994

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JUL.; LLOYDS LIST, 1994, 25 MAY.

**Location** : Sao Sebastiao, BRAZIL

**Injured** : 0      **Dead** : 0

---

**Abstract**

Spillage of crude oil from a pipeline caused pollution of several beaches. 2700 tonnes leaked.

---

**Lessons**

[None Reported]

---

6548 10 May 1994

**Source** : LLOYDS LIST, 1994, 19 MAY.

**Location** : Regina; Saskatchewan, CANADA

**Injured** : 0      **Dead** : 0

---

**Abstract**

An explosion damaged a 12 inch liquid ethane pipeline.

---

**Lessons**

[None Reported]

---

6538 07 May 1994

**Source** : LLOYDS LIST, 1994, 9 MAY.; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JUL.

**Location** : Belayarsk, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire at nuclear power plant leaked non-radioactive sodium into the atmosphere when a safety relief valve malfunctioned during maintenance.  
[fire - consequence, valve failure]

---

**Lessons**

[None Reported]

---

6534 05 May 1994

**Source** : LLOYDS LIST, 1994, 20 MAY., & 25 MAY.

**Location** : Cano Limon, COLUMBIA

**Injured** : 3      **Dead** : 0

---

**Abstract**

Fire in crude oil pipeline pumping station.

[fire - consequence]

---

**Lessons**

[None Reported]

---



6528 01 May 1994

**Source** : LLOYDS LIST, 1994, 5 MAY.

**Location** : Cristobal, PANAMA

**Injured** : 0      **Dead** : 0

---

**Abstract**

During the unloading of fuel oil from a marine tanker a spill of 1400 barrels occurred due to a valve failure. A further 400 barrels were spilt when the flexible hose failed.

[hose failure]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Total refinery power supply failure. All external electrical power supply was cut from the duplicate feeders to the refinery, resulting in an of all process units. It was found that there had been unauthorised switching of electric power. It is not clear why the unauthorised switching of electric power was allowed to take. Had there been adequate leadership/supervision, this event would not have occurred. An independent air supply would have enabled steam generation until emergency power was available.

[safety procedures inadequate, refining]

---

**Lessons**

Sites need to be aware that, even with two separate electrical feeders, power can still be lost from circumstances beyond their control.

Alternative instrument air supplies back up for essential users should be available.

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

Dock transfer line ruptures. During transfer of product at a product loading dock, a 16 inch crude oil line ruptured. There was damage to equipment, product loss, environmental damage, release to soil and water, cost of clean-up. Product expansion caused the pipeline to rupture. The basic cause was inadequate communications, including lack of written procedures. In addition the operator lacked facility knowledge.

[human causes]

---

**Lessons**

Well written procedures as well as knowledgeable operators are critical to safe conduct of any task.

---

Source : ICHEME

Location : , UK

Injured : 0      Dead : 0

---

### Abstract

A leak occurred at the base of a debutaniser into the skirt of the column and subsequently overflowed into the plant sump. The leak resulted in the loss of 4.5 tonnes of polymer and approximately 2.5 kg of raffinate. The plant was immediately shutdown and the butane content of the column was pumped to storage. The factory fire service was called, but was not needed. There were no injuries, but the plant was shut down for 8 days. Although attempts were made to recover the polymer from the sump, some was found in the effluent outlet, such that the consent limit of 30 ppm oil would have been exceeded. The investigation into the incident showed that:

1. The site of the leak was a corroded 2 inch NB nozzle at the base of the column. The nozzle was a dead leg with no flow.
2. The corrosion was probably the result of condensate lying in the nozzle for 3-4 month periods between plant wash out.
3. Severe thinning had occurred at the interface between the polymer and the condensate.
4. A failure had occurred on a dead leg nozzle on a reboiler recirculation pump some months earlier. However, this nozzle had not been recognised as being vulnerable to the same type of failure.

