

Source : CNN.COM NEWS, DECEMBER 17, 2000, (<http://www.cnn.com>).

Location : Oshkosh, Wisconsin, USA

Injured : 4 Dead : 0

Abstract

A rail transportation incident. A fire occurred onboard and box car containing sodium hydrosulphite. Nearby residents were evacuated.

Sodium hydrosulphite is highly flammable that can heat and ignite in the presence of moisture and air.

Four people were affected by fumes.

[fire - consequence, gas / vapour release]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, NOVEMBER 5, 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 : Sonora, Texas, USA

Injured : 6 **Dead :** 0

Abstract

A fire and several explosions occurred at a chemical warehouse when lightning struck an electrical transformer during a thunderstorm. The warehouse stored methanol, cleaning solvents and other hazardous chemicals. Nearby residents were evacuated as a precaution from toxic smoke being released to atmosphere. The building was completely destroyed in the fire.

[fire - consequence, warehousing, evacuation, gas / vapour release, injury]

Lessons

[None Reported]

Source : BBC NEWS, 31 OCTOBER, 2000, 1 NOVEMBER, 2000, (<http://www.bbc.co.uk>).; CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 31 OCTOBER, 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 : English Channel, Off Alderney,

Injured : 0 **Dead :** 0

Abstract

A marine transportation incident. A marine tanker containing mainly styrene, a colourless, clear, odourless toxic liquid, sank in gale force winds after running aground. Other materials onboard included isopropanol, alcohol and methyl ethyl ketone. Fourteen crewmembers were winched to safety onboard a helicopter. It has been reported that styrene had been seen leaking from the vessel as it sank.

Styrene is a carcinogenic, is slightly soluble in water and very corrosive. There are concerns that the spillage may cause environmental and ecological damage to sea life and nearby coastlines.

[sinking, spill, strong winds, ship ran aground]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, OCTOBER 18, 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 : St Louis, USA

Injured : 0 **Dead :** 0

Abstract

An explosion occurred involving a medical refrigerator in a university medical school building. Fortunately no one was injured in the incident although fifteen students in the area at the time have been quarantined due to radioactive material used in medical imaging stored in the building. The cause of the explosion is not known.

[refrigeration unit]

Lessons

[None Reported]

Source : <http://www.edie.net/news/Archive/3387.html>

Location : Kentucky, USA

Injured : 0 **Dead** : 0

Abstract

Approximately 250 million gallons of water mixed with 155,000 cubic yards of coal wastes spilled into a stream after an unexpected underground mine collapsed. The stream runs into major rivers and there are fears of an environmental disaster.

An estimated 30,000 people are without water and local wildlife has been affected.

A major clean up and investigation is underway.

Lessons

[None Reported]

13153October 2000

Source : THE ENGINEER, 20 OCTOBER 2000, P7.

Location : , UK

Injured : 0 Dead : 0

Abstract

Radioactive iodine was released from a nuclear power station. It was reported that the release was apparently within the authorised discharge level. An investigation into the incident is underway. Checks on milk and grass in the area are being carried out.

A split fuel can in the plant's pressurised water reactor is thought to have caused the iodine to leak into the coolant circuit. The iodine was then drawn off as a gas and vented through the authorised route.

[gas / vapour release, reactors and reaction equipment]

Lessons

[None Reported]

13182October 2000

Source : BBC NEWS, 3 OCTOBER, 2000, (<http://www.bbc.co.uk>).

Location : Shanxi, CHINA

Injured : 0 Dead : 0

Abstract

A road transportation incident. A road tanker carrying sodium cyanide plunged into a river. An emergency barrier was immediately set up to contain the cyanide that had spilled into the river. Chemicals were poured into the river to neutralise the cyanide. No one is reported to have been injured or killed in the incident.

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, SEPTEMBER 14, 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 : Bowling Green, USA

Injured : 40+ **Dead :** 0

Abstract

An unknown amount of sulphuric acid mixed with an amniotic shield conditioner spilled at a plastics coating plant injuring at least forty people and leading to the building being evacuated. The forty workers injured in the incident were treated for the effects of fumes. Clean-up of the plant is now underway.

[evacuation, gas / vapour release, injury, unidentified cause]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, SEPTEMBER 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 : Milwaukee, USA

Injured : 0 **Dead :** 0

Abstract

A fire occurred involving a chemical used as sanitation in water treatment. The chemical caught fire and released toxic fumes and smoke into the atmosphere.

Forty workers were evacuated.

The fire was quickly extinguished by fire fighters. No one was injured in the incident.

[fire - consequence, gas / vapour release, evacuation]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, AUGUST 22, 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 : Prudhoe Bay, Alaska, USA

Injured : 0 **Dead :** 0

Abstract

Approximately 29,400 gallons of mixed crude oil and water overflowed a setting tank. Fortunately the spill was contained in lined cells and the surrounding area was not contaminated.

The incident occurred at a processing facility where oil, water and gas are separated from the crude after it comes out of the ground.

In addition to the crude oil mixed with water, ethylene glycol was spilled inside the processing facility. This was also contained in a lined cell and did not contaminate the ground. No one was injured in the incident.

An investigation into the two spills is being carried out.

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN, OCTOBER 2000.

Location : Montana, USA

Injured : 0 Dead : 0

Abstract

A rail transportation incident. Seven cars of a freight train, three containing carbon disulphide and two containing titanium dioxide, derailed. Fortunately no spillage occurred although a number of small fires were reported. Nearby residents were evacuated.

[derailment - consequence, fire - consequence, evacuation]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARDS INVESTIGATION BOARD, AUGUST 14, 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 : Richmond, USA

Injured : 0 **Dead :** 0

Abstract

An oil leak occurred on a flare stack causing a gas cloud to develop over a nearby city.

The incident occurred on the hydrotreater, which uses hydrogen gas to strip gas oil of sulphur-containing impurities.

The company fire department doused the oil with foam to stop it from catching fire, but the leak forced workers to shut down the hydrotreater. This in turn requires excess hydrogen gas containing impurities to be vented to the flare stack and burn, producing sulphur dioxide and nitrogen oxides.

[gas / vapour release]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARDS INVESTIGATION BOARD, AUGUST 14, 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 : Honolulu, USA

Injured : 1 **Dead :** 0

Abstract

A plant was shut down due to an accidental mixing of two incompatible chemicals causing a release of approximately 20 pounds of chlorine gas. The incident occurred when an operator accidentally pumped sodium hypochlorite, bleach, into a 200-gallon storage tank containing phosphoric acid. The operator was injured in the incident.

[plant shutdown, people, gas / vapour release, storage tanks, normal operations, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARDS INVESTIGATION BOARD, AUGUST 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 : Hamilton, Ontario, CANADA

Injured : 0 **Dead :** 0

Abstract

An explosion and fire occurred at a steel mill when water leaked from a furnace. The leak in the furnace's cooling system reportedly caused a safety valve to open to vent pressure, inadvertently allowing oxygen to flow into the vessel, triggering off the explosion and fire. Fortunately no one was injured in the incident.

[fire - consequence, milling]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARDS INVESTIGATION BOARD, AUGUST 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 : Pheonix, USA

Injured : 5 **Dead :** 0

Abstract

A fire occurred at a chemical supply warehouse releasing clouds of toxic smoke. Approximately 100 people were evacuated from the surrounding area. The warehouse stored pesticides, fertilisers, and plastics and possibly cyanide. Five fire fighters were taken to hospital for treatment for exhaustion and smoke inhalation. The fire damaged other businesses in the area. Damage to the warehouse is to be estimated at \$100 million (2000).

[fire - consequence, warehousing, damage to equipment, injury, gas / vapour release]

Lessons

[None Reported]

1292102 August 2000

Source : BBC NEWS, 2 AUGUST, 2000, (<http://www.bbc.co.uk>).

Location : Northern England, UK

Injured : 0 Dead : 0

Abstract

A rail transportation incident. A freight train carrying nuclear waste derailed. The train was carrying four containers of low-level waste when it came off the track.

Fortunately no one was injured and no structural damage to the containers occurred in the incident.

Rail services in the area were disrupted.

[derailment - consequence, radioactive]

Lessons

[None Reported]

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

Location : River Tagus, SPAIN

Injured : 0 Dead : 0

Abstract

Approximately two hundred and fifty thousand litres of highly toxic oil spilled from a power station into a nearby river creating an eight kilometre long oil slick. Water to a nearby city was cut off and farmers in the area were warned not to use the river to irrigate their land. Operations are underway to try and stop the spill from spreading. The incident was caused by a leak in the fuel depot at the power station. An investigation is underway into the cause of the leak.

[environmental]

Lessons

[None Reported]

1292229 July 2000

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

Location : , BRAZIL

Injured : 0 Dead : 0

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]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 20, 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 : Pheonix, USA

Injured : 2 **Dead :** 0

Abstract

A chemical explosion and flash fire occurred at an industrial plant. The incident occurred as two workers were working in an area where chemical sludge is placed on plates and into a furnace to dry out. The two workers were severely burnt in the incident. An investigation into the cause of the incident is being carried out.

[fire - consequence, burns, processing, injury]

Lessons

[None Reported]

1284216 July 2000

Source : CNN.COM, U.S. NEWS, JULY 17, 2000, (<http://www.cnn.com>),; CHEMICAL WEEK, JULY 26, 2000.

Location : Montreal, CANADA

Injured : 0 Dead : 0

Abstract

An explosion and fire occurred at a chemical plant sending a cloud of toxic smoke into the atmosphere and forcing the evacuation of thousands of nearby residents.

The explosion occurred in an acid-transformation plant thought to contain approximately 13,000 gallons of toxic materials, including sulphuric, nitric and hydrochloric acid.

Fortunately no injuries occurred in the incident.

Earth and sand was trucked to the site to prepare for any spill of acid-contaminated water and truck loads of lime were put on standby to neutralise any spilled acid.

The cause of the explosion is not known but it is thought that an electrical or mechanical failure may have contributed to the incident.

[fire - consequence, gas / vapour release, processing, sulphuric acid, nitric acid]

Lessons

[None Reported]

1282610 July 2000

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

Location : Halifax, CANADA

Injured : 2 **Dead** : 0

Abstract

An explosion occurred in a laboratory at a brewery. The incident occurred when a mixture of glycol and sulphuric acid exploded in a beaker. Two workers were injured in the incident.

The plant was shut down and evacuated.

An investigation into the cause of the explosion is underway.

[laboratory work, evacuation, burns, container, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JULY 10, 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 : Tooele, USA

Injured : 6 **Dead :** 0

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]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JUNE 29, 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 : Lahore, PAKISTAN

Injured : 24 **Dead :** 1

Abstract

An anhydrous ammonia leak ignited killing a worker at a storage facility. Approximately twenty-four people were affected as the toxic fumes spread through out the factory. Workers were evacuated.

The fire was extinguished and the gas leak sealed.

[gas / vapour release, fire - consequence, evacuation, fatality]

Lessons

[None Reported]

Source : CNN.COM, U.S. NEWS, JUNE 29, 30, JULY 4, 2000, (<http://www.cnn.com>).

Location : Richland, Washington, USA

Injured : - Dead : 1

Abstract

Thousands of residents were evacuated due to wildfires spreading across a nuclear reservation area. The fire doubled in size in just a few hours. The fire was started by a fatal car crash.

The fire came within 1,000 feet of the reactor and within half a mile of buried high-level radioactive and chemical waste.

It was feared that radioactive soil could burn and release contaminated particles into the air.

A highway and chemical retardant dropped from the air stopped the fire's advance about a quarter-mile from some uranium waste barrels stored in a field.

[natural disaster, road incidents, evacuation, fatality, near miss]

Lessons

[None Reported]

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

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]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JUNE 23, 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 : Waimairi, NEWZEALAND

Injured : 0 **Dead :** 0

Abstract

A chemical fire occurred at a yarn factory when a worker added water to a chlorine substance, which caused it to ignite. Fort-five people were evacuated from the factory along with businesses within a 150-metre radius of the factory. The fire was quickly extinguished using carbon dioxide fire extinguishers and the smoke was dispersed using the ventilation system.
[fire - consequence, mixing, drums, evacuation]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JUNE 15, 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 : South Elgin, USA

Injured : 2 **Dead :** 0

Abstract

Approximately 15 to 20 gallons of nitric and sulphuric acid spilled at a metal finishing company when a valve between a tanker truck and a building malfunctioned. Two workers including the driver were affected by the release.

The spill affected approximately 400 square feet.

Heavy rain at the time of the spill diluted the chemicals.

Nearby buildings were evacuated as a precaution.

[nitric acid, evacuation, valve failure, material transfer, injury]

Lessons

[None Reported]

Source : BBC NEWS, 12 JUNE, 2000, (<http://www.bbc.co.uk>)

Location : Lancashire, UK

Injured : 0 **Dead** : 0

Abstract

A fire occurred at a rubber factory forcing the evacuation of nearby residents. The company makes roofing felt. Twenty fire crews attended the scene. Police warned householders in a radius of several miles to keep their windows closed due to the fumes coming from the factory.
[fire - consequence, gas / vapour release]

Lessons

[None Reported]

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

Location : Scotland, UK

Injured : 0 **Dead** : 0

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]

Lessons

[None Reported]

Source : CHEMICAL & ENGINEERING NEWS, JUNE 5, 2000.; CNN.COM, U.S. NEWS, MAY 31, 2000, (<http://www.cnn.com>); CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MAY 31, 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 : Eunice, USA

Injured : 0 **Dead :** 0

Abstract

A rail transportation incident. Approximately 3,000 nearby residents were evacuated when a freight train derailed. One of the derailed cars contained flammable and toxic toluene diisocyanate another contained acrylic acid. Demolition experts set explosives on the pressurised tankers as handling them would be safer if the toxic substances inside were burned off. Damage occurred to 1,200 feet of rail track and a 189 foot bridge. No injuries occurred from the incident.

[derailment, fire - consequence, explosion, evacuation, damage to equipment, flammable chemical]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MAY 30, 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 : Taizihe, Liaoning Province, CHINA

Injured : 17+ **Dead :** 1

Abstract

An explosion occurred at a chemical plant killing one and injuring seventeen others. The incident occurred when a chemical filled barrel exploded. A leak of nitric acid and sulphuric acid resulted from the explosion.

It is thought the incident was caused by workers who were adding chemicals to a barrel with a broken temperature gauge.

The explosion caused electric outages at nearby factories and a chemical leak which was contained in a nearby field.

[container, spill, material transfer, fatality, mechanical equipment failure, injury]

Lessons

[None Reported]

1252025 May 2000

Source : BBC NEWS, 26 MAY, 2000, (<http://www.bbc.co.uk>); CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MAY 26, 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 : Hampshire, UK

Injured : 10 **Dead** : 0

Abstract

A chemical fire occurred at a jacuzzi and spa manufacturers injuring ten people. The chemicals involved in the fire were liquid petroleum gas and fibrous resin. Hundreds of nearby workers and residents were evacuated as a precaution.

Symptoms from smoke inhalation can include irritation and a burning sensation to the eyes, mouth and throat, chest tightness, short of breath, headaches and stomach upsets. The symptoms can take up to eight hours to emerge.

[fire - consequence, evacuation, LPG, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MAY 26, 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 : Akron, USA

Injured : 2 **Dead :** 0

Abstract

A flash fire occurred at a paint and varnish plant seriously injuring two workers. The incident occurred when four workers were cleaning equipment in the manufacturing area.

They were using a flammable liquid solvent and it is thought that a tow motor passing nearby ignited vapours from the solvent.

The plant was evacuated and the fire was extinguished.

[fire - consequence, hot surface, evacuation, burns, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 25 MAY, 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 : Dacatur, USA

Injured : 2 **Dead :** 0

Abstract

Approximately 1 million gallons of a fermenting corn and water mixture spilled from two 500,000-gallon ethanol processing tanks. Two workers were injured in the incident. The two tanks ruptured causing the liquid to spill.

A dike system was built and the liquid was pumped into holding containers.

The liquid was approximately 99 percent water and contained corn mash as part of the early ethanol process.

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

[material of construction failure, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 23 MAY, 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 : Summit, USA

Injured : 4 **Dead :** 0

Abstract

A fire occurred at a chemical warehouse injuring four fire fighters. It is not known what caused the fire but fire fighters believe that the point of ignition was some cotton bales stored in the warehouse.

The warehouse also stored 55-gallon drums containing chemical solvents.

[fire - consequence, warehousing, burns, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 27 APRIL, 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 : Charlotte, USA**Injured :** 0 **Dead :** 0**Abstract**

A chemical leak occurred at a water treatment plant killing over 5,000 fish. A leak of sodium hydroxide occurred from a tank used in the wastewater treatment process at the plant.

The chemical leaked into a concrete containment area filled with rainwater. When a utility worker pumped out the area, the sodium hydroxide in the rainwater spilled from the ground into a nearby storm drain that empties out into a nearby creek.

[ecological damage, design or procedure error]

Lessons

[None Reported]

Source : CNN.COM, U.S. NEWS, APRIL 26, 2000, (<http://www.cnn.com>)

Location : Danville, Kentucky, USA

Injured : 0 Dead : 0

Abstract

A rail transportation incident. A fire and explosion occurred on a freight train carrying toxic chemicals forcing the evacuation of nearby residents. The car was carrying 148,000 pounds of sodium dithionite, a flammable product that can produce irritating, corrosive or toxic gasses. The chemical is also known as sodium hydrosulfate. The car with the chemical still burning was moved approximately one mile south of the city. No injuries were reported.

[fire - consequence, gas / vapour release]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 24 APRIL, 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 : Seligman, USA

Injured : 0 **Dead :** 0

Abstract

A rail transportation incident. A freight train derailed causing six cars containing hazardous materials, vinyl acetate and ethanol, to overturn. Two of the overturned cars were reported to be leaking.

No one was injured in the incident.

[derailment, spill, materials - hazardous]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 12 APRIL, 2000,

CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 9 MAY, 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 : Muskegon, USA

Injured : 8 **Dead :** 0

Abstract

An explosion occurred at chemical plant injuring eight, three critically. An investigation into the cause of the explosion is being carried out. It is thought that one of the chemicals involved was toluene. Severe damage occurred to the building.

[damage to equipment, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 10 APRIL, 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 : Scarborough, Ontario, CANADA

Injured : 0 **Dead :** 0

Abstract

A fire and explosion occurred at a chemical plant forcing the evacuation of at least 60 residents living nearby. Large plumes of toxic smoke could be seen billowing out from the plant and being blown away from residential areas out towards a nearby lake.

Water run off is being tested for pollutants and air-monitoring tests are being set up.

The plant uses a variety of chemicals, solvents and raw materials, asphalt, varsol and linseed oil. The most harmful chemical kept on site is hexane, which can produce toxic gases when it is burned.

[fire - consequence, gas / vapour release, toxic fumes]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 6 APRIL, 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 : Port Royal, USA

Injured : 7 **Dead :** 0

Abstract

A release of organophosphates occurred due to a spill, which occurred in the back of a lorry. The fumes affected seven people.

Organophosphate is used as a soil fumigant used to kill bugs in soil before planting.

An investigation into the release found that the vapour came from a pressure relief valve.

[gas / vapour release, chemical, injury]

Lessons

[None Reported]

Source : CNI NEWS, 31 MARCH, 2000, (<http://www.cnionline.com>)

Location : Houston, Texas, USA

Injured : 2 Dead : 0

Abstract

A fire occurred at a paint factory where two warehouses containing hazardous waste were destroyed.

Nearby residents were evacuated.

Two fire fighters were slightly injured in an effort to control the blaze that was eventually extinguished four hours later.

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

[fire - consequence, warehousing, evacuation, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 28 MARCH 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 : 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, 29 MARCH 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 : Naples, Florida, USA

Injured : 0 **Dead :** 0

Abstract

A road transportation incident. Sulphuric acid was spilled during a routine delivery at a water treatment plant. Rain water from a storm the night before made it difficult to determine the exact amount of acid spilled. It is thought to be approximately 65 gallons.

Sulphuric acid reacts violently when mixed with water, severely irritates the eyes, respiratory tract and skin.

Sulphuric acid has several industrial purposes, including: pulp and paper manufacturing; copper, steel and metal fabrication; fertiliser, chemical, textile, explosive and paint manufacturing; soap and detergent production; water treatment and petroleum product refinement.

[unloading]

Lessons

[None Reported]

1276627 March 2000

Source : CHEMICAL HAZARDS IN INDUSTRY, JUNE 2000.; CHEM. WEEKBL. 29 MAR 2000, (DUTCH WEBSITE: <http://chemischweekblad.nl/>).

Location : , GERMANY

Injured : 6 Dead : 0

Abstract

A rail transportation incident. An unknown amount of vinylbenzene (styrene), leaked from a freight wagon that was coupled to a train waiting at a station. The following day a leak of ethyl acrylate occurred. Six people were affected by the release of styrene fumes including the driver of the train. All passengers were evacuated.

No injuries occurred from the spill of ethyl acrylate.

[gas / vapour release, people, evacuation, rail transport, injury]

Lessons

[None Reported]

Source : BBC NEWS, 28 MARCH, 2000, (<http://www.bbc.co.uk>); CHEMICAL ENGINEERING, MAY 2000, (<http://www.che.com>); CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 27 MARCH 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 : Pasadena, USA

Injured : 71 **Dead :** 1

Abstract

An explosion and fire occurred at a chemical plant. It is thought the chemicals involved in the incident were butadiene, styrene and cyclohexane. One worker was killed and more than seventy others were injured.

The explosion sparked a fire releasing a huge cloud of black smoke over the area.

An investigation into the incident found that the probable cause was due to a reaction of residual butadiene with styrene-butadiene copolymer (SBC) in a supposedly empty butadiene tank.

The tank was offline and believed to be in a purge mode, but it contained sufficient polymer and butadiene to react. Polymer may have plugged the purge lines of the tank, causing it to burst.

[fire - consequence, fatality, gas / vapour release, processing, burns, unwanted chemical reaction, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 26 MARCH, 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 : Jackson, Mississippi, USA

Injured : 20 **Dead :** 0

Abstract

Anhydrous ammonia fumes escaped from an agricultural tank. Approximately 20 people were treated at hospital after being affected by the toxic gas leak.

The gas causes shortness of breath and respiratory irritation. Prolonged exposure can be fatal.

The incident occurred when thieves left open a valve on the tank causing the leak.

[gas / vapour release, deliberate acts, people, toxic fumes, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 23 MARCH, 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 : Pennsville, USA

Injured : 3 **Dead :** 0

Abstract

An explosion occurred whilst loading an industrial dryer with a powdery substance wet with solvents. The three workers carrying out the operation were seriously injured in the blast.

An investigation into the incident is being carried out.

[drier, burns, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 24 MARCH, 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 : Lily, USA

Injured : 48 **Dead :** 0

Abstract

Sulphuric and hydrochloric acid were accidentally mixed resulting in two accidental releases of chlorine gas. The building was evacuated.

Forty eight people were treated for minor respiratory problems.

[sulphuric acid, gas / vapour release, evacuation, accidental mixing, mixer, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 23 MARCH, 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 : Farmington, USA

Injured : 0 **Dead :** 0

Abstract

Two drums of highly toxic trichloroethylene were found dumped by the side of a reservoir. One of the drums was found to be leaking.

The area surrounding the drums was cordoned off.

Trichloroethylene is a colourless liquid known as TCE and is used by many industries.

An investigation is being carried out.

[spill, human causes]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 25 APRIL, 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 : 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]

Lessons

[None Reported]

Source : BBC NEWS, 23 MARCH, 2000, (<http://www.bbc.co.uk>); CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 22 MARCH, 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 : Port Moresby, PAPUA NEW GUINEA

Injured : 0 **Dead :** 0

Abstract

An air transportation incident. Two one tonne boxes containing sodium cyanide pellets were being transported by helicopter when they were accidentally dropped from a sling.

It is thought around 100 and 150 kilos of the cyanide has been dissolved by rain and spilled into a nearby river.

Approximately 70% of a one tonne pallet has been recovered, the remaining cyanide will be neutralised with ferrous sulphate.

An investigation into the incident is being carried out.

[spill, pollution]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 24 MARCH, 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 : Grand Prairie, CANADA

Injured : 0 **Dead :** 0

Abstract

An explosion occurred during welding operations on a tanker truck. The incident occurred when sparks ignited leftover fumes after the tanker had been emptied of its load of flammable oil well service water.

The explosion blew a hole 8 metres in diameter through the sheet metal roof and dented three overhead garage doors. Fortunately no one was injured in the incident.

Damage was estimated at \$350,000 (2000) to the building and \$70,000 (2000) to the truck.

[road transport, damage to equipment]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 21 MARCH, 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 : Iron Mountain, USA

Injured : 0 **Dead :** 0

Abstract

A store holding fertilisers and plant chemicals was destroyed in a fire. Nearby residents and businesses were evacuated due to toxic smoke released by the fire.

An investigation into the fire is being carried out.

[storage, storage equipment, fire - consequence, gas / vapour release, toxic fumes]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 20 MARCH, 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 : Albany, Kentucky, USA

Injured : 0 **Dead :** 0

Abstract

A fire occurred at a chemical storage forcing the evacuation of the surrounding area. At the time of the report a building fire had been extinguished but four tanks each containing approximately 2,000 gallons of gasoline continued to burn. The plant stores gasoline, oil and toluene.

[fire - consequence]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 15 MARCH, 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 : New Brunswick, CANADA

Injured : 0 **Dead :** 0

Abstract

A chemical spill at a science centre forced the evacuation of approximately 800 people.

The incident occurred when a cooler unit used to store volatile chemicals malfunctioned, causing a chemical reaction.

The refrigeration unit contained 30 to 35 containers of chemicals. The chemicals included a styrene monomer, a special alcohol used in the production of plastics and approximately 11 kilograms of initiator.

[unwanted chemical reaction, storage]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 14 MARCH, 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 : Rock Hill, USA

Injured : 2 **Dead :** 2

Abstract

Two workers were killed and two injured when turpentine fumes ignited during welding operations on a tank at a paper plant.

The tank was used to collect liquid product during the papermaking process.

Approximately fifty workers were evacuated.

[evacuation, fire - consequence, fatality, safety procedures inadequate, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 13 MARCH, 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 : Chonburi, THAILAND

Injured : 1 **Dead :** 0

Abstract

A fire occurred at a footwear factory. The factory was totally destroyed in the fire which was fuelled by combustibile adhesives and rubber stored inside.

An investigation into the incident is being carried out.

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

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 13 MARCH, 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 : Austin, Texas, USA

Injured : 0 **Dead :** 0

Abstract

A road transportation incident. An 18-wheeler carrying chemicals overturned on a highway. The truck was carrying three drums of sulphuric acid and two drums of a cleaning agent when the incident occurred.

One of the 330-gallon drums of sulphuric acid was punctured in the incident causing half of its contents to spill into a storm drain, which runs into a nearby creek.

Lessons

[None Reported]

1226010 March 2000

Source : CNN.COM, U.S. NEWS, 10 MARCH, 2000, (<http://www.cnn.com>).

Location : Baia Mare, ROMANIA

Injured : 0 Dead : 0

Abstract

Approximately 20 tonnes of tailings and residues of heavy metals zinc, lead, iron spilled into a river after a dam broke at a lead and zinc mine.

The incident occurred after heavy rain.

A team of experts is carrying out an investigation into the incident.

[environmental, ecological damage, material of construction failure, weather effects]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 9 MARCH, 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 : Lake Alfred, USA**Injured** : 0 **Dead** : 0**Abstract**

A fire occurred at a fertilizer plant. The incident occurred whilst plant workers were welding a metal bin, which was still containing chemicals. The fire occurred inside a 12-foot by 30-foot hopper containing a mixture of sludge, or sewage, and ammonium nitrate used to make the fertilizer. Fifteen workers were evacuated and fire fighters eventually brought the fire under control. Sand was placed around a nearby storm drain to contain the chemicals.

The plant was closed down for repairs and clean up.

No injuries were reported.

[fire - consequence, evacuation, plant shutdown, design or procedure error]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MARCH 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 : 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]

12768 March 2000

Source : CHEMICAL HAZARDS IN INDUSTRY, JUNE 2000.; OCCUPATIONAL HAZARDS, APR 2000, 62(4), 24.

Location : Westchester, USA

Injured : 0 Dead : 0

Abstract

A small crack was discovered in a tube on a nuclear plant that caused a small amount of radioactive steam to enter the atmosphere. Radioactive water leaked from the cracked reactor and contaminated clean water used to drive turbines.

The crack was discovered using a remote-controlled device with attached video camera.

The plant will remain out of service for several weeks.

[gas / vapour release, contamination, reactors and reaction equipment]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 29, 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 : 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]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MARCH 1, 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 : , USA

Injured : 30 **Dead :** 0

Abstract

A chemical reaction occurred when a contractor driving a road tanker poured a chemical into the wrong tank causing chlorine vapour to be formed. Approximately 30 people were taken to hospital for treatment for eye, throat and nose irritation. Workers were evacuated in the incident. The incident occurred when the driver pumped sodium hypochlorite, bleach used for odour control, into the tank with a residue of ferric chloride, another odour control chemical.

An investigation into the incident is being carried out.

[unwanted chemical reaction, evacuation, injury, gas / vapour release, human causes, unloading]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 25, 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 : , USA

Injured : 0 **Dead :** 0

Abstract

A road transportation incident. Approximately 20 pounds of trimethylamine was released when a relief valve on a truck opened.

A county warning siren sounded after being activated by the leak.

Triethylamines have a strong, pungent odour and can be smelt at a concentration as low as a half-part per billion.

[gas / vapour release, mechanical equipment failure]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 20, 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 : Anchorage, USA

Injured : 0 **Dead :** 1

Abstract

An explosion caused a 20-foot by 15-foot hole in the roof of a tank and sent several large steel support beams into the air. At the time of the incident a worker was welding a ventline on top of the large wastewater tank when it exploded. The worker was blown through the roof of the building and killed instantly. It is thought that the tank was contaminated with combustible or flammable fumes, which may have caused the blast.

[contamination, fatality]

Lessons

[None Reported]

1220515 February 2000

Source : CNN.COM, U.S. NEWS, FEBRUARY 16, 2000, (<http://www.cnn.com>).

Location : New York, USA

Injured : 0 Dead : 0

Abstract

A radioactive leak occurred at a power plant. The incident occurred when a small leak was detected in a steam generator at the plant's containment building, a sealed concrete building that holds the reactor at the nuclear power plant. Approximately 1 cubic foot of gas escaped.

The leak was immediately isolated and the plant shut down.

An investigation into the incident found that the leak occurred in a tube used to carry hot, radioactive, high-pressure water to a pool of cool, non-radioactive water. Steam produced when the hot water hits the cool water, turns a turbine and generates electricity.

