

EXPERT GROUP ON CHEMICAL ACCIDENTS

Second meeting on 1st to 3rd December 1993

OECD DATABASE ON INDUSTRIAL ACCIDENTS ACCIDENTS NOTIFIED BY 01/11/93

CURRENT STATUS

This document represents the current status of the OECD database on industrial accidents by the 1st of November 1993. It gives a summary of the 299* reported events, completed with an evaluation of the Accident Gravity Scale indexes (when available). A level of "potential interest", which gives an idea of the importance of lessons to be learnt, is also proposed.

This information is being classified and entered in the ARIA database (BARPI). Texts will be available in English and French. Semantic research will be possible in these summaries, using any letter or symbol sequence.

ACTION REQUIRED

Delegations are required to check and complete the information available.

(*) Including 2 events reported by Japan on December 1992 on a document called "Recent events in Japan" (not quoted). Events notified by Canada for 1992 are not yet included.

OECD DATABASE ON INDUSTRIAL ACCIDENTS

88-08-03	A-1	AUSTRIA	GLAUBENDORF/NIEDER OSTERREICH	HEICHINGER
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Description:

Explosion of barium nitrate dust in a mixing mill. Probable cause: sparks. The resulting fire was extinguished after 9 hours. Plant completely demolished. An unknown number of people were evacuated or instructed to remain indoors. Water used for extinguishing the fire was pumped up during the operation but some percolated into the soil, contaminating the groundwater table.

Activity: CHEMICAL INDUSTRY	Products: BARIUM NITRATE (POWDER)	Deaths : 2
Cost of damage: \$100 000 (U.S.)	Quantity: 1 000 KG	Poisoned : 0
AGS : 2/3/2	Potential interest : 4	Injured : 9

91-06-16	A-2	AUSTRIA	VIENNA	REICHHOLD CHEMIE
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Description:

Loss of control during a phenol-formaldehyde condensation reaction in the resin production process. Sudden increase in temperature, followed by rupture of the burst disk. Destruction of the building housing the reactor. Roughly 60% of reactor contents expelled and dispersed by the wind over a 5-ha area. Crops declared unmarketable.

Activity: RESIN PRODUCTION UNIT	Products: PHENOL/FORMALDEHYDE	Deaths : 0
Cost of damage: ?	Quantity: 5-6 T out of 10 T/ 3-4 T out of 7	Poisoned : 0
AGS : 3/2/2	Potential interest : 4	Injured : 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

87-07-03	B-2	BELGIUM	ZWIJNDRECHT / ANTWERP	BP CHEMICALS
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Description:

No information on the causes and context of the explosion. Windows shattered over a 1-km radius. Expressway traffic interrupted for 2 hours.

Activity: DISTILLATION UNIT

Products: ETHYLENE OXIDE

Deaths : 0

Cost of damage: ?

Quantity: ?

Poisoned : 0

AGS : ?/4/? Potential interest : 5

Injured : 14

88-06-24	B-1	BELGIUM	LIER / ANTWERP
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Description

Probable cause: spark during a welding operation. Plant completely demolished. 2 000 people evacuated over 1/2 day Fire fanned by strong winds.

Activity: POLYETHYLENE BAGS

Products: POLYETHYLENE and other plastics

Deaths : 0

Cost of damage: 20 MILLION ECUs

Quantity: ?

Poisoned : 0

AGS : ?/5/3 Potential interest : 2

Injured : 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

88-03-07 CDN-3 CANADA COME-BY-CHANCE (RIVER)

Description:

Two accidental crude oil spills: the first caused by rupture of an oil washing pipeline and the second by overflow of the slop tank. One kilometre of shoreline polluted and cleaned up.

Activity: MARINE SHIPPING

Products: OIL (FROM SAUDI ARABIA)

Deaths : 0

Cost of damage:

Quantity: 80 M³ (IN TWO SPILLS)

Poisoned : 0

AGS : Potential interest : 1

Injured : 0

88-05-10 CDN-4 CANADA LINTON

Description:

Train derailment caused by subsidence of the track as a result of a degraded embankment and water activity. 4 freight cars tipped over and 26 tonnes of domestic fuel oil spilled into the Batiscan River. Fish-farming activities affected (taste of fish altered).

Activity: TRAIN DERAILMENT

Products: DOMESTIC FUEL OIL

Deaths : 0

Cost of damage: ?

Quantity: 26 TONNES SPILLED

Poisoned : 0

AGS : Potential interest : 2

Injured : 0

88-05-24 CDN-5 CANADA SARNIA/ONTARIO

Description:

Defect in flare system resulted in the untimely transfer of 12 tonnes of acrylonitrile to the oil separator of the biological purification station which was unable to retain more than 2.4 tonnes of the amount. The accident began at 5 p.m. on May 24. Product dumped into the St. Clair River. The highest concentrations measured were of the order of 4 ppm. Interruption of water intake operations until 9 a.m. on May 26.