[normal operations, plant shutdown]

---

### Lessons

In addition to various repairs, inspections and stress calculations on the column, the following actions were taken:

1. The corrosion mechanism was to be investigated by the Company Metallurgist.
  2. The Plant Wash operating instructions were to be updated to cover the draining of dead legs to show they are free of condensate.
  3. When a scheme of examination is set up for a plant item, previous inspection reports should first be reviewed.
  4. The drainage route for the plant effluent should be reviewed.
  5. Some alterations to the Emergency Response Procedures were recommended for further consideration.
-

6522 23 April 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

**Location** : Viljoensdrift, SOUTH AFRICA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Bomb attack on a diesel pipeline. Explosion led to a fire that blazed for 5 hours.

[fire - consequence, sabotage]

---

**Lessons**

[None Reported]

---

6520 21 April 1994

**Source** : LLOYDS LIST, 1994, 25 APR.

**Location** : Sasolburg; Johannesburg, SOUTH AFRICA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Explosion blasted a diesel oil pipeline. Cause terrorism.

---

**Lessons**

[None Reported]

---

6514 17 April 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

**Location** : Saratov, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Explosion ruptured a natural gas pipeline fire followed.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6512 16 April 1994

**Source** : LLOYDS LIST, 1994, 18 APR.

**Location** : Cork Harbour, IRELAND

**Injured** : 0      **Dead** : 0

---

**Abstract**

Natural gas pipeline damaged by vessel which dragged pipeline 25 m across the seabed. Possibly caused by an anchor.  
[marine vessel snagged pipeline, damage to equipment]

---

**Lessons**

[None Reported]

---



6506 14 April 1994

**Source** : LLOYDS LIST, 1994, 16 APR.

**Location** : Brent A; North Sea, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

Mechanical problem on offshore platform well when wireline operations and ball valve became blocked, caused partial evacuation of non-essential staff. Near miss.

---

**Lessons**

[None Reported]

---

6509 14 April 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

**Location** : Monterrey, MEXICO

**Injured** : 3      **Dead** : 1

---

**Abstract**

Fire and explosion on 14 inch gasoline pipeline after thieves attempted to divert gasoline from line. Fatality.

[fire - consequence, deliberate acts]

---

**Lessons**

[None Reported]

---

**Source** : FIRE PREVENTION, 275, 1994, DEC.

**Location** : Essex, UK

**Injured** : 0      **Dead** : 0

---

**Abstract**

A company was fined £17000 (1994) for exposing its employees to fire risks during an incident when 7000 litres of highly flammable ethanol was spilled into a yard area from an open pipeline when work was being carried out to remove an area of plant at the site. The ethanol, flash point 14 degrees C, did not ignite. [near miss, safety procedures inadequate, demolition]

---

**Lessons**

[None Reported]

---

6499 09 April 1994

**Source** : LLOYDS LIST, 1994, 11 APR.

**Location** : Mesana; Gujarat State, INDIA

**Injured** : 6      **Dead** : 3

---

**Abstract**

A terrorist bomb attached to a pipe caused an explosion on this state-owned oil rig.

[terrorism, processing]

---

**Lessons**

[None Reported]

---

6496 06 April 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

**Location** : Belaya River; Bashkortostan, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Crude oil spilled from pipeline into river.

---

**Lessons**

[None Reported]

---

6494 05 April 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JUN.; LLOYDS LIST, 1994, 7 APR.

Location : Sui, PAKISTAN

Injured : 0      Dead : 0

---

**Abstract**

Fire and explosion following a leak in a pipeline between purification plant and compressor supplying natural gas from an installation. The suspected cause was overheating of the pipe.

[fire - consequence]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 1994, FEB.