The plant will remain closed for maintenance.

[gas / vapour release, plant shutdown, processing]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 15, 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,; CHEMICAL HAZARDS IN INDUSTRY, APRIL 2000.

Location : Santee, USA

Injured : 3 **Dead :** 0

Abstract

An explosion and fire occurred in an extruder at a plastics manufacturing plant.

The explosion occurred when three workers were mixing polyethylene granules, raw sulphur powder and potassium nitrate granules to produce a semisolid.

The explosion occurred after the materials were heated, before any material had emerged from the extruder barrel. The building was evacuated.

The workers suffered third-degree burns and shrapnel injuries.

The cause of the explosion is under investigation.

[fire - consequence, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 13 MARCH, 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 : 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]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 14, 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 : Nova Scotia, CANADA

Injured : 0 **Dead :** 0

Abstract

A road transportation and marine transportation incident. A truck carrying approximately 26 tonnes of sodium hydrosulphide started to leak whilst on board a freighter ferry.

The leak was discovered when an employee of the freighter ferry detected fumes.

A small spill was later found in the top of one of nine containers of the chemical in the truck. The spill was quickly cleaned up and the all clear given.

Sodium hydrosulphide is used in papermaking and normally presents minimal risk when properly packaged. However, its fumes are toxic and it can explode and burn in extreme temperatures.

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 14, 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 : 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]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 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 : , FRANCE

Injured : 17 **Dead :** 0

Abstract

An oil leak occurred from the radiator of a mechanical digger in a traffic tunnel under construction, sending a wave of toxic smoke through the tunnel.

Fourteen workers and three fire fighters were affected.

[bulldozer/jcb/digger, gas / vapour release, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, MARCH 6, 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 : Hong Kong, CHINA

Injured : 0 **Dead :** 0

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]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 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 : 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]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 4, 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 : Salt Lake City, USA

Injured : 0 **Dead :** 0

Abstract

A 55-gallon drum of sodium hydroxide started to leak forcing the evacuation of six workers.

Approximately 6-gallons is thought to have leaked from the drum.

The chemical if inhaled can cause respiratory problems and is corrosive to the skin.

[drums]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 21, 2000, MARCH 20 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 : Los Alamos, USA

Injured : 0 **Dead :** 0

Abstract

Approximately 500 to 1,000 gallons of waste water thought to be contaminated with high explosives was accidentally released from holding tanks onto 200 square feet of soil surrounding the tanks.

An investigation into the incident found that the water did not contain concentrations of explosives residue.

Analysis of the water found it contained trace amounts of solvents and other chemicals.

[spill, contamination]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 18, 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 : St Paul, USA

Injured : 12 **Dead :** 0

Abstract

Fumes affected twelve people when tetrahydrofuran leaked at a chemicals company. The workers affected experienced respiratory problems and were taken to hospital for treatment.

Workers were evacuated as hazardous material teams cleaned up the leak and ventilated the building.

Tetrahydrofuran is a colourless, mobile liquid that reacts with heat, flames, other sources of ignition, and light and air. Acute exposure to the eyes and skin can cause extreme irritation and burning.

Inhalation may lead to headache, nausea, vomiting, dizziness, narcosis and respiratory failure.

[gas / vapour release, people, evacuation, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 15, 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 : , USA

Injured : 0 **Dead :** 0

Abstract

A road transportation incident. A tractor-trailer carrying hazardous materials turned over. Fortunately none of the 1,200 gallons of sodium hydroxide leaked, no one was injured and no one evacuated.

The accident occurred when the driver of the truck attempted to break, the break lines froze so the driver pulled off the road's shoulder but lost control of the vehicle.

Sodium hydroxide (caustic soda), is used for water treatment operations and is highly corrosive.

[near miss, loss of control]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 14, 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 : Texas, USA**Injured :** 0 **Dead :** 0**Abstract**

A potentially toxic chemical reaction at a tire and rubber company caused the evacuation of plant personnel and a nearby highway. The incident occurred when workers noticed an elevated temperature in a tank holding two chemicals used in the production of antioxidants used in plastics. The tank was hosed down to keep it cool and disaster specialists were put on alert and the road closed. It was reported that no leakage occurred when a stabilising agent was added to the tank to stop any possible reaction. An investigation found the tank used to mix the two chemicals, mercaptan and methylacrylate, was not the one normally used. A full investigation into the incident is being carried out.

[unwanted chemical reaction, mixing]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 13, 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 : Tokyo, JAPAN

Injured : 5 **Dead :** 0

Abstract

Approximately 2,000 litres of sodium hydroxide solution leaked at a chemical plant. Five workers suffered eye irritation.

Sodium hydroxide solution is a clear and colourless liquid with no odour. It reacts with water and moisture and produces corrosive fumes.

[injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, JANUARY 14, 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 : La Guaira, VENEZUELA

Injured : 0 **Dead :** 0

Abstract

Cargo containers were found to be leaking a toxic mix of chemicals after the containers were battered by massive floods. As a result of this, residents of the area were evacuated and access to the area was restricted.

Chemicals leaking from some containers were identified as toxic and posed a threat to public health.

Authorities stated, the chemicals could contaminate the ground and sea, emit dangerous gases and cause an explosion.

Health officials issued public warnings that any survivors from the floods suffering from skin rashes, respiratory ailments or other health problems are to seek medical attention.

The flooding killed between 5,000 and 30,000 people, making it the worst natural disaster in the country this past century.

[evacuation, storage, toxic chemical]

Lessons

[None Reported]

Source : CHEMICAL WEEK, FEBRUARY 2, 2000. (<http://www.chemweek.com>).

Location : , UK

Injured : 0 Dead : 0

Abstract

Residents from a village situated near a chemical site were evacuated after concentrations of hexachlorobutadiene (HCBd), a suspect carcinogen, were detected in the air outside their homes.

HCBd is thought to have reached the houses from two nearby landfill sites where the product had been dumped between the 1920's and 1970's.

[evacuation, toxic, gas / vapour release, human causes]

Lessons

[None Reported]

122302000

Source : THE ENGINEER, 27 OCTOBER 2000.

Location : , UK

Injured : 0 Dead : 0

Abstract

A marine transport incident. Twelve nuclear submarines were taken out of service as a precaution when cracks were found in the reactor cooler system of one submarine.

Checks are being carried out to determine whether this incident could occur on the other eleven submarines.

[reactors and reaction equipment, near miss, radioactive, marine transportation]

Lessons

[None Reported]

1210910 December 1999

Source : BBC NEWS, 10 DECEMBER, 1999, (<http://www.bbc.co.uk>).

Location : Devon, UK

Injured : 16 Dead : 0

Abstract

More than 500 people were evacuated from their homes after a fire broke out at a plastics factory.

A cloud of toxic smoke and fumes from the fire drifted into nearby residential areas.

People evacuated were allowed to return home nearly two days after the incident.

Sixteen people, including police and fire fighters, were treated for minor breathing problems, fortunately no-one was seriously injured.

The cause of the fire is not yet known.

[fire - consequence, evacuation, gas / vapour release, injury, toxic fumes]

Lessons

[None Reported]

12108December 1999

Source : CNN.COM, U.S. NEWS, 9 DECEMBER, 1999, (<http://www.cnn.com>).

Location : , USA

Injured : 3 Dead : 0

Abstract

A chemical explosion occurred at a nuclear weapons plant injuring 10 workers whilst cleaning a welding area that had been shuttered since 1993. Three workers were hospitalised for burns and smoke inhalation. One worker suffered second degree burns over his face and chest. The other workers were treated and released.

The incident occurred whilst workers were removing an old crucible used in casting nuclear weapons parts. The explosion occurred when they were attempting to clean up a sodium hydroxide alloy that had spilled.

It is thought that the alloy might have reacted with moisture, but the exact cause of the explosion was unclear.

[leak, injury]

Lessons

[None Reported]

1195405 October 1999

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

Location : , SOUTH KOREA

Injured : 77 Dead : 0

Abstract

During maintenance safety checks at a nuclear plant, twenty two workers were exposed to radiation after a coolant leak.

The incident occurred when workers mixing a uranium solution triggered a nuclear chain reaction at the processing plant. Fifty five people, mainly workers and emergency personnel who responded to the incident were also exposed to radiation.

[radioactive, contamination, people, unwanted chemical reaction]

Lessons

[None Reported]

1210204 October 1999

Source : CHEMICAL HAZARDS IN INDUSTRY, DECEMBER 1999,; BUISINESS DAY, 7 OCT 1999, <http://www.bday.net>

Location : , SOUTH KOREA

Injured : 22 Dead : 0

Abstract

A leak of 45 litres of heavy water occurred at a nuclear power plant exposing twenty-two workers to small levels of radiation. It is thought that the incident occurred due to human error when two workers were carrying out maintenance work. The nuclear reactors were not operating at the time of the incident. The heavy water was recovered with in hours.

[radioactive, people, human causes, injury]

Lessons

[None Reported]

1208330 September 1999

Source : EUROPEAN CHEMICAL NEWS, 25/31 OCTOBER 1999,; JOURNAL OF THE BRITISH NUCLEAR ENERGY SOCIETY, FEBRUARY 2000, VOLUME 39, NUMBER 1,; CHEMICAL HAZARDS IN INDUSTRY, MARCH 2000,; NEW SCIENTIST, 8 JAN 2000, (2220), 5,; BBC NEWS, 27 APRIL, 2000, (<http://www.bbc.co.uk>).

Location : Tokaimura, JAPAN

Injured : 56 **Dead** : 2

Abstract

A nuclear chain reaction was triggered whilst workers were mixing a uranium solution at a uranium processing plant. Fifty five people, mainly plant workers and emergency personnel were exposed to the radiation, three remained in a serious condition. Nearby residents were evacuated.

It is thought that a water jacket designed to cool the tank, fuelled the reaction as it reflected neutrons back into the uranium solution. The emergency crews managed to drain the water jacket and douse the hot material with boric acid, which absorbs neutrons. The reaction finally stopped after 17 hours.

[radioactive, reactors and reaction equipment, evacuation, people, unwanted chemical reaction, human causes]

The following conclusions were published in the Journal of the British Nuclear Energy Society, February 2000, Volume 39, Numer 1.

The cause of the incident has been confirmed. A solution of 16.6 kg of 18.85 enriched uranium was poured into a precipitation tank, in which the maximum amount of uranium should be limited to 2.4 kg.

[fatality]

Lessons

[None Reported]

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

Location : New Jersey, North Carolina, USA

Injured : - Dead : -

Abstract

People were told to boil their tap water after fears of contamination caused by Hurricane Floyd.

Drinking water was found to have been contaminated by overflow from sewage plants and animal waste lagoons.

Floodwaters were contaminated by fuel, farm chemicals and manure. Flooding also swept at least 1,000 containers of explosive and toxic materials into waterways. Officials warned people not to come into contact with any drums, cylinders or other unfamiliar objects. The biggest danger comes from flammable materials like gasoline, cleaning solvents and propane gas.

More than a million gallons of waste water thought to contain chromium, spilled at a chemical plant during the hurricane.

[toxic chemical]

Lessons

Water contaminated by sewage and animal waste could cause a host of gastrointestinal illnesses.

Source : CNN.COM, U.S. NEWS, AUGUST 9, 1999, (<http://www.cnn.com>).

Location : , USA

Injured : 5+ Dead : 0

Abstract

An explosion occurred at a metals plant injuring at least five people. The explosion occurred during titanium melting process which was followed by a smaller explosion. There was no release of any toxic materials.

[processing, heating equipment, injury]

Lessons

[None Reported]

11872September 1999

Source : BBC NEWS, SEPTEMBER 15, 1999, (<http://www.bbc.co.uk>).

Location : , UK

Injured : 0 Dead : 0

Abstract

A toxic chemical used as a sealant for glass jars of baby food was found to have been seeping into the product. A test carried out found that 66 of 137 samples of baby food from glass bottles contained the chemical, epoxidised soya bean oil, ESBO.

ESBO is used on jars to prevent contamination from bacteria or anything else by creating an airtight seal, and also helps make signs of tampering more obvious. [contamination, container]

Lessons

ESBO is only dangerous in large quantities.

1262608 August 1999

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

Location : Surrey, UK

Injured : 0 Dead : 0

Abstract

Transformer oil was discharged into a nearby river from a fractured sight-gauge valve on a tank. The spillage was made worse by the sight-gauge being left in the open position allowing approximately 900 gallons of oil to escape into the bund. At this stage the spilt oil should have been immediately pumped out of the bund by the tanker.

However, due to human error the oil was left in the bund for a while. When a tanker did arrive to pump it out, the oil had disappeared.

Following heavy rain the oil was forced out through the company's oil interceptor system to discharge into two nearby watercourses.

It is thought that due to the oil being left in the bund for about eleven days, the oil had weathered and emulsified, thus defeating or 'tricking' the oil interceptor device and causing the oil to be pumped out into a drain leading to the interceptor system. This should have prevented any release of oil to the surface water system, but further failure in the form of a floating valve jammed in the on position in the interceptor, coupled with the fact the electronic alarm failed to operate, meant that no one was aware when the interceptor overflowed into the river. This was due to heavy rainfall taking up the very minimal storage capacity left in the interceptor once the 900-gallon spillage had entered it.

The company was fined £15,000 and costs of £1,1000 (2000).

[spill, pollution, mechanical equipment failure, design or procedure error, storage tanks]

Lessons

[None Reported]

1175705 August 1999

Source : CNN.COM, U.S. NEWS, 5 AUGUST, 1999, (<http://www.cnn.com>).

Location : , ROMANIA

Injured : 9 Dead : 3+

Abstract

An explosion occurred at a steel plant killing at least three people and injured nine. The explosion occurred in a furnace. The injured suffered burns and injuries from flying debris.

[fatality, processing, injury]

Lessons

[None Reported]

1262726 July 1999

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

Location : Surrey, UK

Injured : 0 **Dead** : 0

Abstract

Approximately 18,000 litres of sewage effluent discharged into a ditch from portable toilets. The discharge came from a manhole in a park that connects to the rainwater drainage system that drained into the ditch, which connects to a river.

The company apparently thought they were discharging into a foulwater sewer system, which would not have resulted in the pollution of controlled waters.

Unfortunately it was a rainwater drain, discharging directly to the river, resulting in serious pollution. Fortunately no fish were killed in the incident due to prompt action.

The company was fined £6,000 and costs of £1,103.

[human causes, pollution, spill, drains & sewers, waste]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 16 MARCH 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 : Gramercy, Los Angeles, USA**Injured :** 29+ **Dead :** 0**Abstract**

Three explosions occurred at a chemical plant, which caused a natural gas leak and blew out a cloud of sodium hydroxide and bauxite ore, a caustic chemical from which aluminium is obtained, into the air.

The explosion occurred in a part of the plant where electricity is generated and where the bauxite ore and liquid sodium hydroxide are mixed.

Twenty-one workers were injured in the blast, two critically. Injuries ranged from severe burns, breathing difficulties and eye irritation. Nearby residents were also treated for nausea and respiratory problems.

An investigation into the incident found that the cause was due to power failure at the plant. The power to a vat holding chemicals failed. The material was supposed to move from the vat to another part of the plant, but the pressure built up after pumps failed, causing the explosion that destroyed approximately 25 percent of the plant.

The company was fined \$533,000 (2000).

[gas / vapour release, power supply failure, processing, injury]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN, SEPTEMBER 1999.

Location : Texas, USA

Injured : 20 **Dead** : 0

Abstract

A road transportation and rail transportation incident. A road tanker carrying oilfield waste was hit by a train on a crossing causing two engines and seven freight cars to derail. Twenty people were injured.

[collision, derailment - consequence, 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]

Source : HAZARDOUS CARGO BULLETIN, SEPTEMBER 1999.

Location : Texas, USA

Injured : 0 **Dead** : 0

Abstract

An explosion and fire occurred in a k-resins unit at a petroleum plant during maintenance. Two contract workers were killed.

[fire - consequence, fatality, resins]

Lessons

[None Reported]

Source : C & EN, JUNE 28, 1999.

Location : , USA

Injured : 3 Dead : 2

Abstract

An explosion and fire occurred on a chemical complex killing two contract workers and forced the shutdown of the K-Resin section of the plant. Two other of the contract workers and an employee were also injured in the incident.

The workers were performing scheduled maintenance on a K-Resin unit, which produces styrene-butadiene polymers. A 100 million lb per-year expansion of the unit was started up earlier this month, increasing the company's K-Resin production to 370 million lb per year.

The cause of the explosion and fire is being investigated.

The company were fined \$204,000 (2000).

[fire - consequence, fatality, injury]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN, SEPTEMBER 1999.

Location : Pennsylvania, USA

Injured : 0 **Dead** : 0

Abstract

A fire occurred in a sulphur extraction unit at a refinery after power failure. A plume of smoke was released.

[fire - consequence, power supply failure, gas / vapour release, refining, separation equipment]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN, SEPTEMBER 1999.

Location : , FINLAND

Injured : 0 Dead : 1

Abstract

An explosion and fire occurred during maintenance shutdown at a chemical plant killing a worker and destroying a reactor.
[fire - consequence, damage to equipment, reactors and reaction equipment, sodium borohydride, fatality]

Lessons

[None Reported]

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

Location : , UK

Injured : 0 Dead : 0

Abstract

An old cast sewage pipe became blocked by debris causing it to overflow into two ponds. A large number of fish was affected by the discharge. The system had not been monitored as it is on a steep incline and was expected to be self-cleaning. The company was fined £5,000 and costs of £715 (2000).

[drains & sewers, waste, design or procedure error, ecological damage, spill, pollution]

Lessons

[None Reportd]

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]

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

Location : , UK

Injured : 0 Dead : 0

Abstract

Sewage was reported to be coming up from a manhole and was running down the road and into a highway drainage system.

A small spring-fed spring was inspected and found to smell of sewage. Also a large number of fresh water shrimps were found to be in distress on the surface.

Samples of the water were taken and three times the fatal dose of ammonia was found.

An inspection of the sewage pumping station found that neither the duty pump of the standby pump was working leading to an overflow of effluent.

An investigation found that one of the pumps had not been working since five weeks earlier and that the shaft had been dismantled.

The main pump had shut down due to a technical fault and had attempted to bring the missing pump on line, leading to the failure of the station.

The company was fined £4,500 and costs of £600 (2000).

[drains & sewers, mechanical equipment failure, design or procedure error, waste, spill, pollution, environmental]

Lessons

[None Reported]

Source : NATIONAL TRANSPORTATION SAFETY BOARD, DCA99MZ006, (<http://www.nts.gov>).

Location : Michigan, USA

Injured : 1 **Dead** : 1

Abstract

A chemical reaction occurred during unloading from a road tanker of sodium hydrosulphide solution into a storage tank containing ferrous sulphate at a tannery. Sodium hydrosulphide solution reacts with ferrous sulphate solution to produce hydrogen sulphide, a poisonous gas.

An employee in the basement of the building smelled a pungent odour and lost consciousness, and fortunately regained consciousness ten minutes later. The driver of the road tanker was found unconscious and was later pronounced dead at the scene. It was determined that he had died from the effects of hydrogen sulphide gas.

[storage tanks, unwanted chemical reaction, fatality, management system inadequate, human causes, injury, evacuation]

Lessons

[None Reported]

12611 June 1999

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

Location : Cornwall, UK

Injured : 0 **Dead :** 0

Abstract

A company was fined £2,000 and costs of £255 when oil and chemicals were found to be discharging from the company's drainage system into the sea. The waste consisted of chemicals that can be harmful to the environment and require specialist removal.

Although the drainage system was fitted with an oil interceptor, designed to prevent harmful material escaping, it was clear that it was not successfully stopping the release of pollutants.

[drains & sewers, pollution, design or procedure error.]

Lessons

[None Reported]

1105627 May 1999

Source : CHEMICAL WEEK, JUNE 9, 1999.

Location : Pasadena, Texas, USA

Injured : 1 **Dead** : 0

Abstract

An explosion occurred at a chemical plant critically injuring a worker who was cleaning a 10,000 gallon tank containing a ferric sulphate compound. The explosion was caused by water being mixed with residue inside the tank. The worker suffered second degree burns to the face, neck and hands. An investigation into the incident is being carried out.
[accidental mixing, injury]

Lessons

[None Reported]

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

Location : , UK

Injured : 0 Dead : 0

Abstract

An underground slurry system had been run over night during which it failed and caused slurry to spill into a nearby watercourse.

Approximately 260 cubic metres of slurry was discharged from the system, polluting about 1km stretch of river.

The company was fined £1,000 and costs of £600 (2000).

[drains & sewers, mechanical equipment failure, design or procedure error, pollution, waste]

Lessons

[None Reported]

1147713 May 1999

Source : CHEMICAL NEWS INTERACTIVE, 14 MAY, 1999.

Location : , SOUTHWESTERN CHINA

Injured : 6+ **Dead :** 0

Abstract

An explosion and fire occurred at a vinyl chloride monomer (VCM) plant injuring several workers, six seriously.

The explosion was so great that it broke glass in surrounding homes.

[fire - consequence, damage to equipment, injury]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, FEBRUARY 14, 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 : 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]

12599May 1999

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

Location : Wales, UK

Injured : 0 **Dead :** 0

Abstract

Sewage was discharged into a stream from a sewage pumping station. An investigation found that the nearby stream was contaminated with sewage fungus for 200 metres downstream and that the cause of discharge was due to the pumping station malfunctioning.

The company was fined £5,000 and £750 costs (2000).

[mechanical equipment failure, drains & sewers, pollution, waste]

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]

11022May 1999

Source : CHEMICAL NEWS INTERACTIVE, 11 MAY, 1999.

Location : , USA

Injured : 4 Dead : 3

Abstract

A tetrafluoroethylene (TFE) explosion and fire occurred at a plant killing three employees and injuring four others.

The fire was quickly contained and extinguished but the cause of the explosion is under investigation.

TFE is one of the raw materials used in production of fluoro resins. TFE in its purest state is an odourless, colourless gas that will decompose when it contacts high temperatures and oxygen. It is classified as a flammable gas.

[fire - consequence, processing, fatality, injury]

Lessons

[None Reported]

11876May 1999

Source : CHEMICAL HAZARDS IN INDUSTRY, SEPTEMBER 1999.

Location : , USA

Injured : 0 Dead : 0

Abstract

A fire occurred at a plant causing damage of £1 million (1999). The incident occurred whilst toluene was being transferred from a 10,000 gallon tank to a 55 gallon drum. A spark caused a flash fire. Approximately 1000 gallons of toluene were spilled.
[fire - consequence, damage to equipment, drums, material transfer]

Lessons

[None Reported]

11875May 1999

Source : CHEMICAL HAZARDS IN INDUSTRY, SEPTEMBER 1999.

Location : , USA

Injured : 4 Dead : 3

Abstract

An explosion occurred at a tetrafluoroethylene plant killing three workers and injuring four others. An investigation is being carried out into the cause of the incident. The plant was subsequently shutdown.

[fatality, plant shutdown, 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]

1299801 April 1999

Source : LOSS PREVENTION BULLETIN, 147, 27,; BBC NEWS, 2 APRIL, 1999, (<http://www.bbc.co.uk>).

Location : , IRELAND

Injured : 0 Dead : 0

Abstract

A fire occurred at plant releasing toxic fumes into the atmosphere and forcing the evacuation of approximately 700 nearby residents. The blaze badly damaged the plant. Fortunately no one was injured in the incident.

[fire - consequence, damage to equipment]

Lessons

[None Reported]

12610 April 1999

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

Location : Devon, UK

Injured : 0 Dead : 0

Abstract

Raw sewage spilled into a drainage ditch from a pumping station. The incident occurred when the standby pump had been moved for repair and had not been replaced. The remaining pump had become air locked, and with no back up, sewage began to overflow and spill into the ditch.

A failure of the company's warning system meant the problem had been left undetected.

The company was fined £5,000 and costs of £300 (2000).

[drains & sewers, maintenance inadequate, waste, pollution, design or procedure error]

Lessons

[None Reported]

1052219 March 1999

Source : YAHOO NEWS, MAR 20, 1999, (<http://www.yahoo.co.uk>).

Location : Offshore, SCOTLAND

Injured : 0 Dead : 0

Abstract

A marine transportation incident. A marine tanker carrying flammable chemical fluids caught fire off the northern coast of Scotland, rousing fears of an ecological disaster.

Some 200 residents of two tiny villages were evacuated as the vessel caught fire and drifted just off the rocky coastline.

The tanker was carrying 1,750 tonnes of potentially explosive vinyl acetate which is used in the manufacturing of paints and adhesives, 76 tonnes of bunker fuel and 20 tonnes of fuel oil.

The engine room was sealed and power shut down when the fire was first reported, causing the 102 metre vessel to drift in high winds and stormy seas before being stopped by its anchor less than half a mile from the coastline. The ships captain stayed on board for three more hours, whilst the rest of the crew were airlifted to safety, to set up tow lines, drop anchor and flood the compartment separating the fire from the explosive cargo.

The vessel was eventually towed to a safe haven and the fire was successfully put out.

[evacuation, fire - consequence, near miss]

Lessons

[None Reported]

1052116 March 1999

Source : BBC NEWS, MAR 16, 1999,
(<http://www.bbc.co.uk>).

Location : , UK

Injured : 50+ **Dead** : 0

Abstract

More than fifty people were taken to hospital after a chemical spillage. The leak was of sodium hydroxide, believed to be from cleaning solution. Fire crews wearing special suits managed to control the spillage and a mobile decontamination unit was called in to clean-up.
[cleaning fluid]

Lessons

[None Reported]

Source : LOSS PREVENTION BULLETIN 146, 24,; CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 2 DECEMBER, 1999, (<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 : Springfield, Massachusetts, USA

Injured : 16 **Dead :** 1

Abstract

An explosion and fire occurred at a chemical company, which makes resin. One employee was killed and sixteen others were injured in the explosion. It is thought that the cause of the explosion was due to a build up of resin, which is used in the manufacture of moulds. The company was fined \$148,500 (1999).

[process causes, human causes, fatality, processing, injury]

Lessons

[None Reported]

1137902 February 1999

Source : THE CHEMICAL ENGINEER, FEB 1999,; LOSS PREVENTION BULLETIN 146, 24,; THE CHEMICAL ENGINEER, 11 FEBRUARY, 1999.

Location : , SCOTLAND

Injured : 0 **Dead :** 0

Abstract

An explosion and fire occurred at an antibiotics manufacturer destroying a three storey building. The explosion is believed to have originated in a drying unit which involved solvents and steam, no pharmaceutical products were involved.

[drier, fire - consequence]

Lessons

[None Reported]

1053501 February 1999

Source : BBC NEWS, FEB 2, 1999,
(<http://www.bbc.co.uk>).,; CHEMICAL HAZARDS IN INDUSTRY, JANUARY 2000.

Location : Michigan, USA

Injured : 14 **Dead** : 6

Abstract

An explosion and fire occurred in a motor manufacturing plant. Six people were killed and fourteen others were critically injured when an explosion ripped through the generating station at the plant. Hours after the fire began, thick toxic smoke bellowed from the station and spread to other parts of the plant, which at the time of the incident had 4,000 workers on site. The blast cut off all power.

A seven month investigation into the incident found that a build up of natural gas in the furnace chamber after shutdown was the cause of the explosion.

The company was fined \$7 million (2000).

[fire - consequence, fatality, power plant, boiler explosion, process causes, injury, toxic fumes]

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.

12100February 1999

Source : CHEMICAL HAZARDS IN INDUSTRY, DECEMBER 1999,; SAF. MANAGE. (LONDON), OCT 1999, 31.

Location : , UK

Injured : 2 Dead : 0

Abstract

A company was fined £2500 (1999), following an incident in which two employees suffered burns to their hands and faces whilst using solvent to strip paint off the inside of a boat hull. A spark from an electric sander ignited flammable vapour inside the boat.
[vapour cloud explosion, injury, tools & access equipment]

Lessons

The report stated that the company failed to ensure that the hull was properly ventilated. The incident could have been prevented by using an extractor fan to remove solvent vapour.

10591February 1999

Source : YAHOO NEWS, FEB 9, 1999, (<http://www.yahoo.co.uk>).

Location : , UK

Injured : 0 Dead : 0

Abstract

A fire occurred at a uranium depot. Nearby residents were advised to stay in doors after the blaze swept through a building containing uranium. No evidence was found of any release of uranium.
[fire - consequence, radioactive]

Lessons

[None Reported]

1188013 January 1999

Source : CHEMICAL HAZARDS IN INDUSTRY, SEPTEMBER 1999.

Location : , UK

Injured : 0 Dead : 0

Abstract

A company was fined on several occasions, the first occurred on 13 January 1999, when an uncontrolled chemical reaction caused a fire at a chemical plant. The company was fined £15,000 (1999).

The second incident occurred on 20 January 1999, a gas release incident. The company was fined £10,000 (1999).

The third incident occurred when special waste, mixed in a skip, reacted to produce a cloud of steam and formaldehyde causing environmental pollution and harm to human health. The company was fined £15,000 (1999). Employees from an adjacent company suffered breathing difficulties and eye irritation.

[unwanted chemical reaction, fire - consequence, gas / vapour release, people]

Lessons

[None Reported]

1262406 January 1999

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

Location : , UK

Injured : 0 Dead : 0

Abstract

A blocked sewer caused sewage to re-route itself through an old uncapped connection into a surface water system.

The company was fined £7,000 and costs of £700 (2000).

[flow restriction, waste, spill, drains & sewers]

Lessons

[None Reported]

11012January 1999

Source : CHEMICAL HAZARDS IN INDUSTRY, MAY 1999, ISSN 0265-5271.; CHEMPRESS, 19 FEB, 1999, 33(4), 4(DUTCH).

Location : Ludwigshafen, GERMANY

Injured : 0 **Dead** : 0

Abstract

Around 100 kg of the red pigment rhodamine was discharged into a nearby river from a purification installation. This substance is soluble in water and at certain concentrations is poisonous to aquatic life but in this case toxicity can be ruled out due to the high degree of dilution of the rhodamine.

[spill, chemical]

Lessons

[None Reported]

128601999

Source : QUARTERLY SAFETY SUMMARY, 1976, VOL.47, NO's. 185, 186,; CHEMICAL HAZARDS IN INDUSRY, OCTOBER 1999,; LOSS PREVENTION BULLETIN 147, PAGE 17.

Location : ,

Injured : 0 **Dead :** 0

Abstract

A monomer charge pump casing ruptured at the joint whilst out of service and unattended on a vinyl chloride monomer (VCM) tank farm. A release of liquid and vapour occurred and explosively ignited.