Activity: CHEMICAL INDUSTRY

Products: ACRYLONITRILE

Deaths : 0

Cost of damage:

Quantity: 9.6 T DUMPED OF INITIAL 12 T

Poisoned : 0

AGS : 3/7/7 Potential interest : 3

Injured : 0

88-08-23 CDN-1 CANADA SAINT-BASILE-LE-GRAND

Description:

Fire (arson?) in a dump site containing liquid and solid PCB waste. Release of toxic fluids and gases. Fire extinguished after 3 hours with 25 m³ of foam (20 organizations involved). A 80 x 20 hangar built to limit contamination. 3 800 people in a 14-km² area evacuated for 17 days. Farm production over 750 km² had to be destroyed. \$6.6 million (Cdn.) in cleanup operations (soil, buildings...). Human and animal health and environmental monitoring programs set up.

Activity: PCB WASTE STORAGE

Products: PCBs (+DIOXINS)

Deaths : 0

Cost of damage: CAN\$30-40 MILLION

Quantity: 22.5 M³ LOST OUT OF 90 M³

Poisoned : 0

AGS : 7/5/3 Potential interest : 5

Injured : 0

88-11-26 CDN-6 CANADA FORT ERIE

Description:

Collision between cargo-handling/lifting (?) gear and a tank truck ripped a hole in the tank. 22.7 m³ were recovered and the remainder was neutralized with calcium carbonate. Throughout the operation (in an urban area), concentrations in the air were monitored.

Activity: RAILWAY TRANSPORTATION

Products: SULPHURIC ACID (> 51%)

Deaths : 0

Cost of damage:

Quantity: 26.5 M³ SPILLED

Poisoned : 0

AGS : Potential interest : 3

Injured : 0

88-12-17 CDN-2 CANADA COURTLAND/ONTARIO FARM COOPERATIVE

Description:

Fire of unknown origin in a cluster of fertilizer storage warehouses belonging to a farm cooperative. Prompt action prevented a domino effect involving a nearby service station. 500 people in a 1.5-km radius were evacuated for 7 hours. Two warehouses were completely destroyed. Low levels (traces) of toxic substances recorded in the air and water.

Activity: STORAGE WAREHOUSE

Products: AMMONIUM NITRATE

Deaths : 0

Cost of damage:

Quantity: 245 T LOST

Poisoned : 0

AGS : Potential interest : 3

Injured : 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

89-06-20 CDN-7 CANADA SURREY/BRITISH COLUMBIA

Description:

A fire in a sawmill spread to a wood preservative storage facility. All the tanks were destroyed. The products were either burned off or carried away in the water used for putting out the fire. No significant damage was reported despite the magnitude of the potential risk.

Activity: WOOD TREATMENT

Cost of damage:

AGS : Potential interest : 5

Products: Copper-chrome arsenate/sulphuric acid

Quantity: 100 m³

Deaths : 0

Poisoned : 0

Injured : 0

89/09/12 CDN-8 CANADA OTTAWA COLLISION OF A TANKTRUCK AND BUS

Description:

The driver of a tank truck lost control of his vehicle and hit a public transit bus in an urban area. There were no victims among the general public. The truck driver was killed in the accident.

Activity: HIGHWAY TRANSPORTATION

Cost of damage:

AGS : 1/3/? Potential interest : 1

Products: GASOLINE

Quantity: 40 M³ LOST/57 M³ INVOLVED

Deaths : 1

Poisoned : 0

Injured : 0

89/09/25 CDN-9 CANADA BELLEDUNE/NEW BRUNSWICK

Description:

Leak in a discharge pump (no details available). No victims despite total evaporation of the product.

Activity: FERTILIZERS

Cost of damage:

AGS : 2/1/2 Potential interest : 4

Products: LIQUEFIED AMMONIA

Quantity: 10 M³ RELEASED

Deaths : 0

Poisoned : 0

Injured : 0

89-09-29 CDN-10 CANADA SAINT-JACQUES/QUEBEC

Description:

Highway collision involving a car and a tank truck (the car was at fault). Severe pollution of the small river beside the highway

Activity: HIGHWAY ACCIDENT

Cost of damage:

AGS : Potential interest : 1

Products: ETHYLENE GLYCOL

Quantity: 9100 KG lost out of 27680 KG involved

Deaths : 1

Poisoned : 0

Injured : 1

89-10-02 CDN-11 CANADA
SUDBURY/ONTARIO

Description:

An error on the part of a car driver forced the driver of a tank truck to take the ditch. The tank struck a rock cut and was ripped open. Measures taken to neutralize and clean up the spill (no details).

Activity: HIGHWAY ACCIDENT

Cost of damage:

AGS : 4/3/? Potential interest : 2

Products: SULPHURIC ACID

Quantity: 30 T spilled out of 42 T involved

Deaths : 2

Poisoned : 0

Injured : 1

89-12-12 CDN-31 CANADA ST- LEONARD D'ASTON / QUEBEC TRAIN DERAILMENT

Description:

Train derailment involving 13 cars carrying hazardous goods (including chlorine). The accident occurred in the center of the village and 300 m away from River Nicolet used for drinking water. Derailment caused by rail coupling failure. 75 responders and 75 people evacuated from home. Rural area of 1 km² contaminated. Following river pollution, drinking water supply interrupted during 10 hours for 5,065 people.