**Location** : La Esmeralda; Arauquita; Arauca, COLOMBIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

A crude oil pipeline was bombed for 13th time.  
sabotage, explosion]

---

**Lessons**

[None Reported]

---

**Source :** LLOYDS LIST, 1994, 16 APR., & 18 APR.

**Location :** Amazon Jungle, PERU

**Injured :** 0      **Dead :** 0

---

**Abstract**

A spill of 3500 cum of crude oil occurred from a 24 inch pipeline. Cause of rupture was turbulent waters in the river that eroded earth around the pipeline.  
[earth movement]

---

**Lessons**

[None Reported]

---



6482 27 March 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

**Location** : Sarnia, CANADA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire followed an explosion from a leak of hydrocarbon from a pipe at a rubber plant.

[fire - consequence, processing]

---

**Lessons**

[None Reported]

---

6480 26 March 1994

**Source** : LLOYDS LIST, 1994, 28 MAR.

**Location** : Borgofranco D'ivrea, ITALY

**Injured** : 0      **Dead** : 0

---

**Abstract**

An oil pipeline sprang a leak causing the shutting of a motorway.

---

**Lessons**

[None Reported]

---

6479 24 March 1994

Source : THE CHEMICAL ENGINEER, 1994, 31 MAR.; EVENING MAIL, 1994, 25 MAR.

Location : Durham Woods; Edison; New Jersey, USA

Injured : 50    Dead : 1

---

**Abstract**

Explosion of an underground natural gas pipeline caused massive flames which were seen 50 miles away. Pipeline installed at a depth of 2.5 metres and now found to have 5-7 metres of earth covering it. 50 m crater left. An investigation revealed that the pipeline had been gouged by excavation damage. The mechanically induced gouge probably produced a crack that grew to critical size most likely as a result of metal fatigue.

Fatality.

[fire - consequence]

---

**Lessons**

Install retrospectively automatic or remotely operated isolation valves where high pressure pipelines enter and leave urban areas.

Aerial surveillance procedure inadequate as it did not require the identification of excavation activities within industrial locations.

---

6475 21 March 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

**Location** : Minas Oilfield, INDONESIA

**Injured** : 31    **Dead** : 1

---

**Abstract**

A 12 inch natural gas pipeline failed injuring passengers in a passing bus. Cause of pipeline failure was unclear.  
[fatality, injury]

---

**Lessons**

[None Reported]

---

6453 06 March 1994

**Source** : LLOYDS LIST, 1994, 1 APR.

**Location** : Ufa; Bashkortostan, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Oil spilled from a ruptured pipeline and filled nearby depressions and gullies before overflowing into a river.

---

**Lessons**

[None Reported]

---

6445 01 March 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

**Location** : River Uzh, UKRAINE

**Injured** : 0      **Dead** : 0

---

**Abstract**

Thieves damaged pipeline to steal diesel spilling 157 tonnes into a river.

[deliberate acts]

---

**Lessons**

[None Reported]

---

Source : ICHEME

Location : ,

Injured : 0      Dead : 0

---

**Abstract**

During a spading operation on a pair of exchangers, some straight run naphtha was released and ignited on hot residue exchangers located directly underneath. It was found that no checks were made after steaming to verify the system as empty. Naphtha was admitted to the pipeline from passing valves and overflowed at outlet valve onto heat exchangers below. In addition, during prolonged steaming of the system, dirt had collected and piled up in front of the outlet valve.

Losses: approximately \$24,000 (1994).

[operator error]

---

**Lessons**

Adequate drainage facilities and safe procedures need to be used to avoid spillages of oil from equipment being prepared for isolation.

---

Source : ICHEME

Location : ,

Injured : 4      Dead : 0

---

**Abstract**

Hydrofluoric acid exposures at a refinery. Upon breaking containment on a inch pipeline being replaced during turn-around, a small vapour cloud of isobutane and HF (hydrogen fluoride) (approximately one pound) was released, exposing four persons. It was found that the line was inadequately purged. The cause was inadequate procedures for ensuring that a line had been purged, and unclear instructions given to work team.

[operation inadequate, gas / vapour release, refining]

---

**Lessons**

A physical verification of purging must take place for all lines which are to undergo hot work.

---



6428 19 February 1994

Source : LLOYDS LIST, 1994, 19 MAR.; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, MAY.