Many of the possible causes include, accidental starting of the pump when liquid filled and valved off, or the decomposition of instable compounds, or internal vapour/air ignition, the probable one was considered to be a combination of overpressurisation due to liquid VCM expansion in a completely full and leak tight system coupled with a weakened case joint due to over-tightened replacement mild steel studs in weakened holes where high tensile stud should have been fitted.

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

Lessons

The following recommendations were made:

1. Regular maintenance and corrosion inspections to be carried out.
 2. Improvements to operational practice, plant management and Hazop were suggested.
-

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]

114971999

Source : CHEMICAL HAZARDS IN INDUSTRY, JUNE 1999.

Location : ,

Injured : 0 Dead : 0

Abstract

A fire fighting system was triggered during maintenance activities at a power station when a quartzoid bulb in the system was accidentally broke. The fixed jet fire system activated the automatic deluge valve which failed, causing an escape of water and the ejection of cast iron fragments for distance of up to 20 feet.

No injuries or damage to the plant occurred. Examination showed that there was a lack of water in the priming valve which were made of a rubber which deteriorated in service.

[explosion / pressure release, fire fighting equipment]

Lessons

The following recommendations were made:

1. The automatic deluge valves should be checked for their state of priming.
 2. The rubber washers used should be made of copper tolerant rubber.
-

Source : ICHEME

Location : , MALAYSIA

Injured : 12 Dead : 0

Abstract

An explosion occurred on an air separation unit on a middle distillate synthesis plant.

The plant is designed to convert natural gas to naphtha, kerosene, gas oil, paraffins and wax. The synthesis gas for the gasification process is produced by partial oxidation of methane using pure oxygen.

Pure oxygen at 2,500 tonnes/day is produced by an air separation plant. It is understood that the explosion/detonation took place inside the N₂/O₂ separation column due to contamination (CO, NO or hydrocarbons).

Although the incident is still under investigation, the source of the contamination may have been due to the heavy haze in the region from forest fires. The air feed to the separation unit is water-washed and passes through a molecular sieve. Preliminary calculations, however, show that concentrations of contaminants as low as ppm in the inlet air feed could build up to kilogram quantities in the bottom of the fractionator.

Windows were broken 1.5 km away. Missiles landed in an adjacent liquefied natural gas (LNG) plant (500m away). One piece of metal (1.5 tonne) landed 800 m away.

Heavy damage occurred to the plant.

Fortunately, there were no fatalities and fortunately, the control room was designed for blast resistance.

Twelve injuries were reported on adjacent properties.

[separation equipment, damage to equipment, injury]

Lessons

The report stated the following recommendations:

Sites operating air separation units are to be made aware that contaminants can build up in these units to cause substantial explosions.

1080922 December 1998

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

Location : , CAMBODIA

Injured : 0 Dead : 2

Abstract

Fifty thousand people evacuated a resort after several thousand tonnes of imported toxic waste was dumped about six kilometres outside the city. The waste had been labelled cement material so residents brought sacks of the waste back to their houses using it to mix with cement and building materials.

The waste was later dumped in the streets near water supplies when people realised that the material could be dangerous.

Two people have died.

Authorities say the effects of the waste have been contained.

[evacuation, pollution, spill, human causes, people, fatality]

Lessons

[None Reported]

1262525 November 1998

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

Location : Erith, UK

Injured : - **Dead :** 0

Abstract

A series of errors and an illegal pump connection at a foul pumping station resulted untreated sewage and dangerous chemicals contaminating a surface pumping station. Approximately 5 million gallons of effluent pumped from the station into a nearby river.

A further failure of the pumps at the water pumping station resulted in effluent, which could no longer be pumped into the river, filling the wet-wells that then overflowed into the street, at pressure, via the road gullies. The effluent reached and flooded nearby houses in which residents were evacuated for a considerable amount of time, some not able to return at all due to the toxicity of the chemicals.

The company was fined £250,000 and costs of £12,847 (2000).

[pump failure, human causes, drains & sewers, waste, environmental, evacuation, spill, toxic chemical]

Lessons

[None Reported]

Source : EUROPEAN CHEMICAL NEWS, 23-29 NOVEMBER, 1998.

Location : Augusta, Georgia, USA

Injured : 46+ **Dead** : 0

Abstract

Approximately 46 people were injured when a chemical release sent a toxic vapour cloud of sulphur dioxide and oleum into the atmosphere.

The incident occurred when an instrumentation failure caused chemical vapours to vent from a smokestack instead of collecting in a storage tank.

[gas / vapour release, venting, storage tanks, injury]

Lessons

[None Reported]

1260208 November 1998

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]

1044225 October 1998

Source : CNN.COM, U.S. NEWS, 1998,
(<http://www.cnn.com>).

Location : Louisiana, USA

Injured : 2 Dead : 7

Abstract

An explosion occurred on a natural gas well killing seven workers and seriously injuring two. Flames shot 100 feet into the air as clouds of steam produced by salt water from the gas reservoir billowed over the well site in a clearing surrounded by pine forests.

Workers used bulldozers to dig a reservoir for the water runoff whilst fire crews prepared to cool off the well with water cannons to allow safe passage for workers to go in. Water was also poured onto drums of methanol, which is used for drilling, to try to keep those from exploding. The cause of the of the explosion is not known.

[gas / vapour release, fatality, injury]

Lessons

[None Reported]

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

Location : , UK

Injured : 0 Dead : 0

Abstract

Sewage was discharged from a wastewater treatment works killing fish in a nearby stream. Two days before the incident maintenance and repair work had been carried out at the site. Sometime shortly after this the electronic device controlling the flow to the treatment works failed and all the flow was directed to storm tanks and to the storm discharge point.

The company was fined £7,500 and costs of £660 (2000).

[ecological damage, pollution, leak, waste, drains & sewers, control failure, spill]

Lessons

[None Reported]

1043806 October 1998

Source : CNN.COM, U.S. NEWS, 1998, (<http://www.cnn.com>).

Location : Pennsylvania, USA

Injured : 0 Dead : 0

Abstract

A rail transportation incident. Approximately 200 people were evacuated when a train carrying hazardous chemicals derailed at the edge of a nearby national forest.

Toxic sulphuric and caustic sodium hydroxide leaked from two of the four tankers which overturned.

[evacuation, sulphuric hydroxide, derailment, spill]

Lessons

If inhaled, sulphuric acid can cause respiratory problems or skin, eye and ear irritation. In greater concentrations, exposure could be deadly.

11955October 1998

Source : CNN.COM, U.S. NEWS, OCTOBER 9, 1998, (<http://www.cnn.com>).

Location : , USA

Injured : 6 Dead : 0

Abstract

An explosion and fire occurred at a computer plant sending poisonous fumes into the atmosphere. Six people were injured. The fire released a cloud of silicon tetrachloride gas, which can burn the skin and eyes on contact and burns internally if inhaled. The fire was immediately extinguished and the gas release contained.
[fire - consequence, gas / vapour release, processing, injury]

Lessons

When silicon tetrachloride gas comes in contact with air, it dissipates into fume silica, a sand like material and hydrogen chloride.

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

Location : Wales, UK

Injured : 0 **Dead :** 0

Abstract

Sewage effluent was discharged into a river from a sewage treatment works. The incident occurred due to the works experiencing difficulties with their biological treatment process, resulting in considerable amounts of foam at the aeration tanks.

Foam covered approximately 30 metres downstream and 15 metres upstream; a dark plume could also be seen. The company was fined £1,500 and costs of £546 (2000).

[pollution, leak, drains & sewers, waste]

Lessons

[None Reported]

Source : BBC NEWS, 23 SEP, 1998,
(<http://www.bbc.co.uk>).

Location : , UK

Injured : 8 **Dead :** 0

Abstract

A road transportation incident. Eight people were treated at hospital in blood spill scare after more than 50 gallons of cows' blood leaked from a tanker onto a motorway.

Tests on the blood revealed no BSE contamination.

The remains of the tanker's cargo was transferred to another tanker and transported to an incinerator to be destroyed.

The cause of the incident is thought to have been valve failure.

[waste, road tanker]

Lessons

[None Reported]

10334September 1998

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

Location : , UK

Injured : 6 Dead : 0

Abstract

Six workers were taken to hospital after a 100,000 gallon water tank collapsed and badly damaged a whisky plant.

Contractors were carrying out routine maintenance on the tank at a bottling plant when the accident happened.

The tank ruptured and flooded the whisky plant with thousands of gallons of water.

Considerable damage occurred, the pump room was destroyed completely and there was structural damage to some other buildings. The cause of the incident is not yet known.

[damage to equipment, processing]

Lessons

[None Reported]

11030September 1998

Source : CHEMICAL HAZARDS IN INDUSTRY, JUNE, 1999, ISSN 0265-5271,; CHEM. BR, APR 1999, 35(4), 9.

Location : , UK

Injured : 2 Dead : 0

Abstract

A company was fined more than £25,000 (1998) following an explosion that injured two workers and released cloud of toxic gas.

Nitric acid had escaped from a leaky valve as it was being transferred from one container to another. The leaked nitric acid then mixed with cleaning fluid to create an explosion which blew the workers of their feet. The injured were taken to hospital but were later released. Workers from a nearby plant were evacuated due to the formation of a gas cloud.

[gas / vapour release, material transfer, evacuation, injury]

Lessons

[None Reported]

Source : ICHEME

Location : , UK

Injured : 1 Dead : 0

Abstract

A man was critically ill in hospital after a leak of highly toxic gas occurred at a plant.

About 2000 staff took cover in 'toxic shelters', buildings which can be sealed, when the alarm sounded.

The leak was contained within the plant.

The incident occurred as equipment was being prepared for maintenance.

[evacuation]

Lessons

[None Reported]

10208July 1998

Source : REUTERS LIMITED, 1998.

Location : North Carolina, USA

Injured : - Dead : -

Abstract

Hundreds of thousands of fish have been killed along a lower part of the Neuse River in a major outbreak of the toxic *Pfiesteria* microbe. Heavy spring rains and a dry summer made conditions ripe for emergence of the deadly toxin. The outbreak has killed an estimated 500,000 fish over the past five days, and is an ominous sign for fishermen and boaters along the East Coast.

The *Pfiesteria* microbe has covered a seven-mile stretch of the Neuse River about 15 miles downstream from New Bern in coastal North Carolina. About half the fish caught in one section of the river had ulcerated lesions on their skin associated with an active *Pfiesteria* outbreak.

Pfiesteria in recent years has been linked to several major fish kills on East Coast waterways, where scientists say the microorganism thrives in nutrients generated by sewage, animal waste and fertilisers flushed into rivers and streams. It was first discovered swarming in a major fish kill on the nearby New River in May 1991, causes lesions and stupefies fish, and may have similar effects on people exposed to the toxin.

[hot weather, rain, ecological damage, leak]

Lessons

[None Reported]

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

A factory effluent consent breach occurred following an upset on an ethylene plant. The incident arose from commissioning problems on the plant, after the plant had been shutdown for maintenance work. Emulsified water was sent to the nearby river foreshore via the plant effluent outlet. The sample of the effluent at the foreshore showed the hydrocarbon content to be 62 ppm against a maximum consent limit for spot samples of 45 ppm.

The incident was caused by a short term loss of efficiency of the waste water stripper. The performance of the stripper was reduced for about two hours due to the base section being full of liquid.

[mechanical equipment failure, spill]

Lessons

1. Contingency plans for holding up any contaminated water should be developed prior to restarting the ethylene plant.
 2. The waste water stripper level instrumentation should be reviewed to assess if it is feasible to avoid false zeros.
 3. The stripper Operating Instructions should be reviewed to give guidance on the actions to be taken if the tower is not operating efficiently.
 4. This incident should be used as a learning event to provide refresher training to plant operators.
 5. The ethylene plant radio performance should be reviewed to improve the reliability of the system.
-

Source : HAZARDOUS CARGO BULLETIN, FEBRUARY 2000.

Location : Kalgoorie, AUSTRALIA

Injured : 0 **Dead** : 0

Abstract

A leak of sodium cyanide occurred from a tank container.

The incident occurred due to poor design and location of a pressure test nozzle, which led to the leakage of cyanide liquor from a tank container unloading liquid sodium cyanide.

The end frames of the container normally protect such nozzles but in this case the nozzle protruded over the top of the end frames. It is thought that the nozzle had been damaged when another tank container was lifted over this unit.

[spill, design inadequate]

Lessons

The owner of the tank container has subsequently redesigned the unit and all similar containers so that the pressure test nozzle does not protrude outside the body of the tank.

The company concerned has prohibited the practice of lifting containers over the top of tank containers.

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.
-

10398May 1998

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

Location : Lake Issyk-kul, KYRGYZSTAN

Injured : 70+ **Dead** : -

Abstract

A road transportation incident. More than 70 people were taken to hospital with suspected cyanide poisoning, after nearly 2,000 kg of the chemical spilled into a river.

An emergency committee was set up to cope with the disaster as several hundred other people complained of feeling unwell. Around four thousand people were evacuated from the nearby village.

The sodium cyanide was being transported in cylinders to a gold mine when a truck carrying it crashed spilling its cargo.

The cyanide leaked into the river, which feeds the country's largest lake.

Sodium cyanide is used extensively in Central Asia as a separating agent in gold mines.

[evacuation, road incidents]

Lessons

[None Reported]

Source : CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD, 29 JULY, 1999. (<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 : Clairton, USA

Injured : 2 **Dead :** 2

Abstract

An explosion occurred at a coal tar distillation plant killing two workers and injuring another two.

The explosion occurred during welding work on a pipe connected to a one million gallon coal tar distillation tank, which was out of service at the time of the incident.

[fatality, injury]

Lessons

[None Reported]

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

Location : Nevada, USA

Injured : 8 Dead : 3

Abstract

An explosion and fire occurred at a chemical plant which manufactures a variety of explosives and chemicals . 12 people were believed to have been inside the plant at the time of the explosions.

A second fire was being allowed to burn itself out amid that there may be more explosives at the plant and that there may be toxic vapours in the air. Because the plant is located in a rural, canyon area, no evacuations were necessary.

[fire - consequence, fatality, toxic fumes]

Lessons

[None Reported]

104001998

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

Location : Donana National Park, SPAIN

Injured : 0 **Dead** : 0

Abstract

Clean up of 20 million tonnes of toxic material left by a waste spill from a mine. The clean up began a week after a reservoir wall at a pyrite mine collapsed, sending highly acidic waters into the nearby rivers.

Makeshift dykes were constructed to divert the toxic flow away from the local national park, but surrounding marshlands suffered severe damage. Crops were ruined and thousands of birds and fish killed by contamination.

[environmental, ecological damage, external causes]

Lessons

[None Reported]

102791998

Source : CNN.COM, U.S. NEWS, 1998, (<http://www.cnn.com>).

Location : , USA

Injured : 15 Dead : 1

Abstract

A fire control system at a nuclear waste storage site was accidentally activated, killing one and injuring fifteen.

Maintenance work on electrical systems was being carried out when the fire suppression system, which uses carbon dioxide to snuff out flames by removing oxygen from the air, filled the room the workers were in with dangerous gas.

[fire - consequence, radioactive, safety equipment failure, fatality, injury]

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]

1040128 December 1997

Source : LOSS PREVENTION BULLETIN, 139, 23.; THE WESTERN MAIL, 29 DECEMBER 1997.; CEEFAX, 28 DECEMBER 1997, 9 JANUARY. THE CHEMICAL ENGINEER, 15 JANUARY 1998.

Location : , UK

Injured : 0 **Dead :** 0

Abstract

A rail transportation incident. Around 1000 people were evacuated from their homes following a derailment of a freight train wagon carrying sixty tonnes liquid vinyl chloride monomer (VCM). The wagon was the last of nine being taken to the docks, when it derailed while going over manually operated points and turned on its side.

Although the wagon survived the impact intact and there was no leak, forty-eight fire fighters and twenty one employees were required to provide the necessary support during the operation to pump out the wagon.

The residents within a 300 m radius were evacuated as a precaution, during the decanting procedure in case of leakage, which was due to the flammable nature of VCM could have easily ignited.

The cause of the incident was due to human error.

[evacuation, human causes, derailment - consequence, spill]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, FEBRUARY 1998.

Location : , UK

Injured : 0 Dead : 0

Abstract

A rail transportation incident. A tank wagon containing vinyl chloride monomer (VCM) a liquefied gas derailed at low speed. Although the wagon came off the rails and turned on its side there was no leak of gas.

[derailment]

Lessons

[None Reported]

Source : LOSS CONTROL NEWSLETTER, 1997.

Location : , ANGOLA

Injured : 5 **Dead :** 2

Abstract

A fire consumed a depot's entire stock of solvents and lubricants but was extinguished before spreading to fuel storage tanks at a nearby refinery. The fire was apparently caused by a short circuit.

[fire - consequence, fatality, storage equipment]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 **Dead :** 0

Abstract

An incident occurred during unloading operations, xylene was being transferred from a road tanker to a bulk storage tank. Confusion concerning the capacity of a tank and the amount of material in it caused the tank to overflow.

The spilled material was contained in a bund, covered with foam and then pumped into 200 l drums.

[storage tanks, operation inadequate]

Lessons

[None Reported]

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

Radiography was taking place on a plant. A restricted area had been taped off, checked and was believed to be free of personnel. A process technician left the control room and entered approximately 2m inside the radiography barrier to take a routine sample. Before he could take the sample he was advised to leave the area immediately by another technician (not involved in the radiography). The process technician left the area.

The calculated dose of possible exposure was less than the background radiation and therefore it was concluded that the potential radiation exposure was minimal.

[sampling, radioactive]

Lessons

1. A review of the Radioactive Substances Certificate is recommended.
 2. Local rules for radiography should reflect current HSE guidance on minimising the exclusion area.
 3. The use of a marked up plot plan showing the exclusion zone should be considered for all radiography work to assist permit control and work planning.
 4. Familiarisation with radiography procedures is recommended for manufacturing team members.
 5. Review the source strength being used for site radiography with a view to increase the source strength allowing exposure time minimisation.
-

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

Leaking chemical drums on an industrial site had triggered a fire on a lorry on which they were stored.

The police sealed off the area around the industrial estate and fire fighters were alerted. Two 25 litre drums, stored on the lorry parked overnight at the industrial estate, containing benzene and phosphorus oxydichloride had leaked. The chemical gives off toxic fumes when it is in contact with air and especially water.

The fire service, using special absorbent material which acts as an oil and chemical binder, transferred the leaking drums to larger drums which had been sealed.

It was confirmed that the spillage had been contained and that there was no threat to the environment.

[storage, fire - consequence]

Lessons

[None Reported]

Source : ENVIRONMENTAL INFORMATION BULLETIN, 1997, JUL.

Location : , UK

Injured : 0 Dead : 0

Abstract

Effluent from a vinylidene chloride manufacture spilt into a canal.

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 5 Dead : 2

Abstract

Severe damage occurred to a steam turbine when a compressor on ammonia plant refrigeration failed killing two people and injuring five others.

The failure of the turbine rotor resulted in the steam, let down from 97 bar superheated at 496 degrees C, mixed with lubricating oil. The release enveloped five employees in the area of the turbine and compressor.

An investigation concluded that the incident was a result of a combination of errors, which occurred in a sequence which provided the opportunity for the turbine failure.

[damage to equipment, fatality, mechanical equipment failure, gas / vapour release, injury]

Lessons

[None Reported]

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

Location : New York, USA

Injured : 0 **Dead** : 0

Abstract

A rail transportation incident. Forty cars of a 95 car train, including a tank car carrying sulphuric acid derailed, the tank car leaked from the top dome.
[derailment, spill, rail tanker]

Lessons

[None Reported]

Source : CNN INTERACTIVE, US NEWS STORY PAGE, JULY, 1997. CABLE NEWS NETWORK INC, (<http://www.cnn.com>).

Location : Ohio, USA

Injured : 0 Dead : 0

Abstract

An explosion occurred heavily damaging a chemical plant which caused a cloud of irritating fumes that forced the evacuation of nearby areas, the explosion was felt up to seven miles away.

The cause of the explosion was a kettle in which chemicals were being heated to form a resin, overheated and exploded. Two toxic chemicals, phenol and formaldehyde were being mixed along with sulphuric acid to produce a non toxic resin used as a binder in the manufacture of wood products such as plywood and particle board.

[high temperature, processing]

Lessons

[None Reported]

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

Location : Texas, USA

Injured : 0 **Dead** : 0

Abstract

An explosion and fire occurred in a No.1 cargo tank of a barge loading toluene. The fire was extinguished in 15 minutes using foam agent.
[fire - consequence]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 4 Dead : 0

Abstract

A plant was evacuated when a small leak of ethylene diamine occurred causing toxic fumes to be released. Three workers and a fire officer were injured.
[evacuation, gas / vapour release, injury]

Lessons

[None Reported]

Source : LOSS CONTROL NEWSLETTER, 1997.

Location : ,

Injured : 0 Dead : 0

Abstract

Sulphuric acid vapour was released from a pinhole leak in a tower. The area was doused with a water curtain, which confined the leak to a small plant area.

[gas / vapour release, operational activities]

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]

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

Location : , INDIA

Injured : 0 Dead : 0

Abstract

A marine transportation incident. An anchored cargo ship laden with 4,200 tonnes of sulphur took on water in high winds causing the engines to fail and the ship to sink. All crew rescued.

[weather effects, sinking]

Lessons

[None Reported]

8940 29 July 1997

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

Location : Izmit, TURKEY

Injured : 29 Dead : 0

Abstract

A fire occurred following an explosion in a paint mixing department of a car factory. Twenty nine workers fell ill due to toxic fume inhalation.
[fire - consequence, processing, toxic gas]

Lessons

[None Reported]

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

Location : Ontario, CANADA

Injured : 0 **Dead** : 0

Abstract

A fire occurred at a plant holding 500 tonnes of waste plastics. The blaze lasted for four days causing 100 fire fighters to be exposed to toxic fumes and 650 residents to be evacuated. Debris contaminated.
[fire - consequence, evacuation]

Lessons

[None Reported]

8934 06 July 1997

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

Location : , INDIA

Injured : 100 Dead : 0

Abstract

An SO₂ (sulphur dioxide) release from a copper smelter settled onto an adjacent dry flower factory injuring some 100 people, five of them critically. Symptoms were, chest pains and eye, nose and throat irritation.

[spill, processing, injury]

Lessons

[None Reported]

Source : CNN INTERACTIVE, EARTH STORY PAGE, JULY, 1997, CABLE NEWS NETWORK INC, (<http://www.cnn.com>).

Location : New Jersey, USA

Injured : 0 **Dead** : 5

Abstract

Pollution near a now closed munitions plant killed five residents and sickened others with illnesses including lead poisoning. The company involved improperly disposed of toxic industrial waste, including heavy metals and solvents, by burning it in open pits or dumping it into a stream.
[human causes, fatality]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

Location : Haifa Bay, ISRAEL

Injured : 0 **Dead** : 0

Abstract

A fire occurred on an aromatic plant. The fire was contained in the xylene unit. There were no casualties.

[fire - consequence]

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 : CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

Location : , USA

Injured : 1 Dead : 0

Abstract

A road transportation incident. A tank truck hauling 6400 gal of toluene crashed into a utility pole in a small town. An estimated 200 gal of the cargo spilled, but because the material is highly flammable and live utility lines had been downed in the incident about 300 residents were evacuated. There was no fire and residents were allowed to return to their homes the next day. The driver was treated at a local hospital.

[collision, evacuation]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

Location :

Injured : 2 Dead : 1

Abstract

A rail transportation incident. A transportation freight train carrying hazardous chemicals crashed into a coal train. The freight train burst into flames as its two engines and 13 of its cars derailed. Homes within a half-mile radius of the crash site were evacuated for 24 hours. One freight crew member was killed and two were injured but there were no injuries on the coal carrier.

Tank cars carrying bleach, sulphuric acid and ammonium nitrate were initially reported to be on fire at the scene. The sulphuric acid was transferred and a car partially loaded with hydrogen peroxide was removed.

A tank car carrying acetaldehyde continued burning through to the next day.

[fire - consequence, collision, derailment - consequence, evacuation, fatality, injury]

Lessons

[None Reported]

8904 05 June 1997

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

Location : Teeside, UK

Injured : 0 Dead : 0

Abstract

An oil spill occurred into a river followed by a leak of gas (titanium tetrachloride).

Lessons

[None Reported]

8957 05 June 1997

Source : ENVIRONMENTAL INFORMATION BULLETIN, 1997, JUL.

Location : , UK

Injured : 0 Dead : 0

Abstract

A leak of titanium tetrachloride gas occurred creating a toxic plume.

Lessons

[None Reported]

Source : LOSS CONTROL NEWSLETTER, 1997,; ENDS REPORT 269, JUN, 1997,; ECN, 16-22 JUN, 1997.

Location : , UK

Injured : 0 Dead : 0

Abstract

About 5 tonnes titanium tetrachloride leaked into cooling water system in a heat exchanger, corroding a pipe and was released into the atmosphere. A dense white cloud of hydrochloric acid and titanium oxychloride occurred. Prohibition notice issued.

[cooling equipment, gas / vapour release, corrosion]

Lessons

[None Reported]

Source : CNN INTERACTIVE, US NEWS STORY PAGE, JULY, 1997. CABLE NEWS NETWORK INC, (<http://www.cnn.com>),; HAZARDOUS CARGO BULLETIN, 1997, AUG. LLOYDS LIST.

Location : Indiana, USA

Injured : 34 **Dead** : 1

Abstract

An employee was killed and thirty four people injured when an explosion at an aerosol packaging plant that was caused by a release of toxic gas. About 2,500 people were evacuated from the area because of fumes from toxic ethylene oxide. The colourless gas which escaped can be used as a fumigant, insecticide and sterilising agent.

[leak, evacuation, fatality, toxic gas, injury]

Lessons

[None Reported]

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

Location : , VENEZUELA

Injured : 0 **Dead** : 0

Abstract

A marine transportation incident. A tanker in ballast allegedly illegally discharged 8,500 t of dirty ballast water into a lake.
[environmental, human causes]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 **Dead :** 0

Abstract

Approximately 1000 litres of intermediate containing xylene was spilt when an operator failed to check a connection from a pump. The spillage was contained and covered with foam. There were no environmental consequences.

[operator error, spill, near miss]

Lessons

[None Reported]

8877 05 May 1997

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

Location : , MEXICO

Injured : 0 Dead : 0

Abstract

A fire occurred in a solvent , the fire was brought under control in one hour.

[fire - consequence]

Lessons

[None Reported]

Source : ENVIRONMENTAL INFORMATION BULLETIN, 1997, JUL.

Location : ,

Injured : 0 Dead : 0

Abstract

Over 50 tonnes of trichloroethylene was spilt and approximately one tonne entered a nearby canal.

[spill]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

Location :

Injured : 0 Dead : 0

Abstract

A company illegally disposed of its tins of solvent based liquids with a flashpoint of less than 40 degrees C at a land fill disposal site.
[environmental, human causes]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, OCT.

Location : Chongqing, CHINA

Injured : 0 **Dead** : 12

Abstract

An explosion and fire occurred in a waste water treatment area of a neoprene unit of a chemical factory.

[fire - consequence, processing, fatality]

Lessons

[None Reported]

8969 May 1997

Source : CNN INTERACTIVE, US NEWS STORY PAGE, JULY, 1997. CABLE NEWS NETWORK INC, (<http://www.cnn.com>).

Location : Arkansas, USA

Injured : 16 Dead : 3

Abstract

A fire and explosion occurred in a chemical packaging plant releasing a plume of black toxic smoke, forcing hundreds of people to evacuate homes and businesses.

The cause of the fire is believed to have been a smouldering bag of pesticide which caught fire and ignited the explosion.

The chemicals involved were azinphosmethyl, methomyl and thiophante. All are considered poisonous. Azinphosmethyl is an insecticide that is more toxic to insects than it is to humans and thiophante is a fungicide used to control parasitic worms in animals.

Population totalling about 18,000 were told to stay indoors.

[fire - consequence, fatality, fume, toxic fumes]

Lessons

[None Reported]

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

An incident at a coatings plant. A fitter was working on pipework to remove a blockage from a high speed disperser on the middle floor of a production building. The fitter told the supervisor and an operator not to use the machine. However, whilst he was on a break, a second operator on the top floor started to charge the disperser and 190 litres of xylene flowed out through open pipework. The site was evacuated whilst the spill was cleared.

[evacuation, operator error, permit to work system inadequate, maintenance]

Lessons

Isolation procedures and Work Authorisation notes to be developed

Source : LOSS CONTROL NEWSLETTER, 1997.

Location : , GERMANY

Injured : 0 Dead : 0

Abstract

A fire started when a mixture of isopropyl alcohol and a solvent ignited due to an electrostatic spark during the mixing of the two substances. Leaking solvents were responsible for the extension of the blaze to the production unit.

[fire - consequence]

Lessons

[None Reported]

9067 02 April 1997

Source : ICHEME

Location : , FRANCE/GERMANY

Injured : 0 Dead : 0

Abstract

A train derailed carrying highly radioactive spent nuclear fuel. Three railcars loaded each carrying one shipping cask, which contained six spent fuel elements. The accident happened while the train was changing tracks at low speed.

Lessons

[None Reported]

9006 01 April 1997

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, SEP.

Location : , SINGAPORE

Injured : 0 Dead : 0

Abstract

A leak of hydrogen sulphide from an xylene production unit at an aromatic plant. The incident occurred during a scheduled maintenance.

Lessons

[None Reported]

9002 01 April 1997

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, SEP.

Location : , AUSTRALIA

Injured : 3 Dead : 0

Abstract

A storage tank ruptured releasing 11,600 litres of sulphuric acid.

[storage tanks, spill]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, OCT.

Location : Hampshire, UK

Injured : 0 **Dead** : 0

Abstract

A spill of twenty two tonnes of trichloroethylene. The trichloroethylene leaked from a tank and through a bund towards a nearby river.
[storage tanks]

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]

3204 18 March 1997

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

An incident at a coatings plant. A let-down tank containing a white spirit based resin, overflowed by approximately 800 litres. The site was evacuated and the spillage cleared.

The level in the tank was controlled by a PLC. The PLC had correctly opened the inlet valve to the tank, but the incident happened when the valve failed to shut. It was discovered that the controller on the valve had drifted out of calibration.

[evacuation, valve failure]

Lessons

Data store to check and calibrate controllers.

Install additional valves to this, and other tank inlets and hard wire from high level switches.

Source : LOSS PREVENTION BULLETIN, 134, 24.

Location : ,

Injured : 28 Dead : 0

Abstract

Twenty eight people were taken to hospital after a chemical alert at an airport. Ground staff unloading the aircraft found 68 powdered chemicals, thought to be pesticides, leaking into the hold and giving off toxic fumes.