Activity: RAIL TRANSPORT

Cost of damage: ?

AGS : 3/3/2 Potential interest : 4

Products: Sodium hydroxyde (50 %) / lubrication oil /chlorine

Quantity: 200 m³ / 100 m³ / no release

Deaths : 0

Poisoned : 0

Injured : 0

90-01-23 CDN-12 CANADA PEARSON AIRPORT/ONTARIO

Description:

Overflow from a domestic fuel oil tank. The airport control tower was evacuated for 5 hours because of the hydrocarbon vapours released. Significant disruption of air traffic.

Activity: AIRPORT CONTROL TOWER

Cost of damage:

AGS : Potential interest :

Product: DOMESTIC FUEL OIL

Quantity: ?

Deaths : 0

Poisoned : 0

Injured : 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

90-02-12	CDN-13	CANADA	HAGERSVILLE/ONTARIO	TYRE KING RECYCLING COMPANY
Description: The fire was probably the result of arson. 1 700 people evacuated over a 4-km radius for the 17 days the fire burned. Air and water quality regularly monitored. A number of errors made while trying to bring the fire under control. 11 acres contaminated with 12 to 50 m ³ of liquid residues floating on the pool of water. 20 000 m ³ of solid waste. 25 people deprived of drinking water for 3 months.				
Activity: TIRE STORAGE FACILITY		Products: TIRES (+ benzene, styrene, toluene)		Deaths : 0
Cost of damage:		Quantity: 12.6 million burned out of 14 million		Poisoned : 0
AGS : 7/4/5 Potential interest : 5				Injured : 0
90-02-23	CDN-14	CANADA	VANCOUVER HARBOUR	
Description: Collision involving two boats as a result of foggy conditions. Pollution of 1.5 km of shoreline and 1 ha of docks. 225 birds cleaned 65 birds dead.				
Activity: MARINE SHIPPING		Products: MARINE DIESEL		Deaths : 0
Cost of damage: \$250 000 (CDN)		Quantity: 40 T SPILLED		Poisoned : 0
AGS : 3/2/3 Potential interest : 1				Injured : 0
90-03-14	CDN-15	CANADA	McMASTERVILLE/QUEBEC	
Description: An explosion (cause and exact location not available) prevented a vent from closing with the resulting overflow of a tank. Roughly 1 900 L of a sodium nitride solution overflowed the retention pond into the Richelieu River.				
Activity: PROCESSING UNIT		Products: SODIUM NITRIDE (SODIUM AZIDE)		Deaths : 0
Cost of damage:		Quantity: 2 250 KG SPILLED		Poisoned : 0
AGS : 3/2/1 Potential interest : 3				Injured : 3
90-03-29	CDN-16	CANADA	EDMONTON/ALBERTA	
Description: The untimely introduction of water into a heat exchanger on a waste (type unknown) distillation unit. Explosion of the retort attended by the release of corrosive fumes into the building. The fumes subsequently ignited. Other equipment in the building was damaged by falling concrete from the roof.				
Activity: ACETIC ANHYDRIDE UNIT		Products: ACETIC ANHYDRIDE/ACETIC ACID		Deaths : 0
Cost of damage: \$1 MILLION (CDN.)		Quantity: Less than 1 T / Less than 1 T		Poisoned : 0
AGS : 7/4/1 Potential interest : 4				Injured : 0
90-04-23	CDN-17	CANADA	STE-ANNE-DES-PLAINES/QUEBEC	
Description: Second and smallest of a series of 3 fires in 3 months (along with the fires in Hagersville and St-Amable). The fire was smothered after 48 hours with earth taken from the ditches dug around the storage area. The fire was probably deliberately set. 20 homes were deprived of drinking water as a result of soil and subsoil pollution.				
Activity: TIRE DUMP		Products: TIRES (+ BENZENE, XYLENE, TOLUENE)		Deaths : 0
Cost of damage:		Quantity: 50 000		Poisoned : 0
AGS : 7/2/2 Potential interest : 5				Injured : 0
90-05-06	CDN-18	CANADA	SAINT-AMABLE/QUEBEC	
Description: Probably arson. 150 people evacuated and 150 others confined to their homes for a 2-day period. The fire was easier to extinguish than in Hagersville (90-02-12) because the tires were already in separate piles. It was extinguished with sand after 5 days. Fear of long-term environmental effects (subsoil and groundwater table). Because of particularly favourable atmospheric conditions, the impact on local residents could be limited. The plume of smoke could be seen 80 km away. Estimated pyrolysis oils: 20 m ³ /h.				
Activity: TIRE DUMP		Products: TIRES (+benzene, toluene, xylene)		Deaths : 0
Cost of damage:		Quantity: 3.5 Million		Poisoned : 0
AGS : 7/3/4 Potential interest : 5				Injured : 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

90-05-24 CDN-19 CANADA EDMONTON/ALBERTA

OIL REFINERY

Description:

Probable cause: rupture of a unit pipeline. Flames 15-20 m high. Accident occurred during start-up after a 5-week shutdown for maintenance. 4 people were working in the unit. If the accident had occurred during regular operations which normally required a staff of 30-40 people, the toll might have been much higher.