Location : Wood River; St Louis, USA

Injured : 1      Dead : 1

---

**Abstract**

A short release of ammonia occurred as 2 workers were connecting a pipeline hose to an empty barge at a terminal. There was no requirement to wear breathing apparatus. Fatality.

[gas / vapour release, material transfer]

---

**Lessons**

[None Reported]

---

6425 17 February 1994

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

Location : Castleford, UK

Injured : 0      Dead : 0

---

**Abstract**

Spillage of nitrotoluene entered sewer system and ultimately the local river.

---

**Lessons**

[None Reported]

---

6423 15 February 1994

Source : LLOYDS LIST, 1994, 19 FEB.

Location : Maple Creek; Saskatchewan, CANADA

Injured : 0      Dead : 0

---

**Abstract**

Rupture of natural gas pipeline system caused a huge fireball.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6418 11 February 1994

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

Location : Ryazan, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

Major fire at refinery pipeline valve station. Substance gasoline.

[fire - consequence]

---

**Lessons**

[None Reported]

---

6417 10 February 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, APR.; LLOYDS LIST, 1994, 11 FEB.

Location : Tambov, RUSSIA

Injured : 0      Dead : 0

---

**Abstract**

A crude oil pipeline burst causing a large oil slick. 3000 tonnes of oil escaped before it was stopped. Spill covered 17 acres.

---

**Lessons**

[None Reported]

---

**6410 07 February 1994**

**Source :** LLOYDS LIST, 1994, 7 FEB., & 9 FEB.

**Location :** Sines, PORTUGAL

**Injured :** 11    **Dead :** 0

---

**Abstract**

Explosion in a furnace at a refinery caused by a build-up of gases in the refinery drainage system. Soldering work being carried out.  
[hot work]

---

**Lessons**

[None Reported]

---

6409 05 February 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, APR.; LLOYDS LIST, 1994, 7 FEB, & 8 FEB.

Location : Tabasco, MEXICO

Injured : 30    Dead : 8

---

**Abstract**

Workers were cleaning a natural gas pipeline when there was a sheet of fire 1500 ft around the site. The explosion was heard 3 miles away. The 24 inch pipeline was damaged along 60 ft. Crater 660 ft across and 23 ft deep. 500 people evacuated and some houses destroyed.  
[evacuation, fatality, fire - consequence, maintenance inadequate]

---

**Lessons**

[None Reported]

---

**6404 01 February 1994**

**Source** : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, APR.; LLOYDS LIST, 1994, 21 FEB.

**Location** : Iowa City; Iowa, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Explosion and fire shot flames 200 ft into the air from liquid propane pipeline, led to the evacuation of 6 houses.

[fire - consequence]

---

**Lessons**

[None Reported]

---



**Source :** LLOYDS LIST, 1994, 3 FEB.; THE CHEMICAL ENGINEER, 1996, 25 JUL.; ENDS REPORT NO. 229, 1994, FEB.; HAZARDOUS CARGO BULLETIN, 1994, JUN., 76.; HEALTH & SAFETY BULLETIN, 1996, SEP., 9-12.

**Location :** Ellesmere Port; Liverpool, UK

**Injured :** 4      **Dead :** 0

---

**Abstract**

A leak of ethyl chloride occurred from a recirculating pump. The release of ethyl chloride solution, hydrogen chloride and catalyst - a toxic flammable corrosive mixture - found a source of ignition and a fire raged until well into the next morning. All non-essential workers were evacuated and neighbours warned. Roads closed. The suspected cause was either corrosion of a valve or a fault on the feeding the valve. The fast release of ethylene chloride suggests sudden failure of a joint assembly.