Fire crews in chemical protection suits and breathing apparatus were called. Ambulances took casualties to two local hospitals. The victims had inhaled fumes, though none was seriously affected.

[spill, gas / vapour release]

Lessons

[None Reported]

1197712 March 1997

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

A static discharge occurred whilst a solvent with a flash point of -2degrees C, was being transferred to a drum. This caused ignition of the drums contents, the fire spread to two adjacent drums. The fire was quickly extinguished.
[material transfer, fire - consequence]

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.

Source : LOSS CONTROL NEWSLETTER, 1997.

Location : , NEW ZEALAND

Injured : 0 Dead : 0

Abstract

A fire occurred at the top of a large 10 sq. metre mound of sulphur. A toxic cloud of sulphur dioxide release spread over the nearby town but was contained within an hour to the immediate site.

[gas / vapour release, contamination, fire - consequence, storage, environmental]

Lessons

[None Reported]

9028 09 February 1997

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, AUG.

Location : Texas, USA

Injured : 0 Dead : 0

Abstract

Three hundred and thirty pounds of liquid, mostly water but containing 1.5% acetic acid was released. The spill occurred when a control valve failed on a solvent stripper.

No injuries were reported and contamination was minimal.

[mechanical equipment failure, valve failure]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, JUL.

Location : , NETHERLANDS

Injured : 3 **Dead :** 1

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]

Lessons

[None Reported]

8799 27 January 1997

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, NOV.

Location : Buckinghamshire, UK

Injured : 1 **Dead** : 0

Abstract

A drum containing polyester resin exploded causing slight injury. The employee who was wearing suitable protective clothing suffered minor burns. He had been working removing the tops of barrels with a flame cutter and had successfully removed three lids the fourth exploded due to a build up of styrene vapours.

[explosion, hot work, container, hot surface, vapour cloud explosion, injury]

Lessons

[None Reported]

1197415 January 1997

Source : ICHEME

Location : , GERMANY

Injured : 0 **Dead :** 0

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]

Lessons

[None Reported]

9068 15 January 1997

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

A rail transportation incident. A railcar carrying a nuclear fuel cask derailed during a track change in front of a nuclear power plant.

[derailment - consequence]

Lessons

[None Reported]

Source : ICHEME

Location : , GERMANY

Injured : 0 Dead : 0

Abstract

Part of an upper tray in a column on a distillation plant became displaced releasing approximately 18 tonnes of a mix of acrylonitrile and process water. Prompt action by site personnel minimised the danger to the plant and personnel. The local fire brigade pumped the spilt liquors into another tank for refeeding back into the distillation plant at a later time.

[spill, near miss, mechanical equipment failure]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, SEP.

Location : Dorset, UK

Injured : 0 **Dead** : 0

Abstract

A fire occurred in a plating factory. Firefighters wearing breathing apparatus and chemical protection suits were sent into the factory to find the core of the fire and gauge the danger of the chemicals. It was known that some of the chemicals reacted with water, others would produce highly toxic gases if involved with fire and others were known to be marine pollutants. Therefore, the fire had to be tackled with minimum amounts of water.

The presence of cyanide and the risk of chemical explosion prompted the evacuation of about 300 people from the surrounding area. The intensity of the fire forced firefighters to retreat outside the building and continue operations from there. The fire was contained on the first floor area and extinguished.

Investigation showed that the cause of fire was the overheating of an electrical rectifier, used to convert AC supply to DC for the electroplating process.

Estimated loss was £1,000,000 (1997).

[fire - consequence, toxic gas, cyanide fumes]

Lessons

[None Reported]

Source : ENVIRONMENTAL INFORMATION BULLETIN, 1997, JUL.

Location : ,

Injured : 0 Dead : 0

Abstract

A leak of titanium tetrachloride gas occurred from a trioxide plant.

Lessons

[None Reported]

Source : LOSS PREVENTION BULLETIN, 136, 24.

Location : West Virginia, USA

Injured : 0 **Dead** : 0

Abstract

A rail transportation incident. Hundreds were evacuated when a train packed with bleach, sulphuric acid and other chemicals smashed into the back of a coal train.

[evacuation]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, OCT.

Location :

Injured : 3 **Dead :** 0

Abstract

Three men working on a television mast were accidentally exposed to high levels of ultra-high radiofrequency radiation (685 MHz mean value). They experience an immediate sensation of intense heating of parts of the body in the electromagnetic field, followed by a number of symptoms which included pain, headaches, numbness and parasthesiae, malaise, diarrhoea and skin erythema. Acute and chronic headaches were experienced which involved the part of the head which is most exposed.

[radioactive, maintenance]

Lessons

[None Reported]

122251997

Source : CHEMICAL HAZARDS IN INDUSRTY, FEBRUARY 2000.

Location : South Wales, UK

Injured : 0 **Dead** : 0

Abstract

A company was fined £10,000 (2000), for polluting a watercourse with transformer oil. Allegedly the company was aware that one of it's transformers was leaking, but continued to top up the oil until it eventually contaminated the ground and was washed into a tributary.

[pollution, human causes, contamination]

Lessons

[None Reported]

Source : ICHEME

Location : , GERMAY

Injured : 0 Dead : 0

Abstract

An explosion in the rotary kiln of a waste incinerator at a fibre manufacturing plant.

Charging of the kiln had been stopped for one hour at shift change-over. A molten salt pool accumulated in the kiln. When charging resumed, the explosion occurred.

The waste being charged had a high carbon disulphide content and was frozen due to low ambient temperatures.

The kiln had to be taken off-line for repairs and was returned to service three days later.

A similar incident had occurred in the kiln several years earlier.

[processing, process causes]

Lessons

Project team set up to investigate the incineration of water material with high carbon disulphide content.

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]

9020 December 1996

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, SEP.

Location :

Injured : 2 Dead : 0

Abstract

An explosion occurred when sparks from a cutting torch ignited vapours emitted from a barrel of scrap metal injuring two workers.

[hot work, vapour cloud explosion, gas / vapour release, flammable chemical, injury]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 **Dead :** 0

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

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,

Lessons

[None Reported]

Source : ICHEME

Location : , SWEDEN

Injured : 0 Dead : 0

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.
-

8647 11 November 1996

Source : LLOYDS LIST, 1996, NOV, 13.

Location : Los Angeles, USA

Injured : 0 Dead : 0

Abstract

An explosion rocked the refinery which occurred in a unit using high temperature and pressure to remove sulphur.
[refining]

Lessons

[None Reported]

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

A night shift was converting bright dope into matt dope using a mixer by adding titanium paste. When the operator went to discharge the mixer he opened the wrong valves. The dope was discharged to old pipework which at the time was being decommissioned and had an open end. Approximately 2000 kilograms of matt dope was released. The dope was approximately 73% acetone and 27% acetate.

[operator error, mixing, spill, decommissioning]

Lessons

[None Reported]

8474 06 November 1996

Source : EUROPEAN CHEMICAL NEWS, 1996, NOV, 11.

Location : Northumberland, UK

Injured : 0 Dead : 0

Abstract

A fire occurred in a plant making ink resins and curing agents.

[fire - consequence, processing]

Lessons

[None Reported]

8473 24 October 1996

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

Location : Sakai, JAPAN

Injured : 0 Dead : 0

Abstract

A fire occurred at a refinery causing shortage of xylene.

[fire - consequence, refining]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

An FCC Unit was shut down for 9 days following failure of the wet gas compressor turbine. Total loss was estimated at \$4.65 million (£2,776,119) (1996). The loss was caused by water contaminating the lubricating oil of the turbine driver. Water had entered the lube oil system through a defective steam ejector system that is an auxiliary part of the wet gas compressor's steam turbine driver. The FCC wet gas compressor was installed in 1971 and had two, long operating periods (12 years and 11 years) without an incident. On September 27, 1996, a short-term lube oil bearing temperature increase of 15 degrees F on the inboard end of the turbine was followed with a 70 degrees F fall in lube oil temperature. This was possibly the first indication of some loss of bearing material, which resulted in an increase in the bearing clearances allowing more oil to flow into the bearings. This increased flow resulted in the reduction of the lube oil temperature below normal level. On September 28, a decline in the turbine exhaust vacuum was discovered. This was rectified by adjusting the sealing steam and the condenser ejector system. The decline in vacuum was probably due to the increase in bearing clearance the previous day causing some minor degradation of the turbine labyrinth seals. The turbine exhaust steam vacuum was steady throughout the remainder of the week, until Friday, October 4. Again the sealing steam had to be adjusted to maintain proper vacuum. Operations continued normally until the morning of October 5. At 05:50 hrs. a vibration alarm came on in the control room. Operator response to the turbine-compressor train found excessive vibration on the turbine. The sealing steam pressures were abnormal and the turbine exhaust vacuum had declined. Adjustments failed to correct the vibration problem or the turbine exhaust pressure. Increased vibration and "sparks" from the packing box area of the turbine resulted in the decision to shut down.

The FCC steam turbine driven wet gas compressor was shut down owing to extremely high vibration, sparking from the inboard and outboard packing box and a total loss of turbine performance. Inspections carried out afterward on the turbine and compressor found the following:

1. The radial bearings were excessively worn, all babbitt was found removed and the rotor had operated on the bronze backing of the tilt pad bearings.
2. The shaft labyrinth seals were heavily damaged.
3. There was damage to the rotor blades at the 5th stage (severe) and on the 7th and 8th stages.
4. There was evidence of heavy rust in bearing housings and the oil lubricated coupling was fouled with rust and "blocked up."
5. The compressor itself was undamaged, but there was rust in the bearing housings and minor damage to thrust bearings.

Evidence of water contaminated lube oil throughout the system caused sludge and corrosion material build up in the bearings. The water came from a defective steam ejector system. Eight out of the 12 tubes of the gland condenser had failed; and since the condenser drain was plugged, it allowed the cooling water to flow back into the turbine seals and into the lube oil system.

The refinery took a number of corrective actions that included:

1. Repair of and modification to the ejector system.
2. Development of a proper lube oil monitoring system for all rotating equipment on site.
3. A review of other machine condition monitoring systems for bearings.
4. Development of a comprehensive training program including refresher training to ensure compressor - turbine auxiliary systems are fully understood.
5. Ensuring clear communications between operations and maintenance on the priority that should be given to monitoring and maintenance of critical equipment.

The immediate cause of the failure was the presence of water in the lubricating oil system which destroyed the ability of the lube oil to support the rotating equipment. The basic cause of the contamination was the leaking tubes on the associated with the auxiliary system ejector system combined with the plugged drain. In addition, the failure to identify and/or acknowledge a number of warning signals prior to the incident was also significant. The latter was attributed to training particularly the need for refresher training on the wet gas compressor's auxiliary systems.

[cracking, turbine, mechanical equipment failure, training inadequate, plant shutdown]

Lessons

1. Rotating equipment lubricating oil examination to detect contaminants to be a routine operation.
2. Use condition monitoring equipment to determine critical bearing performance, but be sensitive to other early warning signals.
3. Auxiliary systems are outside operations mainstream expected performance and so are easily overlooked. Refresher training is essential for these systems.

8472 03 October 1996

Source : PROCESS ENGINEERING, 1996, NOV.;; EUROPEAN CHEMICAL NEWS, 1996, OCT, 7.;; PRESS ASSOCIATION.

Location : Avonmouth, UK

Injured : 18 **Dead** : 0

Abstract

A series of explosions ripped through an epichlorohydrin storage tank when a road tanker was unloading sodium chlorite. Smoke drifted across the M4 and M5 motorways which were closed. Rail services were closed. The documentation for the tanker appeared to be incorrect.
[storage tanks, document errors]

Lessons

[None Reported]

Source : LLOYDS LIST, 1996, OCT, 2.

Location : , UK

Injured : 0 Dead : 0

Abstract

A major explosion and fire occurred at chemical plant causing the release of a cloud of toxic smoke which caused the closure of motorways.
[fire - consequence, gas / vapour release, processing, toxic fumes]

Lessons

[None Reported]

11641September 1996

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

An explosion combined combined a number of operating problems with a badly designed plant. Purified starch was treated in a humidifier with water and hydrogen peroxide bleach. The humidifier was supposed to have been inerted, but the vessels also had explosion relief fitted. The dust explosion tore open one humidifier vessel, and caused extensive damage to the building cladding, but comparatively little other damage. Investigation showed that:

1. The vent panels were inadequately designed and required a pressure stronger than the vessel could stand to open.
2. The vent ducts were smaller than the vents and had serious obstruction to the flow.
3. The gas analyser system fitted as part of the inerting system had been out of action for at least a week and probably much longer.
4. The nitrogen generator was incapable of delivering the required volume of nitrogen at the required purity.
5. The peroxide dosing system was filled with over-strength material and did not spray it as fine droplets as intended.
6. The mechanical conveying system in the humidifier was prone to parts falling off causing powder flow problems and possibly contributing to frictional heating in the system.

[solids processing, dust explosion, starch, solids processing equipment, design inadequate]

Lessons

[None Reported]

9027 19 August 1996

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, AUG.

Location : Lancashire, UK

Injured : 0 **Dead** : 0

Abstract

An exothermic reaction caused a fire and subsequent spill from a distillation process vessel. The vessel contained 4000 kg of solvents used in paints and printing inks.

[fire - consequence]

Lessons

[None Reported]

8629 10 August 1996

Source : LLOYDS LIST, 1996, AUG, 13.

Location : Ontario, CANADA

Injured : 0 Dead : 0

Abstract

A rail transportation incident. Two hundred people evacuated when a rail tanker of sulphuric acid was derailed and ruptured. Spill.
[derailment, evacuation]

Lessons

[None Reported]

8633 24 July 1996

Source : LLOYDS LIST, 1996, JUL, 31, AUG, 9, AUG, 21.

Location : Volgograd, RUSSIA

Injured : 0 **Dead** : 0

Abstract

A serious fire occurred in a storage area which was not extinguished until 9th August. Fire started in an area containing waste material.

[fire - consequence]

Lessons

[None Reported]

8618 22 July 1996

Source : LLOYDS LIST, 1996, JUL, 22. LOSS CONTROL NEWSLETTER, ISSUE 3, 1996.

Location : Ontario, CANADA

Injured : 0 **Dead** : 0

Abstract

Lightning struck a gasoline additive (raffinate) storage tank and blew off the roof. The tank contained 8.2 million litres.

The fire took 7 hours to extinguish. 300 evacuated.

[evacuation, raffinate]

Lessons

[None Reported]

Source : LOSS CONTROL NEWSLETTER, ISSUE 3, 1996.

Location : West Yorkshire, UK

Injured : 7 **Dead** : 0

Abstract

There were two sulphur trioxide gas releases - the first while a vessel was being opened for routine cleaning, the second from a relief valve while operations to cap the leak were under way. The cloud, which reached a height of around 650m, drifted over the town and residents were told to stay indoors.
[gas / vapour release]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

A sudden emission of some 33 tonnes of hydrocarbon vapour from a floating roof crude tank occurred at a refinery. The release was caused by an uncontrolled heat input to the steam coils in the tank, which contained a mixture of crude oils and a considerable amount of wet process unit slops. This event was potentially catastrophic. When the cause of the emission was discovered, a full emergency response situation was declared, the tank was isolated from the steam supply and cooled to bring it back into a safe condition.

[gas / vapour release, floating roof tank, process causes, refining, design or procedure error]

Lessons

[None Reported]

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

While radiography of furnaces was taking place on a petrochemical plant a workshop technician discovered that he and a colleague had been working in the exclusion area inadvertently. He alerted his colleague and both then left the area. Personnel did not suffer exposure because of where they were in the exclusion area and the size of the source in use. The exclusion area had deliberately been made large to encompass all the required test sites in a single zone. The sweep for personnel that had been carried out failed to locate the technicians in question.

The zone had been set up in the knowledge of HSE requirements to minimise the size of such areas. This was blamed on the large amount of planned radiography work during a shutdown.

The enquiry recommended:-

1. A review of procedures associated with issuing radiography work permits.
2. Additional training in radiography work procedures for the shutdown teams.

It also recommended considering:-

1. The use of higher level sources to reduce the exposure period.
2. Improved communication between the personnel responsible for radiological protection and those controlling the issue of permits.

[radioactive, testing, design or procedure error, near miss, training inadequate]

Lessons

The investigation concluded that the exclusion zone selected had been too large to control effectively. This was attributed to pressure of work. It also identified weaknesses in allocation of responsibility for sweeping the area and controlling the perimeter.

9011 July 1996

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, SEP.

Location : Yorkshire, UK

Injured : 1 Dead : 0

Abstract

A vapour cloud was released when a chemical storage tank was being cleaned prior to inspection. The vessel was used as a vent tank to relieve pressure during the unloading of delivery tankers before the gases were discharged to the scrubbing system. The sight glasses on the tank were obscured and the process operators assumed that the tank was empty. However, when water was added to the vessel it reacted with an estimated 3.5 tonnes of solid sulphur trioxide which had built up within the tank over several months. The result was a muffled bang followed by the release of a cloud of dense, acidic white mist. The plant manager sustained minor burns to his hand while trying to close the tank lid. The fumes filled the building and spread some two miles from the site. The cloud was blown over a largely un-populated area.

The company was fined £26,000 with costs of £12,800 (1997).

[gas / vapour release, storage tanks, cleaning, unwanted chemical reaction]

Lessons

[None Reported]

Source : EUROPEAN CHEMICAL NEWS, 1996, JUL, 22,; ENDS REPORT 267, APRIL 1997.

Location : West Yorkshire, UK

Injured : 7 Dead : 0

Abstract

During routine cleaning of a storage tank prior to maintenance and inspection. The tank was used as a vent tank to relieve pressure during unloading of delivery tankers before the gases were discharged to the site's scrubbing system. The sight glasses were obscured and the process operators assumed that the tank was empty. When water was added to the tank it reacted with an estimated 3.5 tonnes of sulphur trioxide which had built up in the tank over several months. The result was a muffled bang and the release of a white cloud. The fumes filled the building and spread some 2 miles from the site. The firm was fined £13,000 (1996).

[storage tanks, gas / vapour release, operator error]

Lessons

[None Reported]

Source : LOSS CONTROL NEWSLETTER, ISSUE 2, 1996.

Location : Magdeburg, GERMANY

Injured : 0 **Dead** : 0

Abstract

A rail transportation incident. An explosion caused two wagons carrying vinyl chloride to catch fire leaving a toxic cloud over the area.
[fire - consequence, gas / vapour release]

Lessons

[None Reported]

Source : EUROPEAN CHEMICAL NEWS, 1996, JUN, 17, NOV, 4,; WASTE ENVIRONMENT TODAY, VOL. 19, PAGE 506, 1996, JUN, 12.

Location : Magdeburg, GERMANY

Injured : 0 **Dead** : 0

Abstract

A rail transportation incident. Derailment and explosion of four of 18 rail tankers, each carrying 50 tonnes of vinyl chloride which were consumed in the fire. Schools nearby were closed for a week. Pollution of ground water over 46,000 km² area with dioxins and other contaminants was reported.
[fire - consequence, contamination]

Lessons

[None Reported]

8458 19 May 1996

Source : EUROPEAN CHEMICAL NEWS, 1996, JUN, 3.

Location : Alabama, USA

Injured : 0 Dead : 0

Abstract

A rail transportation incident. A fire started around midnight in a rail tanker car containing sodium hydrosulphite.

[fire - consequence]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, AUG.

Location :

Injured : 0 Dead : 0

Abstract

A fire and explosion occurred in a consignment of lithium battery waste in a 45 gallon drum container. The material which caught fire had been stored on site for five months should have been destroyed within one week of arrival.

[fire - consequence, storage]

Lessons

[None Reported]

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

Location : Mannheim, GERMANY

Injured : 13 **Dead** : 0

Abstract

The release of a zinc compound - toxic occurred after an explosion.

[gas / vapour release]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1997, AUG.

Location : Solihull, UK

Injured : 0 **Dead :** 0

Abstract

A spill of chlorinated solvent occurred while 6000 litter tank of trichloroethylene was being moved on site. After heavy rain the chemical washed into a recreation area.

[weather effects]

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 : 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.
-

8702 18 March 1996

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

Location : California, USA

Injured : 0 Dead : 0

Abstract

A fire occurred on a plant involving sulphur.

[fire - consequence]

Lessons

[None Reported]

8581 12 March 1996

Source : LLOYDS LIST, 1996, MAR, 13.

Location : Mannheim, GERMANY

Injured : 13 **Dead** : 0

Abstract

Toxic chemical cloud spread from plant after explosion released zinc compound.

[gas / vapour release]

Lessons

[None Reported]

8575 28 February 1996

Source : LLOYDS LIST, 1996, MAR, 6.

Location : Tennessee, USA

Injured : 1 Dead : 2

Abstract

A rail transportation incident. 54,000 gallon of sulphuric acid spillage from 4 rail tankers derailed. Fatality.
[derailment]

Lessons

[None Reported]

Abstract

A company specialising in the removal of redundant low-level radiation waste, removed four level gauges used to measure liquids into cans. These contained a sealed radioactive source, which emits alpha-rays. During the removal, the containers holding the source were damaged, the driver, van and car park were contaminated. The van then travelled to another destination, the contamination was only discovered at the company's premises after the week end. The correct type of container had been used but it was found to be too small.

[road transport, damage to equipment, contamination, material transfer]

Lessons

[None Reported]

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

Location : Ludwigshaven, GERMANY

Injured : 25 Dead : 0

Abstract

50 kg of toxic gas escaped after an explosion in a drier.

The explosion cost DM 2m (1996) damage. A cloud of hydrochloric acid, sulphuric acid and chlorine was released and 25 workers were injured. The explosion was in a diaphragm process chlorine plant at the site. The cause was a blocked outlet for condensed water vapour from the hydrogen system of the plant. Plastic anti-corrosion material from the inside of the pipes is believed to have caused the blockage. Hydrogen was then forced back into the electrolytic cell and through its diaphragm into the chlorine system. The excess hydrogen reacted violently with the chlorine causing an explosion in the dryer section of the plant where chlorine is washed with sulphuric acid.

[gas / vapour release, heating, injury]

Lessons

[None Reported]

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

Location : North Ontario, CANADA

Injured : 0 Dead : 0

Abstract

A rail transportation incident. Six rail tankers carrying liquid sulphur careered into a river. Due to freezing conditions most of the sulphur solidified.

Lessons

[None Reported]

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

A high pressure vent line from an ethanol unit was vented to flare, in an attempt to clear a suspected blockage in the line (hydrate formation) which contained a mainly ethylene stream, saturated with water vapour. An explosion occurred and a yellow column of flame was seen at the flare tip. The vent valves were immediately closed.

Minor damage was sustained and after an inspection of equipment and lines it was determined that the system should remain in operation with some additional nitrogen purging. The high pressure vent line was left isolated. It was determined that a more detailed inspection of the system should be carried out.

An enquiry team investigated the incident. It was concluded that an explosion had occurred in the flare knock out drum, but it was not possible to confirm the cause of the incident.

[damage to equipment, flow restriction, venting]

Lessons

1. A full inspection should be undertaken.
 2. The design conditions of the high pressure vent line should be reviewed and the tracing requirements for the line should be confirmed.
 3. The measuring and alarming of temperatures on the vent line should be undertaken.
 4. Nitrogen purge flow requirements should be checked and a method of measuring the nitrogen flow to the flare should be identified.
 5. A procedure should be prepared for depressurising the vent line, allowing for the low temperatures that could be seen.
-

1303 28 January 1996

Source : LLOYDS LIST, 1996, JAN, 30.

Location : Frankfurt, GERMANY

Injured : 0 **Dead** : 0

Abstract

Toxic powder (Isoproturon) escaped following an accident in the pressurised equipment which tore a hole in the roof.
[spill, damage to equipment]

Lessons

[None Reported]

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

Location : , EGYPT

Injured : 0 Dead : 0

Abstract

Water started to enter the rig while it was being moved for reasons which are not yet clear. A salvage operation may be feasible. Offshore.

[sinking]

Lessons

[None Reported]

Source : EUROPEAN CHEMICAL NEWS, 1996, FEB, 26.

Location : Ludwigshafen, GERMANY

Injured : 25 Dead : 0

Abstract

An explosion occurred in a diaphragm chlorine plant causing \$1.4 m (1996) damage. A cloud of hydrochloric acid, sulphuric acid and chlorine was released. The cause was a blockage in the outlet for condensed water vapour from the hydrogen system of the plant. Plastic anti-corrosion material from inside the pipes is believed to have caused the blockage. Hydrogen was then forced back into the electrolytic cell and through its diaphragm into the chlorine system. The excess hydrogen reacted violently with the chlorine causing an explosion in the drier section of the plant where chlorine is washed with sulphuric acid to remove water vapour.

[unwanted chemical reaction, damage to equipment, gas / vapour release, unwanted chemical reaction, processing]

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.

8565 02 January 1996

Source : LLOYDS LIST, 1996, JAN, 5.

Location : Indianapolis, USA

Injured : 0 Dead : 0

Abstract

A flash fire broke out at a water purification plant but the incident did not affect production. The fire lasted 15 minutes.

[fire - consequence]

Lessons

[None Reported]

Source : THE CHEMICAL ENGINEER, 1996, JAN, 25.

Location : , UK

Injured : 0 Dead : 0

Abstract

Up to one tonne of concentrated sulphuric acid leaked into a river after a spill by-passed the site's effluent treatment system. A metal tank with the acid toppled over when being moved and ruptured.

[pollution]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 1

Abstract

Contractors were attempting to unplug a blockage in a pump suction line in the bottom of a mix tank used in their process to convert hazardous waste material into cement kiln fuel. One of the contractors decided to enter the tank, contrary to instructions from his supervisor, in an attempt to expedite the work. He was wearing an air purifying respirator (canister mask) and protective clothing but quickly became disoriented and lost consciousness. He had been exposed to benzene. Fatality

[entry into confined space, asphyxiation, operator error]

Lessons

There was lack of sufficient appreciation for the acute toxic hazards of petroleum hydrocarbons.

There is a need to ensure that contractors effectively carry out their written safety programmes in the field.

Source : ICHEME

Location : ,

Injured : 0 Dead : 1

Abstract

Fatality during maintenance on Fluid Catalytic Cracker Unit (FCCU) heat exchanger.

During steaming of heat exchanger shell covers, to facilitate removal, the lower cover blew off, striking an operator. The tight fit between the shell cover and floating head restricted the path of steam flow, creating an overpressurisation. This was due to the minimum clearance between the shell cover and floating head being less than that required by design.

[fluid cracker]

Lessons

When using steam for heating equipment for disassembly, a free path to vents must be available and maintained; e.g., not blocked by sludge.

Personnel need to be aware of the potential force of steam, nitrogen, air, used as a maintenance aid and not build up uncontrolled pressure in equipment.

Source : ICHEME

Location : ,

Injured : 0 **Dead :** 0

Abstract

A 5500-m3 floating roof tank failed catastrophically during filling operations. The tank was being filled with water for the final water test subsequent to repairs. Fortunately no one was seriously injured.

The tank shell ruptured over the full height of the tank and the sudden release of about 5000-m3 water caused extensive material damage to pipework and 2 other tanks in the same bund.

An investigation into the incident found a tensile fracture " zip failure " due to thinning of the tank shell caused by corrosion. This corrosion was found as concentrated vertical grooves and pitting on the inside of the tank. Scratching by the rim seal brackets, fixed to the floating roof pontoons have contributed to the groove formation and "accelerated" corrosion of the tank shell. The absence of the so-called bumper bars on the floating roof pontoons allowed the brackets to touch the tank shell.

[tank failure, loading, damage to equipment]

Lessons

[None Reported]

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

Location : Grenoble, FRANCE

Injured : 5 **Dead** : 0

Abstract

An explosion occurred in a plant making a toluene derivative product during maintenance.

Lessons

[None Reported]

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

A dust explosion and fire occurred in a primary degasser bin. The bin had been charged with a 50 tonne blend of powder grade from the loop reaction system, and was fifty minutes into the one-hour air degassing/powder recirculation cycle when the incident occurred.

The emergency services and the plant manufacturing teams quickly extinguished the fire. Both reactors were immediately shut down. No injuries were reported.

The explosion occurred due to a build-up of a non-conducting skin of antioxidant, polymer and wax on the walls of the degassing bin and pipework. The likely source of ignition was static, thought to have resulted from a propagating brush discharge inside the vessel.

[fire - consequence, processing, reactors and reaction equipment,

Lessons

The report stated the following conclusions:

1. The incident was caused by a build-up of a non-conducting skin of antioxidant, polymer and wax on the wall of the degassing bin and associated pipework. It is thought that this caused the system to accumulate static charge similar to a capacitor, generating a propagating brush discharge, which initiated a dust explosion inside the vessel. An investigation into this theory is being carried out.
 2. The build-up of the non-conducting skin found in the degassing bin, and other degassing, intermediate and final product vessels was caused by the addition of an aqueous antioxidant compound.
 3. The degasser reached temperatures in excess of 600 degrees C. Internal damage was limited to some minor distortion of vessel cross members and the top of the vent bag filter housing. Minimal damage to equipment external to the source of ignition occurred.
-

8201 17 December 1995

Source : LLOYDS LIST, 1995, DEC,18, DEC, 19.

Location : Somerset West, SOUTH AFRICA

Injured : 100 **Dead** : 3

Abstract

15,000 tonnes sulphur piles near a plant were ignited by a fire in a nearby field. Operations at the plant have not been affected. A cloud of sulphur dioxide forced the evacuation of 2,500 people. Fatality.
[fire - consequence, storage]

Lessons

[None Reported]

8246 10 December 1995

Source : THE CHEMICAL ENGINEER, 1995, DEC, 14.

Location : Runcon, UK

Injured : 0 Dead : 0

Abstract

A toxic cloud hung over the site following an acid release from one of its storage tanks. Chlorosulphonic acid escaped from the base of a stock tank fuming into a cloud of hydrochloric acid and sulphur trioxide.

[gas / vapour release]

Lessons

[None Reported]

Source : HAZARDOUS CARBO BULLETIN, JUNE 2000.

Location : Ohio, USA

Injured : 0 Dead : 0

Abstract

An explosion occurred at a commercial incineration facility. The incident involved drums containing hazardous waste. Significant damage occurred to the facility.

An investigation into the incident found that the drums contained primary and high explosive materials. The drums were not properly marked or labelled. The company was fined \$40,000 (2000).

[damage to equipment, labelling incorrect, design or procedure error, incinerator]

Lessons

Mis-classification of any hazardous material is a very serious matter because it can result in improper handling of the material by the carrier and may cause danger to emergency personnel responding to an incident.

Source : ENDS REPORT 263, 1996, DEC.