Activity: GASOLINE PROCESSING UNIT
Cost of damage:
AGS: 3/3/2 Potential interest: 3

Products: GASOLINE
Quantity: 116 T lost

Deaths: 1
Poisoned: 0
Injured: 3

90-07-14 CDN-20 CANADA REDITT/ONTARIO

RAILWAY TRANSPORT

Description:

Derailment of 32 rail cars (cause not stated). Initially, butadiene was set on fire and burned off under controlled conditions (this was attended by a column of smoke 150 m high). One week later, vinyl acetate was burned off. Methanol and vinyl acetate leak in a sensitive environmental area (muskeg).

Activity: TRAIN DERAILMENT
Cost of damage:
AGS: 3/1/1 Potential interest: 4

Products: METHANOL/VINYL ACETATE/BUTADIENE
Quantity: 75 T spilled out 75/40 T at risk/ 75 T at risk

Deaths: 0
Poisoned: 0
Injured: 0

90-07-23 CDN-21 CANADA

HARROW/ONTARIO

Description:

Fire in a warehouse storing pesticides, fertilizers and other chemicals. The building was destroyed, and debris, waste and water used for extinguishing the fire were disposed of as toxic waste. The fire was extinguished after 7 hours. The water could be successfully contained and did not leave the site. The air and soil were monitored. Levels 4 times the TLV were recorded 400 m from the site and compared with calculated values. Dead fish reported 11 km away (unrelated?).

Activity: STORAGE WAREHOUSE
Cost of damage:
AGS: 3/2/2 Potential interest: 4

Products: FURADAN/ATRAZINE/Trichlorophenoxyacetic acid
Quantity: 300 KG (out of 300)/720 KG (out of 720)/30 KG

Deaths: 0
Poisoned: 0
Injured: 0

91-05-01 CDN-22 CANADA

NIVERVILLE/MANITOBA

AGRICULTURE

Description:

Fire of unstated origin in a storage facility containing granulated fertilizers and several thousand litres of herbicides and pesticides. The fire was extinguished with special fire hoses. Trenches were dug to recover the water. 1 500 people evacuated. Milk, poultry, egg and cattle production in the area was suspended and residue levels in the water and these products were monitored.

Activity: STORAGE FACILITY
Cost of damage: ?
AGS: 2/2/3 Potential interest: 4

Products: PESTICIDES AND FERTILIZERS
Quantity: A total of 180 T destroyed

Deaths: 0
Poisoned: 0
Injured: 0

91-07-09 CDN-23 CANADA

ST LAZARE/MANITOBA

RAILWAY TRANSPORT

Description:

Derailment of a freight train. 23 rail cars involved: 3 with chlorine, 2 with sodium, 2 with glycol, 3 with methanol, 2 with acetic anhydride, etc. Protection area set up over a 5-km radius. Toxic substances released into the air and soil. 500 people evacuated for 6 days. Breathing apparatus required within the area. Evacuation of intact rail cars. Leaking cars emptied. Containment basins were dug. Damage to crops over a 200-m radius due to acetic fumes.

Activity: TRAIN DERAILMENT
Cost of damage: ?
AGS: 2/2/3 Potential interest: 4

Products: Methanol / Acetic anhydride / Sodium / Chlorine
Quantity: 9.5 T out of 68 T / 119 T out of 164 T

Deaths: 0
Poisoned: 0
Injured: 0

91-07-22 CDN-24 CANADA

CAPE BEALE/BRITISH COLUMBIA

BOAT COLLISION

Description:

Collision involving two ships (causes not stated). 1 dead. Skimmers and collection tanks installed on the surface to prevent marine pollution. The products remaining in the holds of the luna clipper Tenyo Maru were pumped out through a hose.

Activity: MARINE SHIPPING
Cost of damage:
AGS: 3/2/2 Potential interest: 2

Products: BUNKER C OIL/DIESEL FUEL
Quantity: 260 T out of 1 000 / 525 m³ out of 900

Deaths: 1
Poisoned: 0
Injured: 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

91-08-06 CDN-25 CANADA KINSELLA/ALBERTA

Description:

Collision involving a train and a tank truck transporting crude oil. The impact was followed by a fireball type of explosion which killed the truck driver and 3 people in the train engine. The train pushed the tank over a distance of 3 km, spreading fire and polluting the soil along the track. A total of 1.5 km² affected. The ballast and surface soil were removed and cleaned.