[maintenance inadequate, evacuation, joint failure, processing]

---

**Lessons**

The following actions were taken;

1. insulation cladding on the process vessels;
  2. relocation of the reactor to separate it and possible spillages from other plant;
  3. relocation and enlargement of a run-off lagoon;
  4. reduced vessel connections below liquid level, with shut-off valves;
  5. dedicated pumps, at the point of original failure, simplifying pipework;
  6. extended cladding, level indicators, and flammable gas detectors.
-

**Source** : THE GUARDIAN, 1994, 26 OCT.

**Location** : Komi Region; West Siberia, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Transportation. A spill of 2 million barrels of oil occurred from a pipeline that suffered corrosion.

---

**Lessons**

[None Reported]

---

6401 February 1994

Source : THE CHEMICAL ENGINEER, 1994, 28 APR.

Location : Wem; Shropshire, UK

Injured : 0      Dead : 0

---

**Abstract**

During commissioning a pilot plant for recovering solvents was in the start-up stages and testing of pipework was being carried out when there was a spill of chemicals into a river. Water supplies affected. Substances involved; xylene, butyl butanoate, 2-methyl-3-hydroxy-propanoic acid, 2,4,4-trimethyl pentyl ester, dichlorobenzene, 2-ethyl-4methyl-1,3-dioxolane.

[pollution]

---

**Lessons**

[None Reported]

---

6400 31 January 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

**Location** : Cizre, TURKEY

**Injured** : 0      **Dead** : 0

---

**Abstract**

Sabotage occurred to a major crude oil pipeline close to the town. 50000 barrels of oil was spilled.

---

**Lessons**

[None Reported]

---

6392 25 January 1994

Source : LLOYDS LIST, 1994, 11 FEB.

Location : Whiting; Indiana, USA

Injured : 0      Dead : 0

---

**Abstract**

3 fires in the space of 17 hours knocked out production. Severe weather conditions caused freezing of pipes and subsequent cracking of pipes.  
[weather effects, fire - consequence, processing]

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

**Location** : Pernis, NETHERLANDS

**Injured** : 0      **Dead** : 0

---

**Abstract**

Fire occurred in furnace following a pipe leakage.

[fire - consequence, processing]

---

**Lessons**

[None Reported]

---

6386 18 January 1994

Source : LLOYDS LIST, 1994, 11 FEB.

Location : Cushing; Oklahoma, USA

Injured : 0      Dead : 0

---

**Abstract**

The support rigging of a crude oil pipeline collapsed allowing the pipeline to crash into river bank bending the structure. The pipeline was undergoing maintenance at the time to replace anchoring apparatus connecting the lines support towers to a suspension bridge which traverses the river. Repair to take 14 days. No spillage reported.

[damage to equipment]

---

**Lessons**

[None Reported]

---

6384 18 January 1994

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

**Location** : Cesar, COLOMBIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Crude oil pipeline sabotaged and around 5000 barrels of oil were spilled and subsequently ignited.

[fire - consequence]

---

**Lessons**

[None Reported]

---



**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

**Location** : Los Angeles; California, USA

**Injured** : 1      **Dead** : 0

---

**Abstract**

Four breaks occurred in a 10 inch crude oil pipeline system causing a spill leading to pollution and property damage following an earthquake. The pipeline was not in operation at the time but company spending \$20 million (1994) on clean up. Pipeline may not be used again.

---

**Lessons**

[None Reported]

---

6376 09 January 1994

Source : LLOYDS LIST, 1994, 12 DEC.; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, MAR.

Location : Suez, EGYPT

Injured : 0      Dead : 0

---

**Abstract**

Shore flexible hose coupling slipped and parted at berth during cargo unloading from marine tanker. Some vegetable oil was spilled into the water.

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 1st QUARTER, 1994.

**Location** : Richmond, USA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Pipeline carrying products to local terminals leaked causing a spill of 3000 gallons of gasoline.

---

**Lessons**

[None Reported]

---

**Source** : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

**Location** : Kemerovo Oblast, RUSSIA

**Injured** : 0      **Dead** : 0

---

**Abstract**

Major leak of aniline at dye manufacturer caused pollution of river through the drainage system.

[processing]

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**Lessons**

[None Reported]

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