Location : North Yorkshire, UK

Injured : 0 **Dead** : 0

Abstract

A road transportation incident. A road tanker delivered 7 tonnes of 96% sulphuric acid which was unloaded into a tank of dioctyl phthalate. No violent reaction occurred but clean up operations were difficult.

[unloading, near miss, design or procedure error]

Lessons

[None Reported]

8187 15 October 1995

Source : LLOYDS LIST, 1995, OCT, 16.

Location : Stenungsund, SWEDEN

Injured : 0 **Dead** : 0

Abstract

A marine transportation incident. A marine gas carrier overflowed into port when shore tank was overfilled and the overflow poured over the tanker deck.

Only small amounts of water sludge with oil escaped. Spill.

[unloading]

Lessons

[None Reported]

8466 05 October 1995

Source : EUROPEAN CHEMICAL NEWS, 1996, AUG, 12.

Location : Yorkshire, UK

Injured : 0 Dead : 0

Abstract

Sulphur trioxide escaped from low level temporary chimney during the start-up of the sulphuric acid plant following a biannual shutdown. Gas oil was being used in the burner to preheat the catalyst, and the combustion gases were being emitted through a temporary chimney just 20 ft high. At the same time the company decided to use the plant's oleum scrubbing tower to produce pure sulphur trioxide for sale. The tower was incapable of being isolated from the upstream section of the process, and some of the evaporated sulphur trioxide escaped to air via the temporary chimney. The company claimed that only a few kilograms had been released. The discharge continued for 2-3 hours and formed a mist.

[gas / vapour release]

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 : Bingham Canyon, Utah, USA

Injured : 0 **Dead** : 0

Abstract

An explosion damaged converting furnace. Cooling element failed in new smelter and released water onto molten metal.
[cooling equipment, spill, metal - molten]

Lessons

[None Reported]

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

Location : Shikoku, JAPAN

Injured : 0 **Dead** : 0

Abstract

A fire in the terephthalic acid plant caused little damage during maintenance.

[fire - consequence, damage to equipment]

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]

1894 20 August 1995

Source : THE CHEMICAL ENGINEER, 1995, SEP, 14; LLOYDS LIST, 1995, AUG, 22.

Location : Preston, UK

Injured : 0 **Dead :** 0

Abstract

Explosion in a drum that contained waste from a distillation process and was a mixture of bromodiethyl carbonate, diethyl carbonate and ethyl bromoacetate. This caused a cloud to drift over the town from the chemical works.
[drums, gas / vapour release, evacuation]

Lessons

[None Reported]

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

Location : Buffalo, New York, USA

Injured : 7 **Dead :** 1

Abstract

A fire occurred in a warehouse. Preliminary cause attributed to the decomposition of sodium persulphate. 800 tonnes of sodium persulphate, ammonium persulphate and potassium persulphate were destroyed. Fatality.

[warehousing, storage, product loss, fire - consequence]

Lessons

[None Reported]

1731 17 August 1995

Source : HAZARDOUS CARGO BULLETIN, 1995, SEP.

Location : Corpus Christi, Texas, USA

Injured : 0 **Dead** : 0

Abstract

Marine transportation. Lightning struck marine tanker barge loaded with 630 tonnes of toluene at refinery. The fire burnt out on No.3 tank but not on No's 1 or 3.
[fire - consequence, damage to equipment]

Lessons

[None Reported]

3256 16 July 1995

Source : LLOYDS LIST, 1995, JUL, 18, JUL, 25.; EUROPEAN CHEMICAL NEWS, 1995, JUL.; CHEMICAL HAZARDS IN INDUSTRY, 1995, DEC.

Location : Ludwigshaven, GERMANY

Injured : 4 **Dead :** 0

Abstract

Explosion in laboratory caused considerable damage when solvent leaked from a 250 litre vessel. Sulphuric acid accidentally entered a distillation vessel being used to purify an intermediate for making an animal feed additive. The acid caused a runaway reaction that shattered the glass column and escaping vapours caught fire.

[fire - consequence, laboratory work, damage to equipment]

Lessons

[None Reported]

1196415 July 1995

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

An overflow occurred on a tank containing bitumen and white spirit when water flowed into the tank. The maximum possible overflow for the tank was 4.5 tonnes containing 43% white spirit. It is not known why the water flowed into the tank.

It is thought that the majority of the material was retained on site but an unknown amount was lost into the nearby river causing a slick.

[spill, unidentified cause]

Lessons

3950 12 July 1995

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1995.

Location : Tampa; Florida, USA

Injured : 0 **Dead** : 0

Abstract

Lightning struck a tank of methanol causing a fire. One nearby tank filled with solvent reached its boiling point and blew its lid but the blaze was contained. The methanol tank had a 250,000 gallon capacity but was only holding 40,000 gallons when struck.
[fire - consequence, storage]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

Sulphur pit explosion at a refinery. A flashback from the incinerator ignited an accumulation of acid gas in the sulphur pit. The cause of this accident was a previous modification to the sulphur pit design when the unit amine sump vent was connected into the sulphur pit vapour space. This allowed hydrogen sulphide to accumulate in the sulphur pit vapour space. The amine sump had originally been fitted with an atmospheric vent.
[near miss, design inadequate, refining, contamination, modification procedures inadequate]

Lessons

Allowing for understandable technical reasons, the contamination of the sulphur pit with drainings from the amine sump was undesirable, especially with the limited control over quantities being drained.

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

An 8 inch line on a carbon disulphide plant fractured and a 9 metre diameter fireball resulted. The line was carrying a mixture of carbon disulphide, hydrogen sulphide and methane at 600 degrees C between the furnace and the reactor. The fire was brought under control by shutting down production and allowing it to burn out in a controlled manner. The incident caused release of sulphur dioxide to the environment and loss of production. Damage to plant was minimal and there were no injuries.

The cause was unknown at the time of the report. The pipe failed at the heat affected section close to a weld. It had been in service for at least 12 years and was due its next two-yearly inspection in September 1995. Ultrasonic thickness tests on the failed pipe revealed inconsistencies with the results from September 1993. The appearance of the failed section of pipe differed substantially from the remaining sections.

[fire/explosion, fire - consequence, mechanical equipment failure, reactors and reaction equipment, material transfer, gas / vapour release, material of construction failure]

Lessons

1. A major incident had occurred and only good fortune prevented serious casualties and potential escalation of the incident.
 2. The shift team dealt with the incident effectively.
 3. Their task could have been eased if emergency procedures had been clarified and rehearsed. In particular the workload of dealing with incoming telephone calls at a time of intense activity was a problem.
 4. The frequency of examination on some pipelines on hazardous duty was inadequate and failed to reveal a section of pipe which was below specification.
-

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 : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

A fire occurred on a mixer handling cellulose acetate and acetone. The cellulose acetate was in the form of waste produced during the process and was being recovered by adding to the acetone prior to charging fresh flake. This requires removal of the man lids on the charging chute. It is carried out under a positive pressure of inert gas and with vapour extraction. The fire was extinguished by refitting the man-lids and suffocating it.

The waste is in bale form and passes over a wetted earth-bonded roller prior to addition via the earth-bonded chute.

[fire - consequence, mixing]

Lessons

The investigation concluded that:

1. The cause of the incident was static discharge from inadequately discharged waste and oxygen from air entrained in the waste.
2. Under the then current operating procedure, avoidance of localised pockets of flammable vapour in the mixer could not be guaranteed.
3. The systems for discharge of static electricity were inadequate.

The main recommendations were:-

1. Improve the wetting of the waste as it enters the system in the short term.
 2. Investigate an automatic waste addition system in the medium term.
-

2986 14 June 1995

Source : THE CHEMICAL ENGINEER, 1995, JUN, 29.

Location : Whyall, AUSTRALIA

Injured : 0 **Dead** : 0

Abstract

A disused tank caught fire during demolition when about 1 metre of sludge at the bottom of the 48 m x 15 m tank ignited.

[storage tanks, fire - consequence]

Lessons

[None Reported]

2519 02 June 1995

Source : LLOYDS LIST, 1995, JUN, 3.

Location : Jaipur, INDIA

Injured : 0 Dead : 9

Abstract

A toxic gas release at a water treatment plant from an underground chamber at the plant after an operator opened a pipeline valve. The operator succumbed to the gas immediately and 8 other operators were killed as they one by one came to check on the welfare of the first victim. Fatality.
[asphyxiation, gas / vapour release, operator error, drains & sewers]

Lessons

[None Reported]

Source : LOSS PREVENTION BULLETIN, 133, 22.

Location : ,

Injured : 0 **Dead :** 1

Abstract

A mechanic who was carrying out maintenance work on a vacuum tanker using an oxyacetylene torch to remove a faulty valve, was unaware of the fact that the road tanker had not been cleaned since its use two days earlier for the transportation of petrol, waste oil and sludge. Consequently, flammable vapours remaining in the valve were ignited by the torch, leading to the explosion which killed the operator. Fatality.

[hot work, gasoline]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

The bottom of a zinc sulphate storage tank failed catastrophically causing the release of its contents (approximately 8000 US gallons of 10% H₂SO₄ (sulphuric acid) and 15% ZnSO₄ (zinc sulphate) solution) into the secondary containment. Due to the failure approximately 3800 gallons of the solution washed out of the containment onto the surrounding area.

The site emergency response team neutralised the spilled material with sodium bicarbonate.

There were no injuries or external environmental consequences.

[storage tanks, spill, mechanical equipment failure]

Lessons

[None Reported]

Source : LOSS CONTROL NEWSLETTER, 1997.

Location : , USA

Injured : 0 Dead : 0

Abstract

An explosion blew the top off a 1000 gallon tank, is believed to have been caused by a volatile mix of hydroxylamine nitrates and nitric acid. The solution had been diluted with water in 1993 and put into storage. Over a period of time, the water evaporated, leading to a greater concentration of the chemicals which heated up causing them to react.

[storage tanks, unwanted chemical reaction]

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]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1995, JUN.

Location : Corpus Christi, Texas, USA

Injured : 20 **Dead** : 0

Abstract

A marine transportation incident. Two marine barge tankers were in collision when loaded with vinyl chloride and cumene. Traces of vapour release were detected four miles from the incident and 2700 people evacuated.

[collision, gas / vapour release, evacuation]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN, 1995, JUN.

Location : Corpus Christi, Texas, USA

Injured : 0 **Dead** : 0

Abstract

A marine transportation incident. A marine barge loaded with vinyl chloride monomer (VCM) collided with a barge loaded with cumene. Small spillage of cumene. Locals evacuated.

[collision, evacuation]

Lessons

[None Reported]

2205 10 April 1995

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1995.

Location : Scarborough, Toronto, CANADA

Injured : 2 **Dead** : 0

Abstract

An explosion at a plastics producer plant injured 2 firemen and caused the evacuation of neighbouring schools and residents because of emissions of chemicals (phenol, formaldehyde, xylene).

[fire - consequence, injury]

Lessons

[None Reported]

8110 31 March 1995

Source : LLOYDS LIST, 1995, APR, 13,; HAZARDOUS CARGO BULLETIN, 1995, JUN.

Location : Sydney, Australia

Injured : 0 **Dead** : 0

Abstract

A fire believed to have started in the solvent recycling plant totally destroyed plant with 20% damage to adjacent buildings.
[fire - consequence, damage to equipment]

Lessons

[None Reported]

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 2, 1995.

Location : Wuxi, Jiangsu Province, CHINA

Injured : 0 **Dead** : 0

Abstract

Storage drum containing sodium hydrosulphite exploded in workshop.

[drums, explosion]

Lessons

[None Reported]

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

Location : Ilan, TAIWAN

Injured : 0 Dead : 0

Abstract

A fire occurred in terephthalic acid unit.

[fire - consequence]

Lessons

[None Reported]

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

Location : Carteret, New Jersey, USA

Injured : 0 **Dead** : 0

Abstract

A 2 hour fire raged at this gasoline storage terminal after a pipe connected to a 2 million gallon gasoline tank failed. Some nearby toll operators were taken to hospital after inhaling toxic fumes.

[fire - consequence, tank failure]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN, 1995, APR.

Location : , BRAZIL

Injured : 0 Dead : 0

Abstract

A marine transportation incident. A chemical marine tanker struck an underwater object. 32 tonnes of styrene monomer spilt from port tank to sea. City and port area tainted by odour.

[collision, gas / vapour release, spill]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN, 1995, APR.

Location : Ontario, CANADA

Injured : 0 Dead : 0

Abstract

A fire occurred after a transformer blew up in NRC laboratory. Mildly radioactive material in building.

[fire - consequence, laboratory work]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN, 1997, MAR.

Location : , NORTH ATLANTIC

Injured : 0 Dead : 0

Abstract

A marine transportation incident. A leak from a tank container occurred aboard a container ship. The frame of a tank container buckled during a storm at sea, causing damage to the tank shell and discharge valve and the loss of some eight tonnes of product (a solution of sodium borohydride and sodium hydroxide in water) occurred. This compound, UN number 1760, is a Class 8 corrosive product and releases hydrogen when in contact with metals. When discovered the frame around the tank container was seen to be bent and the discharge valve was damaged. The crew attempted to staunch the leak but was only partially successful.

[weather effects, damage to equipment, spill]

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 : 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]

8495 21 January 1995

Source : LLOYDS LIST, 1995, JAN, 24, JAN, 25.

Location : Lac sur Sables, Shawinigan, CANADA

Injured : 0 Dead : 0

Abstract

A rail transportation incident. 28 cars of a 44 car train were derailed causing the spillage of 50,000 gallons of sulphuric acid into the river. The pH of the river was down to 3.7 at the spill and 5.0 16 km away. Limestone was added to the river. Investigation showed that one tanker split open completely, 10 tankers tipped into the lake and, that of these, 6 leaked, while 5 other tankers lost some of their contents. 10 of the 11 cars that lost their contents had damage to the top assembly and rupture disc due to the shield being insufficient.

[damage to equipment, pollution, inadequate guarding, derailment]

Lessons

There was a lack of shielding on the tanker domes.

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

Location : Tawachiche River, CANADA

Injured : 0 **Dead** : 0

Abstract

A rail transportation incident. 50,000 gallons of sulphuric acid spillage into an environmentally sensitive area after 28 rail tankers came off the rail track. Extensive pollution and damage to fish spawning grounds.
[ecological damage]

Lessons

[None Reported]

1966 12 January 1995

Source : CHEMICAL HAZARDS IN INDUSTRY, 1995, OCT.

Location : Wurtland, Kentucky, USA

Injured : 0 **Dead** : 0

Abstract

23,000 gallons of sulphuric acid spilled from a storage tank. 1000 people evacuated.

[storage tanks, evacuation]

Lessons

[None Reported]

8492 12 January 1995

Source : LLOYDS LIST, 1995, JAN, 17.

Location : , GULF OF MEXICO

Injured : 0 Dead : 0

Abstract

Valve rupture led to spillage of 255 barrels of a mixture of gas, oil, water and sand. Spill contained.

[valve failure, offshore]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN, 1995, FEB.

Location : North Sea,

Injured : 0 **Dead** : 0

Abstract

A marine transportation incident. Container broke apart on deck of ro-ro vessel due to poor weather conditions. 30 barrels containing sulphur oxychloride lost overboard.

[weather effects, spill]

Lessons

[None Reported]

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

Location : Fos-sur-Mer, FRANCE

Injured : 0 **Dead :** 0

Abstract

A fire in the vinyl chloride monomer (VCM) furnace damaged site facilities.

[fire - consequence, damage to equipment, processing]

Lessons

[None Reported]

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995

Location : Bavaria, GERMANY

Injured : - **Dead :** 0

Abstract

Bursting of a 10 cubic metre reaction vessel containing solvents caused damage and injury at this plant which manufactures nitrocellulose, explosives and intermediates.

[damage to equipment, rupture, processing, explosive, injury]

Lessons

[None Reported]

8484 06 December 1994

Source : LLOYDS LIST, 1995, JAN, 1,; HAZARDOUS CARGO BULLETIN, 1995, MAR.

Location : Shanxi, CHINA

Injured : 0 Dead : 100

Abstract

A rail transportation incident. A guard's cigarette set fire to trackside bush. The ensuing fire engulfed two trains with carriages containing 60 tonnes of TNT, dynamite and detonators.

An explosion occurred devastating four nearby villages.

[fire - consequence, trinitrotoluene, fatality]

Lessons

[None Reported]

6782 02 December 1994

Source : LLOYDS LIST, 1994, 6 DEC.

Location : Avignon, FRANCE

Injured : 0 Dead : 0

Abstract

A rail transportation incident. Derailed train in rail station necessitated the transfer of 59 tonnes of vinyl chloride without incident. Led to the evacuation of 4000 people.

[derailment]

Lessons

[None Reported]

Source : ICHEME

Location : , UK

Injured : 1 Dead : 0

Abstract

Two contractors were assisting a fitter to remove the end cap from a condenser. The condenser had not been drained and when the end cap was opened, pressure release and hot water escaped.

One contractor sustained burns to his feet. No damaged occurred to the plant.

An investigation is underway.

[operation inadequate, maintenance]

Lessons

[None Reported]

6770 18 November 1994

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1994.

Location : Takasago; Hyogo Prefecture, JAPAN

Injured : 1 **Dead** : 2

Abstract

Liquid vinyl chloride monomer tank was being inspected by personnel when it caught fire and exploded. Fatality.
[inspection, explosion, fire - consequence]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, DEC.; LLOYDS LIST, 1994, 25 NOV.

Location : Morrice; Michigan, USA

Injured : 0 **Dead** : 0

Abstract

A rail transportation incident. A boxcar on a train carrying a drum of sodium isopropylxanthate burst into flames and exploded. Fumes caused evacuation of people within 3 km radius.

[explosion, fire - consequence]

Lessons

[None Reported]

1195916 November 1994

Source : ICHEME

Location : , UK

Injured : 1 Dead : 0

Abstract

Hydrogen sulphide rich dilute sulphuric acid overflowed from an acid recovery plant. This was contained in a bunded area but hydrogen sulphide evolved and spread to an adjacent area. The area was evacuated. A contractor working in this area was affected and fortunately recovered fully.

[gas / vapour release, people, evacuation]

Lessons

[None Reported]

8481 16 November 1994

Source : HAZARDOUS CARGO BULLETIN, 1995, JAN.

Location : Michigan, USA

Injured : 0 Dead : 0

Abstract

A rail transportation incident. A fire and explosion occurred in freight train with sodium isopropylxanthate. Homes and two schools evacuated.
[fire - consequence, evacuation]

Lessons

[None Reported]

6761 10 November 1994

Source : LLOYDS LIST, 1994, 12 NOV.

Location : Lake St. Catherine; Louisiana, USA

Injured : 3 **Dead** : 1

Abstract

Explosion on offshore platform blew a salvage worker into the water. Men cutting a motor out of a housing with welding torch ignited waste oil in storage tank causing the explosion. Fire being allowed to burn itself out. Fatality.
[fire - consequence]

Lessons

[None Reported]

6760 10 November 1994

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1994.

Location : Corpus Christi; Texas, USA

Injured : 2 **Dead** : 0

Abstract

Brief fire at an oil water separator extinguished in 35 minutes.

[fire - consequence, separation]

Lessons

[None Reported]

6734 19 October 1994

Source : LLOYDS LIST, 1994, 21 OCT.

Location : Bonn, GERMANY

Injured : 0 Dead : 7

Abstract

Boiler ruptured spraying men with steam at 500 degrees C when carrying out routine valve maintenance at a power station. Fatality.

Lessons

[None Reported]

6720 10 October 1994

Source : BBC NEWS

Location : Hucknell; Nottingham, UK

Injured : 0 **Dead :** 0

Abstract

Material leaking from storage drums reacted from water to give hydrochloric acid fumes.

[gas / vapour release, contamination]

Lessons

[None Reported]

6722 10 October 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.; LLOYDS LIST, 1994, 11 OCT.

Location : Golabovo, BULGARIA

Injured : 20 Dead : 8

Abstract

Metal side of boiling water reservoir at a coal fired power station cracked and spilled boiling water. Fatality.

Lessons

[None Reported]

6718 04 October 1994

Source : THE GUARDIAN, 1994, 5 OCT.; THE CHEMICAL ENGINEER, 1994, 13 OCT.

Location : Balby; Doncaster, UK

Injured : 26 Dead : 0

Abstract

Water came into contact with sodium dithionite in a storage drum and released fumes of sulphur dioxide.

[gas / vapour release, contamination]

Lessons

[None Reported]

6709 27 September 1994

Source : CHEMICAL ENGINEER, 1994, 13 OCT.

Location : Ellesmere Port, UK

Injured : 0 Dead : 1

Abstract

Body of 15 year old boy found in a toluene storage tank when opened for cleaning prior to demolition. The boy had disappeared 7 years previously. Fatality.

Lessons

[None Reported]

6706 22 September 1994

Source : THE CHEMICAL ENGINEER, 1994, 27 OCT.

Location : Dunston, UK

Injured : 0 Dead : 0

Abstract

370 kg of ethyl acrylate and styrene vapour escaped to atmosphere. The accident was caused by the decomposition of a catalyst involved in a polymerisation reaction. The reactants, ethyl acrylate and styrene, and the catalyst were being dripped onto a reaction vessel full of hot xylene when fumes were noticed. At first it was thought the fumes were coming from the kettle until it was noticed they were coming from the overhead tank. The catalyst had started to decompose and the reaction was taking place there instead.

[gas / vapour release]

Lessons

[None Reported]

Source : LOSS PREVENTION BULLETIN, 123, 13-14.

Location : ,

Injured : 0 Dead : 0

Abstract

This incident occurred during the application of a polyurethane foam and a silicone finish to the roof of a vacant building. Shortly after workers applied a perimeter coating of silicone, a spark from a nearby welding operation ignited vapour from the coating. A worker immediately used a fire extinguisher to put out the fire. The site superintendent and the fire department were notified, but further assistance was not required. The damaged section of roof was repaired the same day, and all welding activities were suspended until work on the roof was completed.

[fire - consequence]

Lessons

The following steps should be taken to prevent or control fires associated with roof fires.

1. Identify and communicate all potential hazards before work begins.

This process is particularly important when unseen hazards exist, such as the presence of flammable vapours. Precautions to ensure that materials do not reach their flashpoints should be planned and executed. All required thermometers, thermostats, and other safety devices for Heating equipment should be routinely inspected by qualified personnel.

2. Control hazardous materials on the job site.

This should include co-ordination of concurrent work so that hazards are recognised and minimised. Ensure that nearby workers are not exposed to hazards.

3. Develop fire protection plans that will minimise the potential for roof fires and ensure their control.

4. Plans for responding to potential roof fires should include controlling a fire to prevent its spread to other areas.

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

Location : Port Sulphur; Louisiana, USA

Injured : 0 **Dead** : 0

Abstract

400 m strip of sulphur burnt for 4 hours on the edge of a solid sulphur vat.

[fire - consequence, storage]

Lessons

[None Reported]

Source : SEDGWICK LOSS CONTROL NEWSLETTER, ISSUE 1, 1995.

Location : , SOUTH KOREA

Injured : 53 Dead : 3

Abstract

Loss of 25,000 tpy TDI (toluene diisocyanate) and urethane plant caused by explosion. Fatality.
[product loss, processing]

Lessons

[None Reported]

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

Location : Houston; Texas, USA

Injured : 0 **Dead** : 0

Abstract

A decomposition caused an explosion and fire in peroxide plant. 2 tonnes of sulphuric acid and sulphur dioxide fumes were released.

[fire - consequence, processing]

Lessons

[None Reported]

Source : PROCESS SAFETY PROGRESS, VOLUME 16, NO.1, GLENN E MAHNKEN, MICHEAL T ROOK.

Location : , USA

Injured : 0 Dead : 0

Abstract

A fire consumed the titanium tube bundle of a steam turbine condenser during demolition work in a decommissioned power plant. The titanium fire is believed to have initiated by contact with hot steel slag from torch cutting which was being conducted to remove sections of the steel condenser casing above the tube bundle. The approximately 25 ft long bundle was essentially consumed end-to-end, including the tube sheets.

A fire watch had stationed as part of the plant's Hot Work Permit System, but the initial phase of the fire was obscured from view. Workers reported a bright yellow low flame coming from inside the south end of the tube bundle. Water application on the fire by workers and the local fire department was followed by explosions within the tube bundle and discharge pipes. Fortunately, no injuries or property damages occurred from this incident.

[fire - consequence, hot work, hot surface]

Lessons

Conclusions and Recommendations:

1. Titanium is a known "combustible" metal, but fire experience is mainly with chips, fines and powders. Ignition of a self-propagating tube bundle fire during torch or arc cutting is a less frequent type of fire, but such fires can have severe consequences. Ignition appears to occur by development of a "hot spot", either directly by contact with the torch, or indirectly via heat transfer from accumulating hot steel slag particles. The hot spot develops into a self-sustaining fire due to the close spacing of the tubes in the bundle.
2. There is a risk of subsequent explosions if water is applied to extinguish heat exchanger fire.
3. Prevent, prevent, prevent. Before performing any hot work on a heat exchanger, the materials of construction must be verified, in addition to other standard hot work precautions. If titanium tubes are present, hot work must not be allowed unless the tubes are first removed mechanically.
4. Heat exchangers containing titanium tubing must be labelled to that effect, with a hot work fire hazard notice posted on the unit.
5. Hot work permits in use in plants where titanium could be present is to contain a specific check box to confirm that no "combustible metals" are present in the work area.
6. Persons involved in hot work and emergency organisation personnel to be trained to recognise metal fires and to use proper metal fire extinguishers (if safe to do so).
7. A co-operative, aggressive and co-ordinated effort by all parties involved in the incident and the loss investigation helped to expedite the determination of the cause and the necessary measures to prevent a recurrence.

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

Location : Deer Park, USA

Injured : 4 **Dead :** 0

Abstract

Power supply failure caused the release of 2 tonnes of vinyl chloride monomer (VCM) and 35 kg of chlorine. Vapours dispersed within the fence lines.
[gas / vapour release, processing]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.; LLOYDS LIST, 1994, 24 AUG., 25 AUG., & 7 SEP.

Location : Mentor; Ohio, USA

Injured : 0 **Dead** : 0

Abstract

A rail transportation incident. Derailment of 11 rail tanker cars of a 118 car train led to one leaking vinyl acetate from 3 leaks. 12000 gallons spilt. Two leaks were plugged but third could not be stopped. Tanker righted to stop leakage. People evacuated. Cost of incident reported at \$1 million (1994).
[evacuation, spill]

Lessons

[None Reported]

6666 16 August 1994

Source : EUROPEAN CHEMICAL NEWS, 1994, 22/29 AUG.

Location : Kaohsiung, SOUTH KOREA

Injured : 0 Dead : 0

Abstract

Fire on p-xylene unit caused extensive damage.

[fire - consequence, processing]

Lessons

[None Reported]

Source : LOSS PREVENTION BULLETIN, 123, 13-14.

Location : ,

Injured : 1 Dead : 0

Abstract

When heating synthetic tar in a portable kettle to repair the roof of a maintenance shop. A worker draining tar from the kettle into a bucket noticed that the surface of the tar had caught fire in the bucket. As he moved backward, the handle stuck to his glove and the bucket tipped over, spilling the burning tar on the ground. The tap on the kettle did not close as designed, allowing additional hot tar to drain and causing the fire to spread. The fire engulfed the tar kettle trailer and an adjacent utility trailer that held a 100 litre liquefied petroleum gas (LPG) cylinder. When the LPG cylinder exploded, the end cap was hurled about 40 metres, causing a small grass fire. A second LPG cylinder in the vicinity vented but did not explode. One worker sustained first degree burns to his forearm from splattered tar. The site fire crew were called to the scene to extinguish the fire. Damage amounted to the total loss of the tar kettle, the adjacent utility trailer, and the two 100 litre LPG cylinders.

[explosion, fire - consequence, damage to equipment]

Lessons

The following steps should be taken to prevent or control fires associated with roof fires.

1. Identify and communicate all potential hazards before work begins.

This process is particularly important when unseen hazards exist, such as the presence of flammable vapours. Precautions to ensure that materials do not reach their flashpoints should be planned and executed. All required thermometers, thermostats, and other safety devices for heating equipment should be routinely inspected by qualified personnel.

2. Control hazardous materials on the job site.

This should include co-ordination of concurrent work so that hazards are recognised and minimised. Ensure that nearby workers are not exposed to hazards.

3. Develop fire protection plans that will minimise the potential for roof fires and ensure their control.

4. Plans for responding to potential roof fires should include controlling a fire to prevent its spread to other areas.

6664 15 August 1994

Source : EUROPEAN CHEMICAL NEWS, 1994, 22/29 AUG.

Location : Ulsan, SOUTH KOREA

Injured : 0 Dead : 0

Abstract

Explosion in urea plant.

[processing]

Lessons

[None Reported]

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]

2493 09 August 1994

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1995..

Location : SemBeth Shipyard, SINGAPORE

Injured : 6 **Dead** : 5

Abstract

Poor control of work led to ignition of paint solvent vapours during a paint spraying operation in the double bottomed tank of the stern block of a cargo ship.
Fatality.

[human causes, repair, marine transport]

Lessons

[None Reported]

6656 07 August 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.; LLOYDS LIST, 1994, 9 AUG.

Location : North Bay; Ontario, CANADA

Injured : 0 Dead : 0

Abstract

A rail transportation incident. A train hit gravel truck on level crossing. 1 of 12 rail tankers ruptured causing a spill of sulphuric acid.
[collision]

Lessons

[None Reported]

6635 17 July 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, SEP.; LLOYDS LIST, 1994, 21 JUL.

Location : Rio Blanco; Vera Cruz, MEXICO

Injured : 25 **Dead** : 0

Abstract

A road transportation incident. A road tanker truck was in collision with a passenger train at a crossing and led to spillage of 5283 gallons of caustic soda.
[sodium hydroxide, injury]

Lessons

[None Reported]

Source : CHEMICAL WEEK INTERNATIONAL, PAGE 6, 1994, JUL, 27.

Location : California, USA

Injured : 1 Dead : 2

Abstract

A road transportation incident. A lorry carrying drums and a bulk container of acetic acid, bleach, sodium hydroxide, methanol, sulphuric acid and surfactants, was involved in an accident. The spillage caused the evacuation of residents. Fatality.

[leak]

Lessons

[None Reported]

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

Location : Pleasant Prairie; Wisconsin, USA

Injured : 0 **Dead** : 0

Abstract

An explosion and fire destroyed a portion of this month old resin manufacturing plant.

[fire - consequence, processing]

Lessons

[None Reported]

Source : HSE REPORT, STATEMENT OF NUCLEAR INCIDENTS AT NUCLEAR INSTALLATIONS, 5 JAN.1995

Location : Hinkley Point; Bridgewater, UK

Injured : 0 **Dead** : 0

Abstract

A nuclear flask of uranium spent fuel had been dispatched when it was discovered that the seal fitted to the lid was of a new type and had not been approved. The flask was returned.