Activity: TRAIN/TRUCK COLLISION

Products: CRUDE OIL

Deaths : 4

Cost of damage: ?

Quantity: 34 T

Poisoned : 0

AGS : 2/3/1 Potential interest : 3

Injured : 0

91-08-11 CDN-26 CANADA MELBOURNE/ONTARIO

RAILWAY TRANSPORT

Description:

Derailement of 30 train cars resulting in a leak in one car transporting chlorosulfonic acid and spillage in three places. Evaporation was promoted by the moisture level of the soil and was accompanied by fog formation. Presumed cause: defective rail. The smell of acid could be detected as far as 3.5 km downwind. Pools of acid neutralized with calcium carbonate. Only slight irritation reported among the rescue and cleanup crew

Activity: TRAIN DERAILMENT

Products: CHLOROSULFONIC ACID

Deaths : 0

Cost of damage: ?

Quantity: 14 T silled out of 65 T

Poisoned : 0

AGS : 1/2/3 Potential interest : 3

Injured : 0

91-10-08 CDN-27 CANADA CANSO/NOVA SCOTIA

Description:

Error in operation during the shutdown of a refrigerating unit for conversion from freon to ammonia. A subcontractor left a valve open on a line he thought was no longer in use. As a result of the accidental release of 20 tonnes of freon, the company was ordered to pay a fine of \$15 000 (Cdn.) to the province. Companies are now required to provide subcontractors with diagrams and to monitor their work more closely.

Activity: FISH-PROCESSING PLANT

Products: FREON (CFC-12)

Deaths : 0

Cost of damage: Fine of \$15 000 (Cdn.)

Quantity: 20 T

Poisoned : 0

AGS : Potential interest : 2

Injured : 0

91-11-15 CDN-28 CANADA FORT ERIE/ONTARIO

ROAD TRANSPORT

Description:

A tank truck carrying propane ran into a bridge. The contents spilled from a rip of roughly 40 cm and exploded, resulting in a fire over a 100 m x 50 m area. The fire burned itself out after 8 hours. Structural damage to the bridge. Traffic was halted on the highway.

Activity: HIGHWAY TRANSPORT

Products: PROPANE

Deaths : 0

Cost of damage: ?

Quantity: 30.7 m³

Poisoned : 0

AGS : 3/2/1 Potential interest : 2

Injured : 1

91-11-20 CDN-29 CANADA GRAND COULEE / SASKATCHEWAN

PESTICIDES WAREHOUSE

Description:

Fire in a chemical warehouse (unknown cause). The fire was permitted to burn without water intervention. Toxic releases in air and soil downwind. Residents evacuated for about 16-18 km during 2 hours. Samples taken in areas suspected of contamination. Land pollution confined into site (0.1 km²). Building was completely destroyed and about 100 m³ of earth was removed

Activity: STORAGE

Products: PESTICIDES / phosphorus / cyanide salts, sodium, potass.

Deaths : 0

Cost of damage: ?

Quantity: 10,000 l / 3 kg / 190 kg at risk

Poisoned : 0

AGS : 3/3/3 Potential interest : 5

Injured : 1

91-12-6 CDN-30 CANADA HAINES / ALBERTA

ON-SHORE OIL RIG

Description:

At about 1835 MST Oil rig froze up and blew out while crews tried to thaw the pipes. Monitoring began the morning after at 0835 MST and indicated hydrogen sulphide concentrations at 0.7 ppm 3 km north of the site. Complaints about odours were received from 20 km north. The contracted company for this incident cleaned the site and stopped the flow by injecting water into the well. Total duration of release : 17 hours.

Activity: CRUDE OIL PRODUCTION

Products: CRUDE OIL / SOUR GAS

Deaths : 0

Cost of damage: ?

Quantity: ? / ?

Poisoned : 0

AGS : 2/2/3 Potential interest : 5

Injured : 1

OECD DATABASE ON INDUSTRIAL ACCIDENTS

88-09-19	CH-1	SWITZERLAND	SAINT GALL	RAILWAY TRANSPORT
Description: Rupture of a poorly greased wheel axle following overheating, resulting in the derailment of an 18-car train transporting kerosene. 8 cars containing 571 m ³ overturned. 250 m ³ evaporated, 187 m ³ were recovered and 104 m ³ percolated into the subsoil. Threat of serious pollution of Lake Constance.				
Activity: TRAIN DERAILMENT		Products: KEROSENE		Deaths : 0
Cost of damage: ?		Quantity: 1225 T EXPOSED; 354 T LOST		Poisoned : 0
AGS : Potential interest : 4				Injured : 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

88-03-10 D-1 GERMANY RUSSELHEIM/ESSEN

Description:

Explosion of the inside atmosphere of a storage tank with an attached roof and of the improperly degassed inside floating blanket during cleaning operations. Ignition point: a supposedly flameproof halogen lamp. The roof was ripped off, one workmen was killed on the spot and another one later died from burns.

Activity: FLAMMABLE LIQUID STORAGE

Products: MINERAL OIL (VAPOURS)

Deaths : 2

Cost of damage: ?

Quantity: ?

Poisoned : 0

AGS : Potential interest : 2

Injured : 0

88-06-17 D-2 GERMANY AACHEN/NORDRHEIN-WESTFALEN

PLASTICS AND SYNTHETIC FIBERS

Description:

Fire of undetermined origin in a 50 m x 35 m warehouse storing synthetic fibres and plastic products. The exact contents of the stock not known. Prompt action prevented the fire from spreading to a nearby supermarket, separated from the warehouse by a simple sandwich wall. 9 firemen and 17 policemen suffered from combustion gas inhalation. The water used for putting out the fire was collected and analysed (results unavailable).

Activity: STORAGE

Products: PVC/POLYACRYLONITRILE/POLYESTER/POLYAMIDE

Deaths : 0

Cost of damage: Several million DM

Quantity: ?

Poisoned : 26

AGS : 7/3/2 Potential interest : 4

Injured : 0

88-10-24 D-3 GERMANY BREMEN

Description:

During the transfer of hot heavy fuel oil from one tank to another, 8 000 L spilled under poorly understood circumstances. Pollution of the nearby river. Because the accident occurred at night, no immediate action was taken to limit the escape of the product into the environment.

Activity: STORAGE

Products: HOT HEAVY FUEL OIL

Deaths : 0

Cost of damage: ?

Quantity: 8 000 L

Poisoned : 0

AGS : Potential interest : 2

Injured : 0

88-11-21 D-4 GERMANY WORMS/RHEINLAND-PFALZ

PROCTER AND GAMBLE

Description:

Explosion of unknown origin of a CO₂ storage tank resulting in the explosion of a nearby liquid nitrogen tank. 4 employees killed, 10 injured, destruction of a nearby shop. The windows of 3 houses in the vicinity, shattered.

Activity: FRUIT JUICE PACKING

Products: CARBON DIOXIDE/LIQUID NITROGEN

Deaths : 4

Cost of damage: ?

Quantity: 30 m³

Poisoned : 0

AGS : 7/3/? Potential interest : 4

Injured : 10

88-11-28 D-6 GERMANY LUDWIGSHAFEN / RHEINLAND PFALZ

MANUFACTURE OF HERBICIDES

Description:

Overfilling in a production unit resulted in a herbicide spill which made its way to the site's purification station and from there to the Rhine River. Levels of 0.19 mg/L were recorded (at periphery of the site?). Pollution of the Rhine. The Germans alerted Dutch authorities who interrupted the intake of drinking water near Amsterdam.

Activity: PRODUCTION UNIT

Products: MECOPROP (CASE 7085-19-0)

Deaths : 0

Cost of damage: ?

Quantity: 200 KG

Poisoned : 0

AGS : 3/1/? Potential interest : 3

Injured : 0

88-12-09 D-6 GERMANY LEVERKUSEN

MANUFACTURE OF TITANIUM DIOXIDE

Description:

Release of unknown amounts of TiCl₄. Cause not indicated. Mixture with the air resulted in the formation of an HCl cloud. Estimated wind velocity: 1 - 2.6 m/sec. Downtown Leverkusen threatened. One policeman was hospitalized and 12 other policemen and 3 local residents complained of skin irritation (no hospitalization required). Traffic was directed away from the area, and downtown residents were instructed to remain indoors. The public was alerted, and an emergency-action plan was set in motion.

Activity: PRODUCTION UNIT

Products: TITANIUM TETRACHLORIDE/HYDROCHLORIC ACID

Deaths : 0

Cost of damage: ?

Quantity: ??