Lessons

[None Reported]

6630 14 July 1994

Source : LLOYDS LIST, 1994, 24 SEP.

Location : Off Cienfuegos, CYPRUS

Injured : 0 **Dead** : 0

Abstract

A marine transportation incident. Explosion in slop tank of a marine tanker holed deck.

Lessons

[None Reported]

6627 11 July 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, OCT.; LLOYDS LIST, 1994, 11 JUL.

Location : Windsor; Ontario, CANADA

Injured : 32 **Dead** : 0

Abstract

During welding a welders torch ignited toluene in a paint booth at a car maufacturing plant.

[fire - consequence]

Lessons

[None Reported]

6621 07 July 1994

Source : HSE REPORT, STATEMENT OF NUCLEAR INCIDENTS AT NUCLEAR INSTALLATIONS. 5, JAN.1995

Location : Windscale, UK

Injured : 0 **Dead** : 0

Abstract

A flask handling uranium oxide leaked contaminated water when moving from vertical to horizontal position. Quantity spilt exceeded notification level but was termed level 0 no safety significance. The water came from an unknown source.

[spill, unidentified cause]

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]

Source : CHEMISTRY IN BRITAIN, 1994, DEC.; ENDS REPORT, 1994, AUG.

Location : Warrington, UK

Injured : 0 **Dead** : 0

Abstract

1.2 tonnes of vinyl chloride monomer (VCM) released due to operator misinterpreting computer data during polymerisation.
[operator error, pollution, gas / vapour release]

Lessons

[None Reported]

6612 30 June 1994

Source : LLOYDS LIST, 1994, 2 JUL.

Location : Bandar Khomeini, IRAN

Injured : 26 **Dead** : 30

Abstract

20000 tonnes of wheat destroyed in silo explosion due to an electrical short circuit. Fatality.

[silo/hopper, storage]

Lessons

[None Reported]

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

A loss of containment of sodium hydroxide occurred during the transfer of material from a bulk storage to a day tank. 900 litres were emptied into a 100 litres day tank used for a water softening system. The tank overflowed into a containment bund. The incident was only discovered the next day. A failure of the distributed control system was considered. An incorrect reprogramming of the system was found to be at fault.

A software change had been requested to modify the refilling of the day tank from a manual to an automated operation because operators had forgotten to carry out this operation on a number of occasions. The software change was implemented but was not subject to any testing. Subsequent investigation also found that the high level check built into the software was also defeated because the day tank level device was incorrectly calibrated.

[material transfer, operation inadequate, spill]

Lessons

1. Software changes to be incorporated into the general engineering change control system. This would have ensured that a risk assessment of potential hazards would have been carried out. This was not required as part of the software change.
 2. Software changes on hazardous systems to be 'walked through' or simulated to ensure all eventualities have been considered.
 3. Software to be tested under real working conditions, to confirm it operates correctly.
 4. Important instruments (such as level devices) to be placed on a preventative maintenance schedule.
 5. Independent hardwired level switches are preferred for shutting off flow when overfilling is a possibility.
 6. A time delay should ideally be incorporated into charging sequences to guard against valves remaining open for too long.
-

Source : WASTE ENVIRONMENT TODAY, 1994, 7, (7), 18

Location : Bristol; Pennsylvania, USA

Injured : 39 **Dead** : 0

Abstract

Violent explosion in plant during mixing of trichlorosilane and styrene in a steel drum. There was a heatwave prevailing at the time which may have caused the unusual reaction during this normally routine mixing operation. The resultant fire took 5 hours to control. Incident led to the evacuation of 200 people in a half mile radius.

[runaway reaction, fire - consequence, weather effects]

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]

6591 12 June 1994

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1994.

Location : , JAPAN

Injured : 0 Dead : 1

Abstract

Fire on sulphur unit. Fatality.

[fire - consequence]

Lessons

[None Reported]

6589 12 June 1994

Source : EUROPEAN CHEMICAL NEWS, 1994, 20 JUN.

Location : , JAPAN

Injured : 0 Dead : 1

Abstract

Refinery down for maintenance had fire on p-xylene plant. Fatality.

[fire - consequence]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, AUG.

Location : Off Kithira Islands, GREECE

Injured : 0 **Dead** : 0

Abstract

A marine transportation incident. A marine tanker with 4200 tonnes of caustic soda grounded. No spillage. Near miss.
[sodium hydroxide, ship ran aground]

Lessons

[None Reported]

6567 27 May 1994

Source : LLOYDS LIST, 1994, 30 MAY., 3 JUN., 17 JUN., & 2 DEC.; EUROPEAN CHEMICAL NEWS, 1994, 6 JUN.; CHEMICAL WEEK, 1994, 1 JUN, 22 JUN, & 29 JUN.; CHEMISTRY IN BRITAIN, 1995, FEB.

Location : Belpre; Ohio, USA

Injured : 0 **Dead** : 3

Abstract

Explosion and fire in a styrene butadiene block polymers resins plant near 3 tanks containing up to 5000 tonnes of styrene. Some people evacuated. Fire lasted for 10 hours. Plant remained closed. 316 tonnes of styrene, 127 tonnes of cyclohexane and 12 tonnes of ethylene dibromide released. It is suspected that there was a disproportionate amount of butadiene in the reactor where it was added to other chemicals. This may have started a reaction which caused a pressure build up in the reactor leading to vessel failure and explosion. Company agreed to pay \$3.02 m (1994). Fatality.

[high pressure, chemicals added incorrectly, unwanted chemical reaction, reaction vessel]

Lessons

[None Reported]

6564 24 May 1994

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1994.

Location : Vancouver, CANADA

Injured : 0 **Dead** : 0

Abstract

Explosion caused severe damage to a 10 metre diameter cone roof storage tank and 3 smaller tanks. Substance involved solvents.

Lessons

[None Reported]

6556 17 May 1994

Source : THE CHEMICAL ENGINEER, 1994, 26 MAY.; THE GUARDIAN, 18 MAY.

Location : Aspatria; Cumbria, UK

Injured : 0 **Dead** : 0

Abstract

Overfilling of a 34% caustic soda storage tank caused a fish kill when the caustic soda spilled into a river.
[overflow, sodium hydroxide]

Lessons

[None Reported]

6552 12 May 1994

Source : HAZARDOUS CARGO BULLETIN, 1994, 12 MAY.

Location : Queretaro, MEXICO

Injured : 0 Dead : 0

Abstract

A rail transportation incident. Collision between 2 freight trains hauling wheat and acid. Acid tankers remained intact.

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]

Source : ENDS REPORT, 1996, JUL.

Location : Atherstone, UK

Injured : 0 **Dead** : 1

Abstract

An operator entered a tank without breathing apparatus or protective clothing nor been trained in the work. He died after inhaling trichloroethylene. Fatality.
[entry into confined space, management system inadequate]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

Damage to vacuum tower trays at a refinery. This incident occurred when the vacuum tower experienced lower than acceptable levels when on recirculation, forcing recirculation to be stopped. Recirculation was again started but, when accumulator levels of light and heavy gas oils could not be sustained, the start-up efforts were aborted. It was found that there had been deviation from standard operating practice for normal start-up. Substantial amounts of water were present in the vacuum unit which were allowed to vaporise rapidly, creating enormous localised forces on the trays and beams. The cause of this incident was due to personnel rotation that left people assigned who were relatively inexperienced on crude/vacuum units and were unable to address the unusual situation. In addition operating procedures did not cover a scenario for starting up the vacuum tower from recirculation mode, without first having been completely shut down according to.

Losses, equipment damage and cost of repair \$1.4 million (1994), production loss \$5.3 million (1994).

[design or procedure error, damage to equipment, refining]

Lessons

Operating stages for start-up of vacuum distillation columns from cold or recirculation must follow strictly to agreed procedures, with great care taken to remove water from the system and to stay at all times within acceptable parameters of pressure and temperature.

Source : ICHEME

Location : , GERMANY

Injured : 0 Dead : 0

Abstract

A series of three explosion occurred within a few seconds in the waste incinerator of a chemical site during a night shift. There were no injuries and the damage sustained was slight. The incinerator burns waste from acrylics and viscose plants. The incinerator was operated for 20 years without any significant incidents. Salts (sodium sulphate and sodium hydroxide) were being charged and collecting as a molten pool in the rotary kiln section. A quantity of this residue had been allowed to build up. The explosion occurred within 2 minutes of a 14 drum charge being made to the system. On-site inspections suggested the damage caused was greater than that consistent with mild over-pressure but there had been no equipment failure. A Rapid Phase Transformation (or Physical explosion) caused by very hot molten salt entering the quench bath (containing water) from the kiln was seen as the most likely cause. This might have been triggered by a small transient over-pressurisation.

[charging, processing, overpressurisation, damage to equipment, accidental mixing]

Lessons

1. Inventories of molten salt to be minimised within the incinerator. The best means of achieving this is not to change salts containing metal ions to the system.
 2. A programme of regular inspections of the kiln should be instigated to ensure that residues are not allowed to build up.
 3. Restrict access to the area at the bottom of the kiln, especially during and after charging.
-

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

An explosion occurred in a waste incinerator, used to dispose of waste from acrylic and viscose plants. Damage was sustained by the incinerator and associated equipment. Immediately prior to the incident, fourteen drums, originating from a viscose making plant, had been discharged into the furnace. The explosion followed a couple of minutes later.

Although the precise circumstances of the explosion are not clear, it was considered that molten salt residues within the incinerator were involved and that the explosion was due to the rapid evaporation of water. Salts (sodium sulphate and sodium hydroxide), entering the incinerator with waste would form a molten pool in the kiln section.

[damage to equipment, normal operations]

Lessons

A number of recommendations were made. These included:

1. The kiln to be operated in such a way that molten salt pool formation is minimised.
 2. A number of routine jobs are carried out in the vicinity of the kiln. These are to be minimised and access to the area should be prohibited if the presence of a molten salt pool is present (and for a period of time after charging waste to the incinerator).
-

6487 31 March 1994

Source : LLOYDS LIST, 1994, 4 APR.

Location : Aix-en-provence, FRANCE

Injured : 4 **Dead** : 1

Abstract

An explosion occurred during cleaning of a vat of slightly radioactive sodium. Fatality.

Lessons

[None Reported]

6462 14 March 1994

Source : EUROPEAN CHEMICAL NEWS, 1994, 21 MAR.

Location : Droylesden; Manchester, UK

Injured : 3 **Dead** : 0

Abstract

An explosion occurred when a phosphorus oxychloride tank was flushed through with water after the material had been off-loaded into drums.
[decomposition, cleaning]

Lessons

[None Reported]

6439 26 February 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, MAY.

Location : Drodgen Canal, FINLAND

Injured : 0 Dead : 0

Abstract

A marine transportation incident. Holes punctured in bottom of oil/chemical tanker. Bottom tank flooded, hydrocarbon slurry and styrene monomer discharged.
[spill]

Lessons

[None Reported]

Source : CHEMICALS IN BRITAIN, 1995, AUG.

Location : London, UK

Injured : 1 Dead : 0

Abstract

A third year undergraduate was attempting to make a heterocyclic compound from sodium azide and cyanogen bromide under supervision. The reaction was carried out and the product filtered off the inorganic by-products. They were then dried and scraped off onto a balance pan when there was an explosion. The thumb of the student was blown off. The supervisor was prosecuted under the Management of Health and Safety Regulations 1992 by failing to make 'a suitable and sufficient assessment of the risks health and safety'. He was found not guilty due to his assessment of the hazards being accepted as reasonable.

[laboratory work, safety procedures inadequate, unwanted chemical reaction, bromine cyanide]

Lessons

Carry out risk assessment on laboratory experimentation.

6432 22 February 1994

Source : LLOYDS LIST, 1994, 23 FEB.

Location : Nanjing, CHINA

Injured : 0 Dead : 0

Abstract

1200 tonnes of waste oils and chemicals including sulphuric acid in corroding storage drums may be washed into river in rainy season.

[pollution, corrosion]

Lessons

[None Reported]

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

Location : Pierrelatte, FRANCE

Injured : 0 **Dead** : 0

Abstract

Due to high levels of radioactivity close to this facility, the unit was shutdown by the local authorities.

[radioactive release, plant shutdown]

Lessons

[None Reported]

6408 04 February 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, APR.

Location : Mutsure Off, JAPAN

Injured : 0 Dead : 0

Abstract

A marine transportation incident. Collision between a cargo vessel and marine tanker with methyl methacrylate and trichlorethylene. No spillage.
[near miss]

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]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, APR.; LOYDS LIST, 1994, 18 FEB.

Location : Fremont; California, USA

Injured : 0 **Dead** : 0

Abstract

A rail transportation incident. A rail wagon with a container derailed and fell into a local creek and broke open causing a spill. Container caught fire. Rail bridge damaged. Substances involved, phosphoric acid, sulphuric acid, hydrochloric acid, hexane, trichloroethylene and dichloromethane.
[fire - consequence]

Lessons

[None Reported]

6391 24 January 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, APR.; LLOYDS LIST, 1994, 25 JAN.

Location : Noyelles-godault, FRANCE

Injured : 9 **Dead** : 0

Abstract

Explosion in refining tower of zinc refinery.

Lessons

[None Reported]

6385 18 January 1994

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, MAR.

Location : Northridge; California, USA

Injured : 0 **Dead** : 0

Abstract

A rail transportation incident. An earthquake caused derailment of a freight train and one tanker of sulphuric acid leaked.

[spill]

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 : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

Isobutane release at a refinery. A vapour cloud of isobutane and water was released from an isobutane cooler (exchanger). The release was contained and the leak isolated. It was found that the water side of the exchanger froze, resulting in gasket failure between shell and channel cover.

Internal failure permitted isobutane to flow into the water side of the exchanger, this mixture of isobutane and water was released through the damaged gasket and from the steam vents which are part of the cooling water return system. The basic cause was a lack of a formal procedure for isolating and winterising the exchanger when it was not being used.

[weather effects, cooling equipment, spill, isolation inadequate, refining]

Lessons

Formal procedure for winterising this equipment should be established.

8435 1994

Source : CHEMICAL HAZARDS IN INDUSTRY, 1995, FEB.

Location : Louisiana, USA

Injured : 1 **Dead** : 1

Abstract

A production vessel in the hydrochloric acid plant ruptured in a TDI (toluene diisocyanate) process. Fatality.

[processing]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1995, MAY.

Location : , France

Injured : 0 **Dead :** 1

Abstract

A warehouse employee was asked to clean out an empty a wine vat which had just been emptied. He was later found dead near the manhole at the bottom of the vat. The autopsy found death was due to asphyxiation. Carbon dioxide, sulphur dioxide and hydrogen sulphide had accumulated at the bottom of the vat. Fatality.

[cleaning, warehousing, entry into confined space, testing inadequate]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

An incident occurred on a tank roof at an oil storage terminal causing an explosion and resulting in damage to the roof structure.

The explosion occurred when twenty one of the stiffener boxes on the tank in question had been cold cut, hot cut, welded and tested satisfactorily. However as the worker approached box twenty two to carry out hot cut operations there was a rumble, subsequently followed by an explosion which distorted the stiffener box severely. An alarm was immediately sounded, tank evacuation procedure instigated, tank area evacuated and the appropriate authorities notified. An investigation into the explosion revealed that an emulsion of oil/water had accumulated inside the stiffener box close to the centre pontoon. At the time of the incident jacking points were being welded to the underside of the centre pontoon. It is believed that this caused gas to be evolved from the accumulated oil/water emulsion resulting in a build up of flammable gas within the stiffener box. After the incident approximately 50 gallons of emulsion was drained from the stiffener box.

[welding, storage tanks, process causes]

Lessons

The report stated the following recommendations:

1. No hot work to be permitted on either side of floating roofs until all the enclosed spaces have been confirmed as being free of hydrocarbons.
 2. A detailed method permitting proper identification of stiffener boxes containing crude oil/gas to be adopted. It is recommended that a series of inspection holes are drilled in the top of the lower end of the box section, large enough to allow proper gas checking and dipping to determine the presence of potentially flammable liquids.
 3. Should flammable liquids e.g. oil/water emulsion be present then holes to be drilled up through the roof into the stiffener box to allow effective draining. Access holes to be cold cut into the side panel of the stiffener box to provide access for cleaning.
 4. Gas checks to be continuous, and even if some stiffener boxes appear gas free they to be monitored on a constant basis. Gas checks to be made immediately prior to the commencement of any hot work.
 5. Hazard analysis to be re-appraised and hazards such as explosion, fire, hot metal, etc. to be identified and addressed during tool box meetings.
 6. Review the Permit-To-Work system and check that all the job precautions specified are being followed during the execution of work.
 7. Update pre-commissioning checks and service inspection procedures for floating roofs of this type to include the identification of possible ingress points for water and hydrocarbons into the stiffening beam box structure e.g. discontinuous welding of the box structure, local corrosion etc. Seal those that are identified as a hazard with the potential for the above situation.
-

117051994

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

A drum of waste solvent and paint residues exploded on a manufacturing site. The drum failed due to build up of pressure within it. The exact cause is unclear, but the drum is known to have contained zinc residue and water and the ambient temperatures were high for the week leading up to the incident. The combination of zinc, water and heat is believed to have lead to a release of gas. Damage was limited and there were no injuries, possibly because it was a bank holiday.

[zinc, storage, drums, explosion, unwanted chemical reaction, high pressure, weather effects, gas / vapour release]

Lessons

1. Waste streams to be segregated to keep incompatible materials separated.
 2. Zinc and aluminium residues are known to be potentially reactive with water and to not be mixed with aqueous residues. They should also be clearly labelled.
 3. Waste drum stocks to be regularly checked for signs of pressure build up.
-

6346 19 December 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JAN.

Location : Hamburg, GERMANY

Injured : 0 Dead : 0

Abstract

Bow of marine tanker pushed from loading jetty during storm and 25 cm hose tore. 1000 litres of p-xylene spilled, part absorbed part went into harbour.

Lessons

[None Reported]

6343 15 December 1993

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1994.

Location : Ghent, BELGIUM

Injured : 0 Dead : 0

Abstract

Factory roof destroyed by fire following welding work within rubber factory.

[fire - consequence]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JAN.

Location : Channel Islands, UK

Injured : 0 **Dead** : 0

Abstract

A marine transportation incident. Ro-ro with steering fault and onboard spillage of 3 tonnes of sodium hydroxide returned to port.

[steering failure]

Lessons

[None Reported]

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1993.

Location : Rorschach, SWITZERLAND

Injured : 0 **Dead** : 0

Abstract

Fire involving 100 litres solvent at factory.

[fire - consequence, processing]

Lessons

[None Reported]

6334 09 December 1993

Source : LLOYDS LIST, 1993, 10 DEC.; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, JAN.

Location : English Channel, UK

Injured : 0 Dead : 0

Abstract

A marine transportation incident. A marine tanker sustained a ballast tank rupture and pump failure in a storm leading to a spill of xylene. Vessel overturned and sank.

[weather effects, sinking]

Lessons

[None Reported]

Source : LOSS PREVENTION BULLETIN, 123, 12-13.

Location : ,

Injured : 0 Dead : 0

Abstract

A door to a sodium bisulphite dosing room displayed a hand-written notice stating 'only enter wearing breathing apparatus or ventilate room'. The door of the room was opened and it was found that the room could not be entered due to a high level of irritation to the eyes and respiratory system. Breathing apparatus were to be worn.

On entry it was noticed that two small bunds each contained approximately 15 litres of sodium bisulphite. A leak was found on the dosing pumps.

There was no fixed gas detection installed in the dosing pump room.

As a result of the leak, the dosing pumps were both mechanically and electrically isolated and also locked-off. The spillage was diluted with water, the area cleaned and permission was obtained for the diluted solution of sodium bisulphite to be flushed into the local sewer.

[testing inadequate, commissioning]

Lessons

The following recommendations were made:

1. It is not acceptable to a commission plant and allow it to continue operating with essential safety equipment missing, or inoperative. Such equipment is not an optional extra, but a pre-requisite to being legally permitted to operate the plant or process.
 2. Where defects are identified as a result of commissioning, or subsequent operation, safety critical defects need to be clearly identified and rectified promptly. It would be useful if safety critical items could be distinguished from minor snagging items to enable prioritisation.
 3. Where it is not possible to achieve either of the above, alternative arrangements need to be put into place which achieve an equivalent standard of safety and arrangements made to communicate these clearly to all staff. Specialist advice should be taken in these circumstances.
 4. In all cases, staff training provided for new processes and plant must include relevant health and safety items and, in particular, the hazards of the materials involved. This again is a fundamental legal obligation.
-

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, FEB.

Location : Jacksonville, USA

Injured : 10 **Dead** : 0

Abstract

Fire destroyed a tank and warehouse after burning oil and xylene spread to nearby drum and tank storage area through open dykes.

[fire - consequence]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

During the start-up of a Bitumen Blower Unit, the Bitumen Blowing Column was overpressured. The bolt and safety pin mechanism on the top cover of the vessel broke and about 7 meters³ of residue was blown some 60 meters in the air and for a distance of about 150 meters.

There were no injuries sustained and no damage to plant, but there was a 3-day loss in bitumen production.

The cause of the incident was an accumulation of water in the bottom of the blowing column and/or bottom line following flushing of the unit. The water came into the column either through a steam line or from the blowing air line. During commissioning of the column, the water reached a high temperature zone, immediately flashed to steam and overpressured the column, causing the top cover to lift and release residue to the atmosphere.

[product loss, gas / vapour release]

Lessons

The report stated the following recommendations:

1. Ensure that water/light oils are not allowed to contact hot oils to avoid overpressuring equipment with possible rupture.
 2. The hazards of mixing cold and hot phases in equipment must be stressed.
 3. Good communication between shift personnel is essential to avoid incidents.
-

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

Bitumen blower column overpressurised at a refinery. During start-up of the bitumen blowing unit, the bitumen blowing column was overpressured. Residue was blown from the top of the vessel and fell for a distance of about 150 metres. Water, that had entered the column undetected, vaporised to steam when it reached high temperature zone. Start-up procedures were slightly modified by individual experience of different shifts. Contributing was poor communications within the shift on at the time of the incident. The cause was due to start-up procedures being modified, albeit slightly; and no procedure existed for checking the guilty steam line.

[overpressurisation, refining, design or procedure error]

Lessons

Operating instructions must be carefully followed to ensure that water/light oils are not allowed to contact hot oils to avoid overpressurising equipment with possible rupture.

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, FEB.

Location : Tracy; Quebec, CANADA

Injured : 1 **Dead** : 0

Abstract

Spill of 5 cum of titanium tetrachloride due to part of piping being removed for repairs.

[pipe

Lessons

[None Reported]

6270 22 October 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, FEB.

Location : Madras, INDIA

Injured : 0 Dead : 0

Abstract

A marine transportation incident. A cargo of 6000 tonnes of palmolein was declared unfit for human consumption after contamination with vinyl chloride monomer, the previous cargo.

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1994, FEB.

Location : Lechang, CHINA

Injured : 0 **Dead** : 0

Abstract

A rail transportation incident. Derailment of train caused rail tanker wagons to overturn and sulphuric acid to spill.

Lessons

[None Reported]

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 4TH QUARTER, 1993.

Location : Texas City; Texas, USA

Injured : 2 **Dead** : 0

Abstract

Small fire in reformer caused shutdown of unit. Substance involved: xylene.

[fire - consequence, processing]

Lessons

[None Reported]

6254 08 October 1993

Source : OIL AND GAS JOURNAL, 1993, 18 OCT.

Location : Martinez; California, USA

Injured : 0 Dead : 0

Abstract

Explosion and fire in a spent acid storage tank holding sulphuric acid from crude oil treatment at this oil refinery.

[fire - consequence]

Lessons

[None Reported]

Source : LOSS PREVENTION BULLETIN, 117, 17.

Location : Georgia, USA

Injured : 1 Dead : 0

Abstract

Workers were transferring a 93% solution of sulphuric acid from a 3785 litre storage tank to 378 litre "day tank" when a 2.5 cm carbon steel transfer pipe line failed. The failure caused sulphuric acid to be sprayed about 18 metres from the origin of the leak. A worker walking through the area was sprayed by the acid mist and received second degree burns on his back. After being washed down in a safety shower by fellow workers, he was taken to a medical facility for treatment. The procedure for transferring acid from the bulk tank to the day tank required that the valve at the dilute tank be closed and that a transfer pump be used to facilitate the transfer of acid from the bulk tank to the day tank. When the accident occurred, the valve at the dilute tank was closed and the transfer pump had been started. The pump built up pressure in the pipe, causing the mist of acid.

An inspection indicated that the failed line was constructed of carbon steel and appeared to be a "Schedule 40 pipe", although the engineering drawings specified use of "Schedule 160 pipe", which has walls approximately twice as thick. In addition, it was known that the flow of acid through the line normally reduces the thickness of the pipe wall by about 5 microns per year. The section of the line that failed had been replaced approximately 10 years ago. On this occasion, as soon as the leak was discovered and the transfer pump shut down, the area was barricaded and thoroughly washed. All piping was subsequently inspected using non-destructive evaluation (NDE) techniques, and pipes of insufficient thickness were replaced.

[pipeline failure, incorrect equipment installed, spill, material transfer]

Lessons

This incident provided several lessons relating to configuration control and the handling of corrosive materials:

1. Whenever system components are replaced or repaired, engineering documents must be checked to ensure that the correct materials are used. Engineering documents (especially drawings) must be carefully managed to ensure that they are kept up-to date. However, specifying the correct materials and components for maintenance and repairs is not enough. Follow up must be conducted to ensure that the entire process is performed correctly, appropriate replacement items must be ordered, inspected on receipt, adequately documented in work orders, installed, and functionally tested.
2. Management must ensure that all hazardous materials and processes are identified and that procedures are developed and implemented to ensure safety. A preventative maintenance programme, including a replacement schedule or through NDE testing, should be established to replace components where failure would result in serious safety or environmental consequences.
3. Implementation of relevant standards related to mechanical integrity, procedures, and training should have prevented the use of incorrect schedule piping. Although many standards apply to facilities with quantities of hazardous material above a certain thresholds, these recommended practices will prevent accidents even when applied to facilities that are not covered by the standard.

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

Spent acid failure. The alkylation unit's spent acid tank overpressurised, causing the roof and shell to separate completely from the floor, the reaction force propelled the tank into an adjacent tank. Hydrocarbons were released, and a fire ensued. There was equipment damage. It was found that weakly alkaline water was pumped into the spent acid tank, and the dilution of spent sulphuric acid in water released heat, increasing the temperature of the hydrocarbon layer, resulting in the tank overpressurising. The basic cause was insufficient monitoring to prevent weakly alkaline water from entering spent acid tanks.

[overpressurisation, spill, fire - consequence, damage to equipment, design or procedure error]

Lessons

When transferring liquids in a system containing acids and water solutions, account must be taken of the heat of dilution released by the chemical reaction of mixing acids with water or alkaline water mixtures. As was demonstrated, this can be sufficient to initiate equipment damage.

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, DEC.

Location : Oakland; California, USA

Injured : 16 **Dead** : 1

Abstract

Cleaning worker died after falling into vat of toxic waste. Second worker overcome by fumes in rescue attempt and fell into vat. Vat turned over to release men. Fatality.
[asphyxiation]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1994, JAN.

Location : Sweeny; Texas, USA

Injured : 2 **Dead** : 1

Abstract

Preventative maintenance on steam turbine when there was an explosion. Fatality.

Lessons

[None Reported]

Source : EUROPEAN CHEMICAL NEWS, 1993, 11 OCT.

Location : Mirande De Ebro; Castille, SPAIN

Injured : 1 **Dead :** 0

Abstract

An explosion of 5 tonnes of vinyl chloride monomer (VCM) occurred at a polyvinyl chloride (PVC) plant, leaving one worker with minor injuries and disrupting production for about 1 month. The polymerisation reactor on one of the plant's two lines sped up, increasing the pressure inside and forcing vinyl chloride monomer out through a valve and into the air, when it exploded. Total capacity of 72000 tonnes per year not severely affected as plant not operating at full capacity.

[explosion, overpressurisation, reactors and reaction equipment, injury]

Lessons

[None Reported]

6208 27 August 1993

Source : CHEMICAL AND ENGINEERING NEWS, 1993, 6 SEP.; EXECUTIVE NEWS, 1993, 27 AUG.

Location : Elyria; Ohio, USA

Injured : 50 Dead : 0

Abstract

Two massive and several minor explosions hit this organic peroxide plant causing extensive damage to plant. A cloud of hydrochloric acid drifted over industrial and residential areas causing the evacuation of 5000 people. Explosion caused rupture of 2 above-ground sulphuric acid tanks. First explosion occurred in catalyst blending building following overheating of pump after it had gone dry. Fire then spread to adjacent building.

[fire - consequence, processing]

Lessons

[None Reported]

6205 26 August 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, NOV.

Location : Harding County; Washington, USA

Injured : 0 **Dead** : 0

Abstract

A rail transportation incident. Derailment of train led to a spill of vinylidene chloride from a punctured rail tanker that was undetected until salvage began.

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

A cone roofed tank in residue service violently ruptured at the roof to shell seam. A black plume rose in the air and was carried into the neighboring area. Steam was injected into the tank to snuff out the internal fire. About 3,400 bbls. of residue of left the tank, with approximately 95 percent of this captured in the tank dike area. The airborne portion (less than 150 bbls.) travelled outside the tank dike area. Damage inside the refinery was limited to the tank roof and its upper shell. There were no injuries.

The project incident cost to date is \$212,000 (1993), including 652 car and 239 house insurance claims resolved to date. The total cost may increase to \$364,000 (1993) due pending claims and the tank repair.

The incident occurred when the combination of hot residue vapours, oxygen and pyrophoric deposits in the vapour space completed the fire triangle with autoignition. The resulting combustion increased the tank vapour space pressure, overpressured the tank and ruptured the roof to wall seam. Combustion vapours and liquid oil was released from the tank.

The incident occurred after the tank had been isolated the previous night at a temperature of 405 degrees F. Just hours before the tank isolation, the vacuum distillation unit cooler box in atmospheric residue service was bypassed due to plugging, raising the rundown from its normal temperature of 400 degrees F to about 670 degrees F.

The combination of excessive temperature and available oxygen in the tank vapour space provided the scenario for autoginition. Lack of communication and a previous tank roof seam split were contributory causes to the incident.

[storage tanks, material of construction failure, gas / vapour release, damage to equipment, design or procedure error, high temperature]

Lessons

The following recommendations were made:

1. Rundown temperatures of residue to storage must not exceed safe levels.
 2. Damaged tanks retained in service may exacerbate problems at a later date.
 3. For residue, bitumens, heavy oils, subject to deposition on tank walls and under roofs, autoignition is a potential hazard.
 4. Tank heating coils must not be in operation without an adequate liquid level coverage.
 5. Temperature indications for storage tanks are usually poorly provided giving operators.
 6. limited reliable information, this needs to be considered when working close to safe temperature limits.
-

6195 19 August 1993

Source : THE INDEPENDENT, 1993, 20 AUG.

Location : Grannagh; Waterford, IRELAND

Injured : 3 Dead : 0

Abstract

Explosion at industrial resins plant.

[processing]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN, 1995, DEC.

Location : Sudbury, Ontario, CANADA

Injured : 0 Dead : 0

Abstract

An incorrectly fitted and deteriorated manway nozzle gasket caused a leak of hydrogen sulphide from a rail tanker car involved in a derailment. Two cars were derailed around a 7 degree curve taken at 8 kmph. One contained vinyl acetate residue and the other 2,700 kg of hydrogen sulphide residues. The bill of lading accompanying this tank wagon identified it as an "empty car which last contained hydrogen sulphide". The tank car was taken to a repair yard where a concentration of 600 ppm was recorded. The gas was flared off. The investigation showed that the derailment occurred because the tank wagon had insufficient side bearing clearance to permit the bogies to rotate sufficiently on the curve. The side bearing clearance did not meet the appropriate regulations. The manway gasket, from which the hydrogen sulphide gas leaked, had not been replaced for at least 4 years.

[human causes]

Lessons

The following lessons were learnt:

1. The placarding of the tankwagon did not give the appropriate warning for hydrogen sulphide.
 2. The hydrogen sulphide was being carried in a single compartment tank wagon under a temporary permit. This practice was now under review.
 3. Several loading and inspection procedures did not comply with the regulations and neither the wagon owners or the shipper were aware of these regulations. A review of compliance with these regulations was being carried out to see if it was the cause of other accidents.
-

6182 06 August 1993

Source : LLOYDS LIST, 1993, 9 SEP.; EUROPEAN CHEMICAL NEWS, 1993, 27 JUN., & 16 AUG.; CHEMICAL ENGINEERING, 1993, SEP.; THE CHEMICAL ENGINEER, 1994, 10 NOV.

Location : Ringskidly; Cork, IRELAND

Injured : 5 **Dead** : 0

Abstract

Several explosions in pharmaceutical plant. Explosion resulted from a build-up in pressure when isopropanol was left in a process vessel for 6 days during the plant's annual shut-down. The vessel was insulated and the heat created by the residue of other chemicals at the bottom of the container could not escape.

[high pressure, reaction vessel]

Lessons

[None Reported]

1152804 August 1993

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

An uncovenanted trip of a boiler feedwater pump on a plant was followed by a delay in starting a standby (steam turbine driven) pump due to difficulties in clearing the pump's trips. This led to the tripping out of a furnace on low steam drum level, which in turn caused instability in the fuel gas system resulting in both boilers tripping out. Continuing difficulties with the feedwater pumps resulted in the loss of the remaining furnaces on low steam drum levels and to the progressive depressuring of the entire plant steam system. The consequent lack of steam led to a slow down in the propylene refrigeration compressor, and to flaring of the ethylene tower overheads, (due to lack of steam, some initial flaring was smoky, leading to complaints from the public). All the emergency shutdown systems operated correctly, and the plant was shut down in a safe manner.

Approximately 53 tonnes was flared, and 50 hours production was lost.

In an initial attempt to reinventory the ethylene tower, misunderstandings led to the depressurisation of the export line to below the minimum design temperature,(but the metallurgical limits of the pipework were not exceeded).

[ethylene, steam, cracking, pump, plant shutdown]

Lessons

[None Reported]

6175 02 August 1993

Source : EUROPEAN CHEMICAL NEWS, 1993, 16 AUG.; CHEMICAL ENGINEERING, 1993, SEP.

Location : Dottikon, SWITZERLAND

Injured : 0 **Dead** : 2

Abstract

An explosion occurred when a methanol/toluene mixture was being routinely filtered using a pressure filter to make an undisclosed intermediate. Fatality.
[separation equipment, filtration, methanol, fire - consequence]

Lessons

[None Reported]

Source : ENDS REPORT NO. 232, 1994, MAY.

Location : Seal Sands; Cleveland, UK

Injured : 0 **Dead** : 0

Abstract

An explosion of a 50 tonne effluent waste storage tank occurred when hydrogen peroxide was passed to the tank. An oxygen rich atmosphere and the solvent vapours were possibly ignited by static generated by splash filling of the tank.

Lessons

[None Reported]

Source : OCCUPATIONAL SAFETY OBSERVER, 1994, MAR.

Location : Shelbyville; Kentucky, USA

Injured : 3 Dead : 1

Abstract

Four workers at a packaging plant were performing maintenance on a parts cleaning system when an explosion and fire ripped through the room. The room contained a number of highly flammable and toxic substances including methyl ethyl ketone, ethyl acetate, acetone and toluene used as solvents. The operation consisted in the removal of a pump from the cabinet system and repairing the filter system. The pump had been removed and a welder was preparing to repair the basket cover when the explosion occurred. Some attempt had been made to clear flammable material but 2 soak tanks were not removed and their lids were unsealed. Fatality.

[packaging equipment, welding, permit to work system inadequate]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, NOV.

Location : Richmond; California, USA

Injured : 0 **Dead** : 0

Abstract

A rail transportation incident. A rail tanker leaked sulphuric acid which formed a cloud 1000 ft high and 6 to 8 miles long. Industrial area evacuated. Workers were moving the tanker when pressure inside the tanker lifted the safety relief valve.
[overpressurisation, evacuation, spill]

Lessons

[None Reported]

6163 27 July 1993

Source : THE CHEMICAL ENGINEER, 1994, 17 MAR.

Location : Avonmouth, UK

Injured : 0 **Dead :** 0

Abstract

Deliberate acts caused release of sulphur trioxide. Company failed to use best practical means to prevent the spill and were fined in magistrates court £15000 (1993).

Lessons

[None Reported]

6160 26 July 1993

Source : LLOYDS LIST, 1994, 21 FEB.

Location : Richmond; California, USA

Injured : 0 **Dead** : 0

Abstract

A rail tanker safety seal failed when unloading 45000 litres of oleum. White cloud formed. The highway and ship channel were closed and led to the evacuation of 2000 people.

[seal failure, sulphuric acid]

Lessons

[None Reported]

6155 17 July 1993

Source : LLOYDS LIST, 1993, 23 JUL.

Location : Mayak; Chelyabinsk, RUSSIA

Injured : 0 **Dead** : 0

Abstract

Radioactive isotopes released at a nuclear facility at a plutonium producing plant.
[radioactive release]

Lessons

[None Reported]

6153 16 July 1993

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 3RD QUARTER, 1993.

Location : Much Wenlock; Shropshire, UK

Injured : 2 **Dead** : 1

Abstract

Fire in waste tank during maintenance operations. Fatality.

Lessons

[None Reported]

6154 16 July 1993

Source : LLOYDS LIST, 1993, 17 JUL.

Location : Henin-beaumont, FRANCE

Injured : 3 **Dead** : 9

Abstract

Cloud of zinc dust exploded in lead and zinc factory as workers were dealing with an abnormal pressure in one of the zinc refining towers. Fatality.
[dust explosion, incorrect pressure]

Lessons

[None Reported]

6137 02 July 1993

Source : CHEMICAL HAZARDS IN INDUSTRY, 1994, MAY.

Location : Fukuoka, JAPAN

Injured : 13 **Dead** : 0

Abstract

Explosion at an aluminium plant when water seeped into smelter.

[unwanted chemical reaction, smelting furnace, processing]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, AUG.

Location : Lazaro Cardenas, MEXICO

Injured : 0 **Dead** : 0

Abstract

Leakage of sulphuric acid in pump room on marine tanker during part unloading.

[spill]

Lessons

[None Reported]

6117 11 June 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, SEP.

Location : Tuticorin, INDIA

Injured : 0 **Dead** : 0

Abstract

Fire in sulphur store.

[fire - consequence, storage]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, AUG.

Location : Norco; Louisiana, USA

Injured : 0 **Dead** : 0

Abstract

Pinhole leak in refinery transfer pipeline from barge allowed 3000 litres of sulphuric acid to spill into ditch.

Lessons

[None Reported]

6109 08 June 1993

Source : LLOYDS LIST, 1993, 11 JUN.

Location : Cengkareng, JAKARTA

Injured : 0 **Dead** : 0

Abstract

A fire in solvent - thinners factory started after workforce had gone home. Fire spread to other businesses.

[fire - consequence, processing, solvent - thinners]

Lessons

[None Reported]

Source : CHEMICAL WEEK, 1993, 16 JUN.

Location : Houston; Texas, USA

Injured : 2 **Dead** : 0

Abstract

A spill of 3000 gallons of sulphuric acid occurred at a refinery during material transfer from a barge.

[transport]

Lessons

[None Reported]

Source : LOSS PREVENTION BULLETIN, 117, 24.

Location : ,

Injured : 0 Dead : 0

Abstract

A valve between the reactor top and the charge line of the diamine and nitrogen, prone to the occasional slight leakage, had been replaced with new ball valve.

There was slight difference between the flange on the reactor and the new valve that required the bolt holes in the valve to be elongated outwards to enable a good alignment and fit. A slip ring gasket was therefore fitted between the faces. On the day of the incident the reactor was charged then sealed and pressure tested in the cold with nitrogen to 2.4 bar g and held for 10 minutes. After complying with the pressure check, the reactor was vented down then resealed ready for its reaction. After 5 hours of its reaction the gasket partially blew out releasing some diamine/methanol mixture in vapour form. An operator passed through some of the cloud making his escape and was effected by inhalation of the fumes.

The most probable cause of the incident was the misalignment, by 6mm, of the gasket on the reactor flange. This misalignment would probably not be noticed at the fitting because of the "play" created by the different bolt centres.

[gas / vapour release, equipment misalignment, maintenance, toxic fumes]

Lessons

The following recommendations were made:

1. Where a new piece of equipment has differing fittings to that being replaced the management of change systems must be invoked. This will properly consider what action needs to be taken. The expedient of slotting bolt holes to make a fit is fraught with potential hazards and should be avoided. When different standards are to be connected, a spool piece making the conversion should be used normally. Full face joints should be used as in application these are self aligning. Slip ring gaskets should not be used in safety critical joints unless they are expressly specified such as spiral wound gaskets.
 2. It must be re-emphasised to all maintenance personnel that a change in standards, all be it an updating, is a change and is subject to the modifications and change control procedure.
 3. Where an emergency condition can release toxic fumes, the reactor should be fitted with remotely operated shut down facilities.
-

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

Rain in the early hours of 10 May, 1993, increased to an extremely heavy downpour with thunder and lightning by around 05.30 hours. This resulted in the refinery steam load increasing rapidly with a corresponding reduction in pressure, and operators going to the offsites area.

Shortly afterwards a fire was detected in the location of the Unit (Hydrogen Generation Unit) and around sewerage manholes across the road, the intensity of which led to operator intervention and the actuation of the ESD system on that unit and isolation of fuel sources. Because of fire around many lines feeding units, a general process unit shutdown followed with the raising of a major fire alarm. The Refinery Fire Service successfully dealt with the fire.

The "All Clear" was sounded by 06.15 hours.

Extensive damage was mainly to piping, supports, aluminium cladding, cabling, and some control valves, but there was no damage to major items of equipment.

The Unit production was lost for 21 days, damage repair costs were \$820,000 (1993), with \$16,000 (1993) for firefighting, and loss of production opportunity assessed as \$4.46 million (1993). No personnel were injured in the incident.

The immediate cause of the incident is blamed on hazardous environmental conditions, i.e., a severe electric storm with an exceptionally heavy rainfall. The process area surface drains were not segregated from the process oil drain system, and the sewer system was unable to cope and became overloaded with oil and water.

Although no one actually saw the start of the fire, it is concluded that it started with an overflow from sewerage manholes leading to a layer of oil in a flooded area which was then probably ignited by a lightning strike.

[fire - consequence, processing, damage to equipment, drains & sewers, weather effects]

Lessons

The report stated the following recommendations:

1. Oily water drainage and clean water surface drainage systems wherever possible to be segregated.
2. The rapid failure of aluminium cladding on pipework/vessels under fire conditions is clearly demonstrated. It melts and fails very early in a fire situation being then knocked off by fire hoses, exposing the underlying equipment to possibilities of fire impingement and adding to the general debris to block drains.
3. For older "impure" aluminium cladding with a substantial magnesium content, it may well add to the fire load.
4. Ball checks not be removed from sight glasses.
5. Review of power/instrument cabling fire protection.
6. Earthing protection against natural electrical activity must be well maintained and checked.
7. Emergency Response procedures to be regularly exercised to ensure that all involved are up-to-date with changes.

6067 07 May 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, JUL.

Location : Salvador, BRAZIL

Injured : 0 Dead : 0

Abstract

Wire rope on crane broke and 2 ISO tanks each containing 10 tonnes of triethyl aluminium fell to sea.

[unloading]

Lessons

[None Reported]

6062 03 May 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, JUN.

Location : , HONG KONG

Injured : 0 Dead : 0

Abstract

Vessel hit underside of bridge and caused rupture of pipeline of town gas.

[gas / vapour release]

Lessons

[None Reported]

6060 02 May 1993

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1993.

Location : Ingelside, USA

Injured : 0 Dead : 0

Abstract

Explosion of a furnace. Substance involved vinyl chloride.

Lessons

[None Reported]

Source : LOSS PREVENTION BULLETIN, 116, 21.

Location : ,

Injured : 0 Dead : 0

Abstract

A magnetic drive pump used for mixing acid (70% nitric acid, 30% sulphuric acid) exploded. After a low level pump shut down, an operator went into the plant and started the off-line pump, which he did not see was blocked in. Upon returning to the control room, he observed the acid tank level to be still low. He called another operator in the plant to restart the acid pump. The second operator started the on line pump and did not notice that the off line pump was still running. There was an explosion in the off line pump.

[operator error]

Lessons

After investigation the following main causes were found:

1. The mixed acid pump was run against a dead head until it failed 11 minutes later.
 2. Operator error.
 3. Management of change procedure failure, a project to repair a flow switch to automatically stop the pump on 'no flow' had not been completed.
 4. Maintenance pump running lights were not working.
 5. Equipment identification, both pumps and start buttons were poorly identified.
-

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

Storm leads to unit fire. In conjunction with extremely heavy rainfall (with thunder and lightning) a fire broke out in the location of the hydrogen generation unit and around sewerage manholes in the same area. The sewer system was unable to cope with the exceptional rain and became overloaded with oil and water. In addition process area surface drains are not segregated from process oil drain system.

Estimated at \$5.3 million (1993) (U.S.) most of which was attributed to loss of production opportunity \$4.46 million (1993). Extensive damage to piping, supports, aluminium cladding, and some control valves, production loss, dispatching of firefighters.

[fire - consequence, weather effects, product loss, damage to equipment]

Lessons

Oily water drainage and clean water surface drainage systems, wherever possible, should be segregated. Rapid failure of aluminium cladding on pipework/vessels under fire conditions is, once again, clearly demonstrated. It melts and fails very early in fire situations, being then knocked off by fire hoses, exposing underlying equipment and adding to the general debris of blocked drains.

6045 21 April 1993

Source : LLOYDS LIST, 1993, 7 MAY.

Location : Yingko; Taipei, TAIWAN

Injured : 0 **Dead** : 0

Abstract

Fire in rubber plant destroyed factory.

[fire - consequence, processing]

Lessons

[None Reported]

Source : LOSS PREVENTION BULLETIN, 113, 25-25.

Location : ,

Injured : 0 Dead : 0

Abstract

Vinyl acetate odour was noticed inside a reactor shed coming from an atmospheric Pre-Emulsion (PE) tank. The manway cover had lifted off the tank and emulsion was present on the deck in front of the manway. The PE tank held a complete pre-emulsion (monomers, maleic anhydride, surfactant, ferrous sulphate and water) since the previous shift on Friday night. Sometime between Friday evening and Sunday evening, a reaction began in the PE tank and was still taking place when the start-up crew arrived at midnight on Sunday. The Shift Supervisor shut the agitator off, recorded the PE tank temperature (60 degrees C) and evacuated the reactor area. Incident Command was established. Personnel donned breathing apparatus and rain gear and entered the area carrying an LEL/O₂ meter. They started the agitator on the PE tank. A sudden pressure surge again lifted the manway cover off the tank. They stopped the agitator and evacuated the area. Moments later they returned to the PE tank, replaced the manway cover, began circulation of the pre-emulsion through the heat exchanger and left the area. Periodic entry to the area to monitor the PE tank temperature while the area was continually monitored for flammables and oxygen (O₂). The Safety, Health & Environment Manager arrived and called the Fire Department. She also contacted the Distribution Safety Manager who advised her to create a water quench in the reactor and transfer the pre-emulsion from the PE tank into the quench. Water and inhibitor were added into the cleaned reactor. The pre-emulsion was slowly metered into the reactor while monitoring the PE tank temperature and the filled space inside the reactor. Once they confirmed that the temperature was holding steady, they increased the pre-emulsion transfer rate. Approximately two-thirds of the pre-emulsion was transferred into the reactor resulting in a temperature drop to 23 degrees C effectively quenching the reaction. Water and inhibitor were added to the remaining pre-emulsion in the PE tank and the material was circulated through the heat exchanger. After confirming that the PE tank temperature was stable, the PE agitator was started. The PE tank temperature dropped from 54 to 37 degrees C. Conditions remained stable on both the reactor and the PE tank and an end to the emergency was declared.

The key findings were:

1. There were a number of problems associated with the emergency response actions and equipment availability.
2. Some formulations called for adding catalyst or other additives to the pre-emulsion tank.
3. The pre-emulsion tank was not monitored.

[reactors and reaction equipment, runaway reaction, spill]

Lessons

Key actions taken were:

1. No monomer mix or pre-emulsion will be left unattended or monitored.
2. Remove catalyst and activators from the pre-emulsion tank.
3. Establish written procedures for minimising hold times of pre-emulsion and monomer mix for handling non-typical (e.g. polymerisation) situations.
4. Improve written emergency response procedures and employee emergency response training.
5. Remove heat sources from pre-emulsion vessels.
6. Complete the ongoing process vessel high temperature/high level alarm project.

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

High pressure steam at 600 psig is generated in two supplementary fired CO boilers at the refinery.

Combustion air to each boiler is supplied by individual (non-spared) forced draft fans.

After a period of observation, starting with noisy running, the outboard bearing of the forced draught fan of one of the boilers became sufficiently hot to enforce a controlled steam load shedding and shutdown of the boiler. It was subsequently found that a build up of sludge de-positions in the bearing housing of the fan had prevented adequate lubrication to the outboard bearing, causing the bearing to fail.

Total losses from the forced shutdown were \$161,000 - \$95,000 (1993) in unit throughput adjustments, \$56,000 (1993) benzene to gasoline adjustments, and \$10,000 (1993) repair costs to the fan bearings. One air violation was incurred as the result of having to vent CO.

Although there were no injuries sustained and no fire damage, it is considered that there was a significant potential for fire and equipment damage.

[lubrication failure, bearing failure, plant shutdown]

Lessons

The report stated the following recommendations:

1. It is essential that high integrity and well maintained lubrication systems are used for equipment, which can be proved in service to be effective, and flushed out as necessary.
 2. Quantities of lubricant used to be monitored to detect changes up or down, either of which can indicate potential problems. Qualities of lubricants supplied should be the subject of routine proof testing.
 3. For some equipment - e.g., such as large electric motors with a constant volume lubricant system - at major overhauls labyrinths/oilways to be inspected/cleaned.
 4. Other monitoring systems, such as bearing temperatures and vibration, routine checks on oil quality of samples taken from the lubrication system, is necessary especially if it is critical equipment without a standby.
-

6033 16 April 1993

Source : LLOYDS LIST, 1993, 22 APR.

Location : Aktyuz, KAZAKHSTAN

Injured : 0 Dead : 0

Abstract

Pipeline from oil dressing factory burst resulting in lead, zinc, cadmium and molybdenum leaking into waters of a river.
[spill, processing]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, JUN.

Location : , BAY OF BISCAY

Injured : 0 **Dead :** 33

Abstract

A marine transportation incident. Water ingress in ship carrying steel, sulphuric acid and paint sank after steel shifted. Fatality.

[spill]

Lessons

[None Reported]

6022 07 April 1993

Source : CHEMICAL HAZARDS IN INDUSTRY, 1993, MAY.

Location : Nutley; New Jersey, USA

Injured : 2 **Dead** : 0

Abstract

Toluene was detected in waste stream prior to explosion and was diverted to a holding tank.

Lessons

[None Reported]

6016 06 April 1993

Source : LLOYDS LIST, 1993, 9 APR.

Location : Tomsk-7; Siberia, RUSSIA

Injured : 0 **Dead** : 0

Abstract

A storage canister of radioactive material exploded in an unoccupied building of a chemical factory. Elevated levels of radio-activity found 12 miles away. 2470 acres contaminated. Incident rated 3 on international 7 point scale.

[radioactive release, container, uranium solution]

Lessons

[None Reported]

6015 05 April 1993

Source : LLOYDS LIST, 1993, 6 APR.; EUROPEAN CHEMICAL NEWS, 1993, 12 APR.

Location : Neratovice, CZECH

Injured : 12 **Dead** : 0

Abstract

Explosion and fire after maintenance work on vinyl chloride monomer polymerisation plant. Cause attributed to error by maintenance worker.
[fire - consequence, human causes]

Lessons

[None Reported]

6012 02 April 1993

Source : EUROPEAN CHEMICAL NEWS, 1993, 12 APR.; WASTE ENVIRONMENT TODAY, 1993, MAY.

Location : Frankfurt, GERMANY

Injured : 0 Dead : 0

Abstract

Pipe joining 2 vats burst during repairs releasing several tonnes of oleum. A cloud drifted towards a nearby town and airport.

[gas / vapour release, sulphur trioxide, sulphuric acid]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

Boiler fan bearing failure at a refinery. Investigation of noisy forced draft fan resulted in monitoring and, thereafter, shutdown of boiler to examine the bearing housing. It was discovered that a considerable amount of sludge had built up in the bearing housing. The immediate cause was sludge forming mechanism that prevented adequate lubrication to the forced draft fan outboard bearing, causing the bearing to fail. Contributing to the incident was oil line to the oiler and other the other level indicator had been plugged with sludge and resulted in false oil level readings. The basic cause was that there was not an adequate means of checking the oil in the housing, therefore, the sludge build-up went undetected. The forced draft fan was a critical piece of equipment, and it was not possible to take it out of service to check the bearing housing without a shut-down.

Losses, unit throughput adjustments, \$95,000 (1993), product adjustments, \$56,000 (1993), maintenance, labour, and materials, \$10,000 (1993), environmental violation.

[refining]

Lessons

1. When there is no redundancy (spare equipment) built into the process, it is essential that high integrity and well maintained lubricating systems are installed.
 2. Quantities of lubricant used should be monitored to detect changes up or down, either of which can indicate potential problems.
 3. Qualities of lubricants supplied should be the subject of routine proof testing.
-

6009 April 1993

Source : EUROPEAN CHEMICAL NEWS, 1993, 10 MAY.

Location : Knapsack, GERMANY

Injured : 0 Dead : 0

Abstract

A road transportation incident. Explosion in vehicle carrying sodium sent a cloud drifting towards a city.

Lessons

[None Reported]

6006 31 March 1993

Source : THE CHEMICAL ENGINEER, 1993, 8 APR.

Location : Martinez; California, USA

Injured : 0 Dead : 0

Abstract

Steel lid blew off sludge storage tank and cut power lines before landing on railway lines.

[explosion]

Lessons

[None Reported]

6005 29 March 1993

Source : ICHEME

Location : , FRANCE

Injured : 0 Dead : 0

Abstract

Fire on ethylene oxide plant. Heat exchanger was open during plant shutdown when sludge caught fire.

[fire - consequence, processing]

Lessons

[None Reported]

6000 24 March 1993

Source : THE STATE, 1993, 25 MAR.; SOUTH CAROLINA DEPARTMENT OF LABOR CITATION, 1993, 29 APR.

Location : Columbia; South Carolina, USA

Injured : 1 **Dead** : 1

Abstract

An unintentional release of terephthalic acid from a pipe downstream of a silo dump valve led to a flash fire. Fatality.

[fire - consequence, processing]

Lessons

[None Reported]

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 2ND QUARTER, 1993.

Location : Deer Park; Texas, USA

Injured : 0 **Dead** : 0

Abstract

Fire in quench column of vinyl chloride plant.

[fire - consequence, processing]

Lessons

[None Reported]

5988 17 March 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, MAY.; LLOYDS LIST, 1993, 19 MAR.

Location : Ulhasnagar; Bombay, INDIA

Injured : 123 Dead : 9

Abstract

After a power supply failure, 11% sulphuric acid leaked from pipe and produced hydrogen sulphide in fabric factory. Fatality.
[spill, processing]

Lessons

[None Reported]

5986 15 March 1993

Source : WASTE ENVIRONMENT TODAY, 1993, 6, MAY.; LLOYDS LIST, 1993, 16 MAR.;

Location : Frankfurt, GERMANY

Injured : 1 **Dead** : 1

Abstract

Explosion in polyvinyl alcohol plant during start-up following maintenance on drier. Release of methanol and vinyl acetate in cloud 3 miles long, 1800 ft high and 1500 ft wide. Fatality.

[gas / vapour release]

Lessons

[None Reported]

5982 12 March 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, MAY.

Location : Wiesbaden, GERMANY

Injured : 0 **Dead** : 0

Abstract

Operating error allowed a spill of 1000 litres of synthetic resin mixture to atmosphere.

[operation inadequate, gas / vapour release, processing]

Lessons

[None Reported]

5981 10 March 1993

Source : TOXIC MATERIALS NEWS, 1993, 17 MAR.; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, JUN.

Location : New Albany; Indiana, USA

Injured : 0 **Dead** : 0

Abstract

A river transportation incident. Ruptured line on river tanker barge during unloading to factory caused 200 tonnes of toluene to spill to a river. City water intake upstream of berth.

Lessons

[None Reported]

5978 08 March 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, MAY.

Location : Kelsterbach, GERMANY

Injured : 0 **Dead** : 0

Abstract

150 litres of solvents released from polymer plant.

[spill, processing]

Lessons

[None Reported]

5972 02 March 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, MAY.; LLOYDS LIST, 1993, 4 MAR.

Location : Agioi Theodoroi, GREECE

Injured : 7 **Dead** : 0

Abstract

An explosion occurred during the testing of an empty oil tank by hydraulic pressure. Substance: water.

Lessons

[None Reported]

5954 16 February 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, APR.

Location : Ponta Grossa, BRAZIL

Injured : 0 **Dead :** 0

Abstract

Explosion and fire in storage tanks at factory. 4 tanks destroyed and extraction equipment damaged. Substance involved soya oil.

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

Approximately 12 tonnes (14,500 l) of white oil escaped into the bunded/diked area of a tank farm from an open drain valve during the filling of rail cars with white oil. The site's vacuum truck was used to recover the majority of the spillage, but some of the contaminated earth in the tank farm area had to be excavated and removed off site as special waste. The total loss was estimated at \$32,000 (£19,200) (1993).

Product from storage tanks is transferred by means of screw pumps to a hose station/manifold. From the hose station/manifold, cross connections can be made from various storage tanks to a considerable number of filling lines, by means of flexible hoses. The filling lines are either dedicated to specific products or product groups. There are no dedicated lines available, however, for different grades of white oil to be loaded. In order to avoid contamination between grades, each filling line is cleared of the previous grade by means of a pipeline pig. At the end of the pigging operation the pig rests in the pig launcher/receiver at the hose station/manifold. The launching/receiving chamber has a mechanical device fitted for determining whether the pipeline pig is actually in the chamber. The chamber is simply a 4 inch "T"-piece, installed vertically and with a side entry for the product. The lower end of the T-piece is closed with a bolted blank cover and houses the pipeline pig, whereas the upper end is connected to the filling line. The end cover below the pig carries a three quarter inch nozzle, to which another T-piece is connected with ball valves at either end, one for depressurizing/draining the system and the other for supplying pigging air. The drain line terminates in a 2 inch header, which collects rain water from dripping pans and is connected up to a sewer box. The sewer box has a level-controlled (start/stop) pump fitted, which transfers any drain water to one of the oil interceptor pits upstream of the effluent treatment plant. The pigging air valve is only opened when the pigging operation is going on. However, the drain valve is kept open during filling. This means that the pipeline pig must have a tight fit in the launcher/receiver, as it is the only means of isolation between the product transfer at approximately 6 barg and the draining system. The operation was not designed this way. The system was installed some 15 years previous, and there had been difficulties during the transfers with the drain valve closed. This resulted in the pipeline pig rising in the piping, restricting flow. Someone then had the clever idea to leave the drain valve open. This mode of operation, however, introduced the potential risk of product entering the drains in quantities in excess of the capacity of the system, should the pig fail to isolate the drain. In such a case the drain line would be back pressured and product would be driven back into the dripping pans and escape into the bunded/diked area. To avoid a repetition of this incident a full bore ball valve will be installed between the pig launching/receiving chamber and the product entry in order to keep the pipeline pig in its housing during product transfers and to obtain positive isolation between the filling line and the draining system.

[loading, contamination, product loss, management system inadequate, operator error]

Lessons

The following recommendations were made:

Operators must be made aware that any departure from normal operating practices require scrutiny through the Management of Change procedure.

All transfer operations should be subjected to periodic hazard analysis with appropriate employee participation.

Source : ICHEME

Location : ,

Injured : 0 Dead : 1

Abstract

During the unplugging of a steam mixer with steam (steam purge), the increase in pressure forced the material back up the chute and into the washer. The impact of the expelled material blew off the partial hood of the pulp washer. The hood (approximately weight: 1,000 pounds) landed on a nearby worker and killed him.

Steam mixers are used to increase the effectiveness of bleaching chemicals on pulp by raising its temperature. They are meant to operate at atmospheric pressure.

[fatality, purging, high pressure, explosion / pressure release, reverse flow]

Lessons

The following recommendations were made:

1. It is recommended that the purging of a plugged steam mixer be done using low-pressure water and/or by physically opening the vessel to manually remove the stock. These methods are currently in use in many mills.
 2. If steam is to be used to purge a plugged mixer, all workers to be evacuated from areas at risk of rupture and discharge (e.g. washer and steam mixer areas) to a safe location during a steam purge operation.
 3. Although a fully enclosed hood on the washer (as opposed to a partial hood) may not contain a steam purge, it would improve containment of periodic steam "blow-backs" which occur during normal operation when a steam mixer is downstream of a washer.
 4. Any opening in the full-enclosure hood (e.g. inspection doors, sampling ports) shall be offset at least 10 feet from the pipe connecting the washer to the steam mixer.
-

5909 06 January 1993

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, FEB.