Poisoned : 0

AGS : Potential interest : 5

Injured : 1

OECD DATABASE ON INDUSTRIAL ACCIDENTS

88-12-18	D-7	GERMANY	KELHEIM / BAVARIA	MANUFACTURE OF CELLULOSE FIBRES
Description: Leak in a line (hose?) at the beginning of operations to unload a truck. The resulting cloud drifted over the city. Attempts to hamper cloud movement with water curtains proved to no avail. The fumes claimed 60 victims among workers, firemen and members of the public. 25 had to be hospitalized for 24 hours. Concentrations in the air (unstated) were above acceptable levels for one hour at the site of the accident (area not stated).				
Activity: TRUCK UNLOADING Cost of damage: ? AGS : 5/3/? Potential interest : 5		Products: LIQUEFIED CHLORINE Quantity: 20 M ³ = 30 T		Deaths : 0 Poisoned : 25 Injured :
88-12-19	D-8	GERMANY	KREFELD/NORDRHEIN WESTFALEN	BAYER
Description: Accidental spill into the Rhine of several hundred kilos of toxic substances from the biological treatment section of the purification station (no details given on the context and causes). Determinations of concentrations in the river revealed that the water was safe for drinking purposes (no details available).				
Activity: CHEMICAL INDUSTRY Cost of damage: ? AGS : Potential interest : 4		Products: DICHLOROMETHANE/CHLOROBENZENE Quantity: > 100 KG SPILLED		Deaths : 0 Poisoned : 0 Injured : 0
89-01-04	D-9	GERMANY	WEIL AM RHEIN/BADEN WURTEMBERG	
Description: Explosion of a train car containing 11 tonnes of a polyurethane/methylfuran mixture as a result of a faulty stopcock which allowed fumes to come accidentally in contact with the air. The train was waiting on a siding or in the process of being shunted. The product spilled on the ground and was then covered with foam by the firefighters.				
Activity: RAILWAY TRANSPORTATION Cost of damage: Production loss DM <4000 AGS : Potential interest : 3		Products: POLYURETHANE/METHYLFURAN Quantity: A TOTAL OF 11 TONNES		Deaths : 0 Poisoned : 0 Injured : 0
89-02-05	D-10	GERMANY	LUDWIGSHAFEN	
Description: A container (barrel?) of dyestuff accidentally fell as it was being transported (the means of transportation unspecified) to the site, and the contents spilled into the Rhine River. The river was stained red over a 4-km distance. No significant effect on the aquatic fauna.				
Activity: MANUFACTURE OF DYESTUFFS Cost of damage: AGS : Potential interest : 3		Products: METHYL VIOLET (DYESTUFF) Quantity: 70 KG SPILLED		Deaths : 0 Poisoned : 0 Injured : 0
89-02-14	D-11	GERMANY	UERDINGEN	BAYER - CHEMICAL INDUSTRY
Description: Explosion of a 4-m ³ reactor (reaction with phthalates) following a runaway reaction during the manufacture of resins. Serious fire with the release of a large cloud of toxic fumes over 2-3-km area. 150 rescue workers were mobilized. 9 were injured, 2 of them seriously. Material damage estimated at 100 million marks. The cause is attributed to the raw materials used. TDI and cyanide levels in the smoke not measured. Residents were instructed to remain indoors.				
Activity: MANUFACTURE OF ALKYD RESINS Cost of damage: ESTIMATED AT 100 MILLION DEUTSCHE MARKS AGS : ?/5/3 Potential interest : 4		Products: ALKYD RESINS Quantity: ?		Deaths : 0 Poisoned : 0 Injured : 9
89-02-19	D-12	GERMANY	ESPELHAMP-FIESTEL	
Description: Fire of undetermined origin (the possibility of arson not excluded) in a storage facility containing finished products. Outside emergency plan put into action. The nearby production shop was damaged. The levels of toxic substances recorded in the air in the vicinity of the accident did not justify implementation of appropriate measures to protect the public.				
Activity: MANUFACTURE OF SYNTHETIC FIBRES Cost of damage: AGS : Potential interest : 3		Products: SYNTHETIC FIBRES (PE, PP, PES, PVC...) Quantity: TOTAL OF 40 T		Deaths : 0 Poisoned : 0 Injured : 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

89-03-09 D-13 GERMANY LUDWIGSHAFEN

Description:

Untimely release of H₂S during a mixing operation (the components and amounts involved not given). The operator was killed and 4 colleagues and 1 rescue worker suffered from toxic fume inhalation while trying to intervene.

Activity: MANUFACTURE OF ZINC ADDITIVES Products: HYDROGEN SULPHIDE

Cost of damage: Quantity: ?

AGS: 7/3/7 Potential interest: 5

Deaths: 0

Poisoned: 5

Injured: 0

89-06-08 D-14 GERMANY MAINZ/RHEINLAND PFALZ

Description:

Two heavy stone objects thrown onto the roof of a storage facility broke a pipeline and a valve on a tank containing ammonia. Some of the contents escaped and ammonia gas was released throughout the vicinity. 18 policemen sustained corrosion-related injuries and 1 developed pulmonary edema. Residents nearby complained of respiratory problems.

Activity: DISTRIBUTION OF CHEMICAL PRODUCTS Products: AMMONIA

Cost of damage: Quantity: 15 M³ INVOLVED

AGS: 3/3/2 Potential interest: 3

Deaths: 0

Poisoned: 0

Injured: 18

90-01-17 D-15 GERMANY AHLSFELD/NIEDERSACHSEN

Description:

Rupture of a reinforced hose during operations to transfer the product from a train car (causes, context and circumstances unspecified). 182 people outside the site suffered from poisoning (seriousness and extent of consequences not stated).

Activity: MANUFACTURE OF PAPER PULP Products: CHLORINE

Cost of damage: Quantity: ?/OUT OF 28.85 TONNES

AGS: 5/4/7 Potential interest: 5

Deaths: 0

Poisoned: 182

Injured: 0

90-03-30 D-16 GERMANY BRETZFELD-ADOLZFURT

Description:

6 explosions (the first due to unknown causes, probably in a black powder filling machine) completely destroyed an explosives factory. Extensive damage due in part to inadequate protection equipment dating from 1926. Toll: 3 dead and 4 injured on the site. Windows were shattered in a 3-km radius.