Location : Deer Park; New York, USA

Injured : 0 **Dead** : 2

Abstract

Explosion and intense fire at vitamin factory. Suspected accumulated dust. Fatality.
[dust explosion, processing]

Lessons

[None Reported]

Source : ICHEME

Location : ,

Injured : 0 Dead : 0

Abstract

Fire at waste gas incinerator. A small fire developed on the waste gas incinerator of a Fluid Catalytic Cracker Unit (FCCU) complex. Shortly thereafter, a gas cloud escaped through the incinerator's explosion doors. The immediate cause was product carry-over that created a fire hazard, the basic cause was instrument alarm failure and suction filters of slop oil pump were blocked. Contributing was the incorrect execution of VDU start-up. Damage repairs: \$137,000 (1993) (U.S.).

[fire - consequence, instrumentation failure, operator error, gas / vapour release, heating]

Lessons

Operational start-up procedures for units should consider possibilities of overloading/ carryover of hydrocarbons in effluent disposal streams to incinerators. Address how to avoid and what remedial actions are needed.

Slops disposal pump filters need regular attention and should be checked for cleanliness before unit startups.

5903 January 1993

Source : CHEMICAL WEEK, 1993, 3 FEB.

Location : Houston; Texas, USA

Injured : 1 Dead : 1

Abstract

Welding on the top of a tank caused an explosion in a nearby tank containing sodium sulphide and residual hydrocarbons. Fatality.

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1993, DEC.

Location : , GERMANY

Injured : 0 **Dead :** 0

Abstract

Rupture of dinitrobenzene tank. During cleaning of a tank at 130 degrees C, the tank split and fractured pipework. It was thought that picric acid and styphnic acid had become enriched in the residue through insufficient washing on previous occasions.
[cleaning inadequate]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1994, MAR.

Location : Boston, USA

Injured : 13 **Dead** : 0

Abstract

2 explosions occurred at tantalum plant when residual sodium was being cleaned out of drums.

[cleaning]

Lessons

[None Reported]

Source : CHEMICAL HAZARDS IN INDUSTRY, 1994, APR.

Location : , GERMANY

Injured : 0 **Dead :** 0

Abstract

An incident occurred during the treatment of a surfactant with a hydrogen peroxide/water solution that was usually highly diluted. On this occasion a stronger solution of peroxide was used which caused a sudden pressure rise that led to the rupture of a pipe releasing large quantities of heating fluid, which caught fire. After investigation in the laboratory it was found that even hydrogen peroxide concentrations as low as 10% by weight in a homogeneous solution with organic material can cause sudden pressure increases in excess of the regular rating of apparatus used in the chemical industry.

[fire - consequence, incorrect pressure, processing]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, FEB.

Location : Houston Ship Channel; Texas, USA

Injured : 0 **Dead** : 0

Abstract

A river transportation incident. Cargo ship was in collision with a river tanker barge containing 2800 tonnes of molten sulphur which sank. Cargo intact.

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1993, FEB.

Location : Rio Segundo, ARGENTINA

Injured : 0 **Dead** : 5

Abstract

Explosion in storage tank containing 2000 litres of sulphuric acid at confectionery factory. Five killed from toxic fumes. Fatality.

Lessons

[None Reported]

Source : ENVIRONMENTAL PROTECTION BULLETIN, 046, 28.

Location : , UK

Injured : 0 Dead : 0

Abstract

A road transportation incident. Two companies were fined £1650 and £300 (1992) costs after a vehicle was stopped in a random road check and was found to be carrying a number of 25 litre drums containing residues of acetone and lacquer, some of which provide inadequate containment for the waste. The company where they came from failed to provide a written description of the waste and failed to pre-notify the shipment of the waste.

[safety procedures inadequate]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, JAN.

Location : Off Spurn Head; Humberside, UK

Injured : 0 **Dead** : 0

Abstract

A marine transportation incident. Styrene slops dumped from marine tanker after discharging. Fine £5900 (1992) plus £2500 (1992) costs.

[Pollution]

Lessons

[None Reported]

5831 24 October 1992

Source : LLOYDS LIST, 1992, 27 & 28 OCT.

Location : Fredrikstad; Norway, NORWAY

Injured : 0 **Dead** : 0

Abstract

800 people evacuated after several explosions occurred at a soya oil factory. There was a leak of hexane.

[evacuation, processing]

Lessons

[None Reported]

5826 20 October 1992

Source : ICHEME

Location : , USA

Injured : 0 Dead : 0

Abstract

A grass fire ignited a pile of rubber tyres leading to the evacuation of 1200.

[fire - consequence]

Lessons

[None Reported]

5819 15 October 1992

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, DEC.

Location : Ignalina, LITHUANIA

Injured : 0 **Dead** : 0

Abstract

A crack on a small pipe in a cooling system caused leak of radioactive water. Plant shutdown and leak contained.
[radioactive release, spill]

Lessons

[None Reported]

5807 04 October 1992

Source : EUROPEAN CHEMICAL NEWS, 1992, 12 OCT.

Location : Lengerich, GERMANY

Injured : 0 Dead : 0

Abstract

A fire occurred in a plastics warehouse led to evacuation of 900 people when toxic fumes containing dioxins were released.

[fire - consequence, warehousing, gas / vapour release]

Lessons

[None Reported]

Source : THE CHEMICAL ENGINEER, 1992, 15 OCT., & 10 DEC., & 1994, 30 JUN.; CHEMICAL TECHNOLOGY EUROPE, 1994, JUL/AUG, 30-31.; A REPORT OF THE INVESTIGATION BY THE HEALTH AND SAFETY EXECUTIVE INTO THE FATAL FIRE AT HICKSON & WELCH LTD., HMSO, 1994, ISBN, 07176 0702 X.

Location : Castleford; West Yorkshire, UK

Injured : 14 **Dead** : 5

Abstract

Incident during cleaning of a nitrotoluene distillation still vessel. The maintenance procedure involved using a steam coil in the base of the still to indirectly heat solid residues to soften them prior to removal. Hot spots developed in the waste and a decomposition began leading to an exothermic reaction and eventually a fireball. A temperature of 80 degrees C was to be used for the softening process, however it is believed that much higher temperature was reached. This may have occurred if the thermometer in the still did not register the true temperature as it was not submerged in the residue. The 2-3 tonnes of residue was heat sensitive and produced a fierce jet of flame which shot out of the manhole opening and consumed the wooden built control room. Fatality.

[fire - consequence]

Lessons

1. Where the batch distillation of highly energetic materials (such as mononitrotoluenes or other organic nitro compounds) is carried out still residues should be analysed, monitored and removed at regular intervals to prevent possible build up of unstable impurities.
2. The use of chemical plant for a different process or purpose should be treated as a plant change procedure requiring rigorous assessment. Consequently, before plant is used to carry out non-routine operation authorisation should be obtained from an appropriate level of management who should ensure that plant hazards have been identified, risks assessed and the precautions determined.
3. Safe systems of work covering all aspects of operation and maintenance of all process plant should be established and defined in comprehensive instructions including those operations undertaken at frequent intervals. These systems should be monitored by management and reviewed at appropriate intervals.
4. The nature, operation and limitations of control systems on process plant should be determined, and their implications for health and safety taken into account, before non-routine operations requiring their use are authorised.
5. Companies should assess and monitor the workload and other implications of restructuring levels of management and supervision to ensure that key personnel have adequate resources, including time and cover, to discharge their responsibilities.
6. Persons authorised to issue permits to work should be sufficiently knowledgeable about the hazards associated with relevant plant. If authorised personnel are relocated to former workstations refresher training should be given and recorded before re-authorisation.
7. The design and location of control and other buildings near chemical plant which processes significant quantities of flammable and/or toxic substances should be based on the assessment of the potential for fire, explosion and/or toxic releases at these plants. Companies should assess the suitability of existing control buildings and, if they are found to be vulnerable, reasonably practicable mitigating action should be taken.
8. Companies should regularly monitor and audit their own compliance with performance standards defined in their fire certificates. Particular attention should be paid to the effects of material alterations, e.g. installation of pipework and cable ducts and other works in areas concealed by false ceilings, to ensure that fire-resisting integrity of protected routes is maintained and fire training records should be regularly updated.
9. When exercising their own on-site emergency plans companies should ensure that roll call information on missing persons is passed immediately, accurately and directly to the senior fire officer in charge. Roll call procedures should be practised routinely to ensure that they are effective when carried out at all periods of the working day.

5784 18 September 1992

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, NOV.

Location : Piraeus, GREECE

Injured : 0 **Dead** : 2

Abstract

An explosion in a marine tanker when cleaning squad with torch tried to enter cofferdam between No's 1 and 2 tank. Substances involved: white spirit and hexane. Fatality.

Lessons

[None Reported]

5773 01 September 1992

Source : THE INDEPENDENT, 1992, 2 SEP.

Location : Pinewood Studios; Iver; Buckinghamshire, UK

Injured : 3 **Dead** : 0

Abstract

Three special effects workers were injured when a keg of titanium powder ignited in a workshop.

[fire - consequence, injury]

Lessons

[None Reported]

5772 01 September 1992

Source : CHEMICAL WEEK, 1992, 9 SEP.

Location : Deepwater; New Jersey, USA

Injured : 3 **Dead** : 0

Abstract

An explosion occurred during cleaning using a pressurised water to clean a 22,000 gallon tank that contained sludge, motor fuel, antiknock compounds and gasoline. No environmental damage occurred.

Lessons

[None Reported]

5754 20 August 1992

Source : THE CHEMICAL ENGINEER, 1992, 10 SEP.; LLOYDS LIST., 1992, 22 AUG.

Location : Odessa; Texas, USA

Injured : 40 Dead : 0

Abstract

Lightning struck a waste storage tank containing a mixture of chemicals and caused a series of explosions amongst a stack of drums. Led to the evacuation of 440 people in a 3 mile radius. Substances involved: xylene and methanol.

[storage tanks]

Lessons

[None Reported]

5751 17 August 1992

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, OCT.

Location : , STRAITS OF GIBRALTAR

Injured : 0 Dead : 0

Abstract

A marine transportation incident. Bow of a ro-ro ferry holed side of chemical tanker in fog. Cargo of sulphuric acid transferred.

Lessons

[None Reported]

Source : ICHEME

Location : , UK

Injured : 1 Dead : 0

Abstract

An operator operating a forklift truck was lifting trash into an open top trash disposal unit. During the operation some pellets leaked onto the ground. The operator backed up the forklift truck and started to clean up the pellets. He stepped on some of the loose pellets and lost his footing. He struck the ground with his head. The employee got back on his feet and walked to the locker room where he sent another employee for help. The ambulance was called and he was transported to the local hospital emergency room.

[waste, cleaning, fall]

Lessons

[None Reported]

5736 02 August 1992

Source : LLOYDS LIST, 1992, 8 AUG.

Location : Pickering; Lake Ontario, CANADA

Injured : 0 Dead : 0

Abstract

3000 litres of radioactive heavy water leaked from a cracked tube in a heat exchanger system causing shutdown of water treatment plant.

[tritium, radioactive release, plant shutdown, spill, heating, drains & sewers]

Lessons

[None Reported]

5730 28 July 1992

Source : LLOYDS LIST, 1992, 6 AUG.

Location : Crowley; Louisiana, USA

Injured : 22 **Dead** : 0

Abstract

A rail transportation incident. A train was in collision with a road vehicle carrying containers of xylene and hydrochloric acid and caused spillage of 1300 gallons.

Lessons

[None Reported]

5729 28 July 1992

Source : OIL AND GAS JOURNAL, 1993, 15 FEB.; LLOYDS LIST, 1992, 1 AUG.

Location : Westlake; Louisiana, USA

Injured : 63 **Dead** : 0

Abstract

Failure of high pressure urea reactor caused the release of a cloud of ammonia over the area and substantial damage to the urea production complex. The explosion was heard 10 miles away but there was no fire. Failure due to an improper weld on a bracket supporting a tray inside the unit. The containment vessel was corroded by carbamate that leaked through the improper weld.

[weld failure, reactors and reaction equipment, corrosion, gas / vapour release]

Lessons

[None Reported]

5726 25 July 1992

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, OCT.

Location : Ghent, BELGIUM

Injured : 0 **Dead** : 0

Abstract

A river transportation incident. A river tanker ruptured bottom at lock and sank. 490 tonnes of sulphuric acid transhipped.

[sinking]

Lessons

[None Reported]

5723 23 July 1992

Source : ASSOCIATED PRESS; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, OCT.

Location : Orem; Utah, USA

Injured : 0 **Dead** : 0

Abstract

Power supply failure while adding materials, trimethyl phosphite and methyl chloroacetate, to a vat stopped a mixer and the mixture overheated causing a release of vapours.

[overheating, agitation failure, gas / vapour release, mixing]

Lessons

[None Reported]

5720 21 July 1992

Source : THE FIRE AT ALLIED COLLOIDS LIMITED, HEALTH & SAFETY EXECUTIVE OFFICIAL REPORT, 1993, ISBN 0717607070; THE CHEMICAL ENGINEER, 1993, 11 FEB; ENDS REPORT 228, 1994, JAN, 25-28; LOSS PREVENTION BULLETIN, 116, 1-8. ENVIRONMENTAL PROTECTION BULLETIN, 041, 6-7.

Location : Low Moor; Bradford; Yorkshire, UK

Injured : 34 **Dead** : 0

Abstract

A fire occurred in a raw material warehouse when kegs of azodiisobutyronitrile (AZDN) ruptured, due to their proximity to a hot steam condensate return line. The powder released spilled onto bags of sodium persulphate and ignited due to a reaction between the compounds. Fire water run off caused the river to be discoloured, and the company was prosecuted for polluted waters reaching rivers. It was discovered that the AZDN had been wrongly classified. The chemicals should never have been stored together.

[containers, warehousing, unwanted chemical reaction, pollution, fire - consequence, management system inadequate]

Lessons

The incident was investigated by the Health and Safety Executive who made the following recommendations:

1. Incompatible substances must be segregated and stored in accordance with current UK legislation.
2. Non-production departments, especially warehouses, should not be neglected areas, so far as health and safety are concerned.
3. Safety policy statements shall be updated immediately following changes in the management system. Job descriptions of managers shall correspond with safety policy statements.
4. Safety performance in storage facilities shall be regularly monitored and statistics compiled.
5. Targets should be set for safety performance in storage areas.
6. Safety related maintenance or engineering requests should be identified as such and given priority.
7. Managers, supervisors and operators of chemical warehouses shall be given appropriate training especially in regard to placement and segregation of chemicals. Records should be kept of the training given to each individual.
8. the emergency services (fire brigade, police), should be summoned to an incident with the potential of escalation and this provision shall be incorporated in emergency plans.
9. Where a site has a public warning system, the circumstances in which it is used, and who can authorise its use, should be agreed with the emergency services. Such sirens shall have back-up power supply.
10. Emergency plans should set out the actions needed to prevent or mitigate environmental pollution from a major incident and which body is responsible for this. The company should give the necessary advise.
11. A company should ensure that they can advise emergency services and other public authorities of the potential toxicity of smoke from fires on their premises.
12. The HSE will develop guidance on the control of fire-water run-off in conjunction with interested parties.
13. HSE's recommendations:- Site occupiers where water run-off could create a major environmental accident should consider how to contain fire-water run-off or to mitigate its effects.
14. Major hazard sites should pay particular attention to congestion, especially when planning modifications or extensions.

5719 21 July 1992

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, OCT.

Location : Condobolin; New South Wales, AUSTRALIA

Injured : 0 **Dead** : 1

Abstract

A rail transportation incident. A freight train derailed after hitting a road tanker on a crossing. Rail wagons contained 40 tonnes of sodium cyanide.
[derailment, evacuation, fatality]

Lessons

[None Reported]

5718 18 July 1992

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, OCT.

Location : , YELLOW SEA

Injured : 0 **Dead :** 0

Abstract

A marine transportation incident. Collision between an oil tanker in ballast and gas carrier with vinyl chloride. No injuries or pollution.

Lessons

[None Reported]

Source : LLOYDS LIST, 1992, 14 JUL. ICHEME

Location : , SINGAPORE

Injured : 60 Dead : 6

Abstract

A marine transportation incident. Flash fire erupted on marine tanker undergoing repairs in shipyard. Fire could have occurred when cleaning fluid accidentally splashed on an engine in the boiler room.

Six people were killed and 60 others injured (8 critically) when a flash fire erupted on board a chemical tanker, which was undergoing repair at a Singapore shipyard on the morning of July 12, 1992. Initial investigations indicated that the fire was caused when cleaning fluid splashed down onto hot work being done further below in the engine/boiler rooms.

Police said there were 225 people working on the 24,000 dwt tanker when the fire broke out.

The dead, and most of the injured, were working in the boiler and engine rooms at the time.

Witnesses said there was panic when fire and intense smoke engulfed the rooms. Many people scrambled to the only staircase leading to the ship's main deck above.

Fire safety officers from the shipyard were the first at the scene and were joined within minutes by firemen of the Singapore Civil Defense Force (SCDF). Half of the firemen concentrated on the fire while the rest evacuated the casualties. The fire was put out within 30 minutes.

Over eighty firefighters were involved in the operation

A foreman led 15 workers to shelter behind a thick steel wall of a control room where they were protected from the fire but not from smoke. This group, however, was rescued after about 30 minutes, the foreman using his mobile radio to attract help. Most of the injured who survived the initial fire were overcome by the dense smoke and fumes, which filled the three levels of the boiler room.

The probable cause of the incident was a 'Permit to Work' on the ship which had been issued following gas free tests by port chemists.

Workers said that some cleaning liquid which was being used to clean pipes fell onto a boiler on a lower deck where welding was being done. A leak in cleaning hoses was mentioned.

Witnesses said they saw the fluid begin to burn as it hit the boiler, with a flash fire. Some workers said that the fluid smelled like thinner or kerosene. The fire spread to insulation material inside the boiler room, and this is believed to have released toxic fumes. Fatality.

[fire - consequence, hot surface, evacuation, toxic fumes, injury]

Lessons

1. Strict control of hot work and use of flammable materials is essential to avoid incidents.

2. Safe means of emergency escape from work area should be provided.

Ship board repairs, when alongside refinery jetties (docks), must only be allowed subject to site and Maritime Code restrictions - e.g., International Oil Tanker Terminal Safety Guide (IOTTSG), national and harbor regulations, etc.

5691 22 June 1992

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, AUG.

Location : Port Kelang, MALAYSIA

Injured : 0 **Dead** : 13

Abstract

A marine transportation incident. Explosion and huge fire on a marine tanker at a depot during 2nd cargo test of 400 tonnes of xylene. 1st test rejected cargo. Previous cargo toluene. Fatality.

Lessons

[None Reported]

5690 22 June 1992

Source : THE CHEMICAL ENGINEER, 1992, 16 JUL.

Location : Martinez; California, USA

Injured : 4 Dead : 0

Abstract

A spill of 330 cubic metres of sulphuric acid sludge leaking from a tank ignited hydrocarbons in the sludge.

[fire - consequence]

Lessons

[None Reported]

5687 20 June 1992

Source : LLOYDS LIST, 1992, 22 JUN.

Location : Port Kelang, SINGAPORE

Injured : 0 **Dead** : 13

Abstract

A marine transportation incident. Surveyors were determining the quantity of a cargo prior to discharging xylene when an explosion occurred. Fire damaged the terminal and two storage tanks. The marine tanker burnt out and sank. Fatality.

[sinking, fire - consequence]

Lessons

[None Reported]

Source : LLOYDS LIST, 1992, 17 JUN.; HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, AUG.

Location : Deggendorf, GERMANY

Injured : 0 **Dead** : 0

Abstract

A poison alarm was given after a fire at a test laboratory. A large explosion occurred when fire brigade used water to fight the blaze. Substance: toxic chemicals.

[laboratory work, fire - consequence]

Lessons

[None Reported]

5684 16 June 1992

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, AUG.

Location : Houston; Texas, USA

Injured : 30 **Dead** : 0

Abstract

A pipe broke during road tanker loading operations leading to a spill of 350 litres of liquid sulphur dioxide.

Lessons

[None Reported]

5681 15 June 1992

Source : LLOYDS LIST, 1992, 17 JUN.

Location : Holliday; Texas, USA

Injured : 0 **Dead** : 0

Abstract

300,000 gallon storage tank of water collapsed causing a spill that damaged several homes.

[storage tanks, damage to equipment]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, AUG.; LLOYDS LIST, 1992, 2 JUL.

Location : Terneuzen, NETHERLANDS

Injured : 0 **Dead** : 0

Abstract

A major fire occurred in a new plant which had dramatic effect on spot European styrene prices. Incident believed serious but length of outage as yet unknown.

[fire - consequence]

Lessons

[None Reported]

5661 14 May 1992

Source : LLOYDS LIST, 1992, 15 MAY., & 16 MAY.

Location : Yarimca; Kocaeli, TURKEY

Injured : 0 **Dead** : 0

Abstract

A fire occurred in a butadiene storage tank which led to a blast and fire that engulfed synthetic rubber tanks and a carbon black factory. Blast broke windows and could be heard a few miles away. Sabotage suspected.
[fire - consequence, storage tanks]

Lessons

[None Reported]

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

On May 11, an operator charged makeup DIB and xylene to a batch of maleic anhydride. Some time later he charged the styrene chaser and tried but had difficulty getting the xylene flush charged. Another operator found and closed a DIB charging block valve which was in the open position. Once this valve was closed the xylene flush was completed smoothly. The batch processed to completion without incident.

On May 12, raw material charging on the next batch proceeded normally. The mix was warmed to 114 degrees C and the first catalyst shot made. As the exotherm began, the normal cooling was applied. Upon observing that the temperature rise was not abating, full cooling was applied. The exotherm continued and the operator realised he was not able to control it. The pressure began to increase and the operator opened the 3 inch vent line to an attached vessel but the pressure increase continued. The operator opened the normal vent to the roof through the condenser and vacated the area. The reactor pressure increased to a reported 40 - 50 psig. The pressure blew out the reactor agitator seal O-ring and spewed a heavy concentration of vapours into the department. A 35 psig relief valve did unseat but the 50 psig rupture disc did not burst. The Plant had experienced an uncontrolled runaway polymerisation in the reactor while manufacturing crude polymer.

[maleic anhydride, styrene, xylene, processing, reaction, reactors and reaction equipment, agitator, non-return valve, environmental, runaway reaction, valve failure, inadequate engineering, design or procedure error]

Lessons

The runaway reaction was a direct result of styrene backflowing into the DIB charging line via the open block valve and a faulty antiquated check valve during the first batch. During the second batch, the normal DIB charge in fact included the styrene. The styrene/maleic copolymerisation reacted much more rapidly than the normal DIB/maleic reaction and exothermed uncontrollably.

Some key contributing factors were:

1. Operator not closing shutoff/charging valve after completion of charge, or opening wrong valve and leaving it open, or not checking valve alignment.
2. Antiquated/faulty check valve in DIB line.
3. Agitator seal pressure design insufficient to hold pressure at the rupture disc setting.
4. No easy means to source emergency quench water, nor a clear criteria for when to inject quench water.
5. Failure of operator(s) and Team Manager to realise potential consequences of the abnormal valve arrangement when it was discovered.
6. Actuator for the department evacuation signal required someone holding it to keep it activated/actuated (was in the locale of the vapour cloud around the reactor).

The actions taken as a result of this incident were:

1. Agitator seal replaced with one of split design and rated for 100 psig.
2. Header charging valves modified to allow only one valve open at a time (to charge the wrong material would now take 4 separate sequential incorrect actions). Used and cumbersome piping was removed and replaced with very direct/simple piping to minimise the potential of material going anywhere but to the meter centre.
3. Antiquated non-return (check) valves on raw material charging lines have been removed and new ones installed within the modified piping outlined in 2 above.
4. All other charging lines have been surveyed and non-return valves have been installed as appropriate.
5. An easily installed and highly visible means of sourcing emergency quench water has been installed and will be accompanied by special instructions in the SOP and on the floor.
6. The knock-out pot has been installed on the normal vent line off the condenser to forewarn of a heavy/condensable vapour flow past the condenser and/or prevent minor upsets from purging small liquid quantities to the outside environment.
7. The department evacuation actuator will have latching mechanism installed.

1079512 May 1992

Source : ICHEME

Location : , UK

Injured : 0 Dead : 0

Abstract

A high pressure relief disc on a plant burst, releasing a cloud of steam and soot which was carried by wind over homes in the neighbourhood.

There were no injuries and there was no danger of exposure to toxics. A degree of complaints came from residents who were awakened by the noise of the valve bursting and cars and windows were soiled by soot.

[gas / vapour release, explosion / pressure release, bursting disc, damage to equipment]

Lessons

[None Reported]

Source : LOSS PREVENTION BULLETIN, 110, 25-26.

Location : ,

Injured : 6 Dead : 0

Abstract

A plant experienced an uncontrolled ("runaway") polymerisation in the reactor which produced a maleic co-polymer. This resulted in a pressure build up and discharged vapours finding their way in to the work area. Six employees were treated for respiratory irritation.

On the day in question, charging the batch proceeded normally. The reactor was heated to 114 degrees C, when the first catalyst addition was made. As the exotherm developed, the reactor was put on normal cooling. The exotherm did not abate and the reactor was put on full cooling. The operator realised then he was not able to control the reaction. The pressure rose and the operator opened a 3 inch vent line to an adjacent vessel, but the pressure continued to rise. He then opened the vent line to the roof through a condenser and evacuated the plant.

The pressure in the reactor rose to an estimated 40-50 psi. A 35 psig relief valve lifted but the 50 psig bursting disc did not burst. However, the agitator seal O-ring blew out and a heavy concentration of vapours were released into the area.

After investigations it was found that:

The reaction runaway was due to styrene back flowing into the other monomer line via the left open block valve. An old non-return valve failed to prevent this.

The second batch contained this styrene in the initial charge. The maleic/styrene co-polymerisation is much more vigorous than the maleic/monomer co-polymerisation and consequently exceeded the reactor control.

[runaway reaction, gas / vapour release, high pressure]

Lessons

[None Reported]

Source : HEALTH AND SAFETY OPERATIONAL NOTE, 1992, 9 DEC.

Location : Harwell; Oxfordshire, UK

Injured : 0 **Dead** : 0

Abstract

The radio-isotope tritium was released during decommissioning operations.

[radioactive release, radioactive isotopes]

Lessons

[None Reported]

Source : LLOYDS LIST, 1992, 6 MAY

Location : Belding; Michigan, USA

Injured : 0 **Dead** : 0

Abstract

A fire occurred at a fiberglass plant that destroyed the filament wound tank plant. The fire started in the area where revolving tanks were being sprayed with resin. Ignition was believed to be due to static.

[fire - consequence]

Lessons

[None Reported]

5608 24 March 1992

Source : LLOYDS LIST, 1992, 25 MAR.

Location : Sosnovy Bor, RUSSIA

Injured : 0 **Dead** : 0

Abstract

A leak of radioactive gas from nuclear reactor occurred.
[radioactive release, reactors and reaction equipment]

Lessons

[None Reported]

Source : HAZARDOUS CARGO BULLETIN, 1995, OCT.

Location : Keith, Alberta, CANADA

Injured : 0 Dead : 0

Abstract

A rail transportation incident. A rail tanker loaded with 90 tonnes of molten sulphur caught fire in the marshalling yards. The tanker was found to have severe corrosion around the safety relief valve which penetrated 75% of the weld thickness securing the valve fitment. The exterior gave no indication of the corrosion which had progressed from inside the tanker.

[fire - consequence]

Lessons

Corrosion of the weld produced 'mackinawite', a spontaneously combustible product when exposed to air and possibly provided the source of ignition. A survey of 128 rail tankers found that 74% had incurred a tank shell loss of 16% or more at the manway area. As a result of this accident, rail tanker specifications for molten sulphur must now have a protective coating or corrosion resistant material in areas of high heat flux. They must also be tested and inspected every 10 years.

5604 16 March 1992

Source : HAZARDOUS CARGO BULLETIN INCIDENT LOG, 1992, MAY.

Location : Banbury; Oxford, UK

Injured : 0 **Dead** : 0

Abstract

Basement blaze with 60 metre high flames at new varnish factory. Road, rail and canal traffic stopped. Building destroyed.
[fire - consequence, solvents]

Lessons

[None Reported]

Source : SEDGWICK LOSS CONTROL NEWSLETTER, 1ST QUARTER, 1992.

Location : Zurich, SWITZERLAND

Injured : 0 **Dead** : 0

Abstract

Part of paints and dyes production site destroyed after 400 litres of xylene caught fire.

[fire - consequence, dyestuffs]

Lessons

[None Reported]

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

Two technicians were involved in carrying out chemical cleaning to the condenser tubes No.1 centrifugal chiller unit located in the basement refrigeration plant room.

The procedure involved pumping a formic acid/water solution through the condenser tubes via a holding tank for a period, this was then to be neutralised and when reaching a specific pH value, was to be pumped down the drains. The previous day the procedure had been carried out to No.2 chiller using the formic acid/water solution as described, and using sodium carbonate as the neutralising agent. On the Friday afternoon, it had been decided that instead of sodium carbonate, sodium nitrite would be used this was added to the formic acid solution within the holding tank and the pumping action commenced.

The operator noticed that gas was forming from this solution and immediately summoned assistance. A colleague telephoned the product helpline number which was printed clearly on the bag of sodium nitrite and asked for advice. They were told to evacuate the room, provide full ventilation and seal all entrances and exits as the gas that was being formed could be toxic. This was immediately carried out.

Advise to all people who could have possibly been in contact with the gas be sent to hospital in order to be checked over.

Air sampling tests were carried out with a nitrous oxide tube, and neutralisation of the existing solution was followed using sodium carbonate until the pH level was acceptable to flush away down the drains. These actions were carried out using full breathing apparatus gear and the whole solution was flushed out from the chiller unit and disposed of down the drain safely.

[unwanted chemical reaction, evacuation, gas / vapour release]

Lessons

The following recommendations were given:

1. Sodium nitrite should not be mixed with any form of acid.

2. Nitrogen monoxide and nitrogen dioxide are toxic gases, anyone who is exposed to either should be moved to an area where there is plenty of fresh air.

They should be watched for any difficulties in breathing and given oxygen if necessary and medical advice should be sought, even if anything appears to be normal as the gas could have delayed effects.