Activity: MANUFACTURE OF EXPLOSIVES Products: BLACK POWDER

Cost of damage: 500 000 DM Quantity: SEVERAL TONNES INVOLVED

AGS: 3/4/7 Potential interest: 3

Deaths: 3

Poisoned: 0

Injured: 4

90-07-11 D-17 GERMANY KARLSRUHE

Description:

A leaky valve resulted in the seepage of 10 m³ of gas oil into a cracking column during maintenance operations. On start-up, the product burst into flames. The fire in the reactor was extinguished with steam. The combustion products were evacuated through a chimney causing a large opaque cloud to form. There was strong public reaction (the accident occurred at 12:50 p.m.).

Activity: REFINERY/CRACKING

Products: GAS OIL

Cost of damage:

Quantity: 10 M³

AGS: Potential interest: 4

Deaths: 0

Poisoned: 0

Injured: 0

90-11-19 D-18 GERMANY TROTSBEUG/BAVARIA

Description:

Malfunction of an indicator in a chain of pH measurements during cyanamide hydrolysis in an acid medium resulted in reaction drift followed by an explosion. No damage reported

Activity: FERTILIZERS INDUSTRY

Products: (CALCIUM?) CYANAMIDE/PHOSPHORIC ACID

Cost of damage: ?

Quantity: 1 410 KG /240 KG

AGS: Potential interest: 4

Deaths: 0

Poisoned: 0

Injured: 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

91-01-31	D-19	GERMANY	FRANKFURT / HESSEN	RUNAWAY REACTION
Description: Overpressure in a chemical reactor due to a runaway reaction during a discontinuous process. Release of nitrobenzene vapors followed by an explosion and release of toxic nitrous gases. On site emergency plan activated. Water used for extinction collected in a retention basin. Concentration of toxic gases checked in the neighbourhood. Production losses evaluated to several million DM. No damage to the environment. This particular production has been stopped.				
Activity: CHEMICALS Cost of damage: Several million DM AGS: Potential interest : 4		Products: NITROBENZENE Quantity: ?		Deaths: 0 Poisoned: 0 Injured: 0
91-02-20	D-20	GERMANY	LUDWIGSHAFEN / RHEINLAND-PFALZ	PHOSGENATION (COLOURING MATTERS)
Description: During a reaction process including a phosgenation for the manufacture of colouring agents, there was a failure of a venting system and a release of less than 50 grammes of phosgen. 200 people outside the establishment were subject to medical examination.				
Activity: CHEMICALS Cost of damage: ? AGS: Potential interest : 4		Products: PHOSGEN Quantity: < 50 g		Deaths: 0 Poisoned: 0 Injured: 0
91-11-05	D-21	GERMANY	LEUNA / SACHSEN-ANHALT	WELDING WORKS
Description: Explosion of a vessel containing formaldehyde vapors during external welding operations. Activation of internal emergency plan and external protection measures : circulation stopped in neighbouring streets, monitoring of waste waters.				
Activity: ? Cost of damage: ? AGS: Potential interest : 3		Products: FORMALDEHYDE Quantity: ?		Deaths: 2 Poisoned: 0 Injured: 10
91-07-28	D-22	GERMANY	FRANKFURT / ESSEN	RUNAWAY REACTION
Description: Runaway reaction at 110°C during a discontinuous phosgenation process of an aliphatic acid. Release of 25 kg of ammonia with some ppm of phosgen. Internal emergency measures taken : confinement of the concerned building, internal atmosphere drained in a neutralization column and treated with soda, water curtains used outside the building for toxic cloud abatement.				
Activity: CHEMICALS Cost of damage: ? AGS: Potential interest : 5		Products: AMMONIA / PHOSGENE Quantity: 25 kg / some ppm		Deaths: 0 Poisoned: 4 Injured: 0
91-08-06	D-23	GERMANY	MANNHEIM / BADEN-WÜRTTEMBERG	RUNAWAY REACTION
Description: Explosive decomposition of ethylester (nitro-blau-base) in a distillation column, leading to explosion and fire. Extinction followed by specific protection measures : measure of gas concentration in the building, ventilation, review of all on-going chemical reactions in other reactors and closing of venting systems to air. Emergency response by internal safety team and external fire brigades from Mannheim.				
Activity: CHEMICALS Cost of damage: DM 2.3 million AGS: Potential interest : 5		Products: ACETIC ACID ETHYLESTER / ISOPROPANOL Quantity: 70 kg / 250 kg		Deaths: 1 Poisoned: 0 Injured: 2
91-10-16	D-24	GERMANY	GÖLLHEIM / RHEINLAND-PFALZ	FIREWORKS
Description: Explosion in a storage unit of a manufacture of fireworks. After the accident, measures taken for the limitation of quantity stored and the separation of products in 2,000 kg cells isolated by sand walls.				
Activity: EXPLOSIVES INDUSTRY Cost of damage: DM 5.5 million AGS: Potential interest : 4		Products: EXPLOSIVES / FIREWORKS MATERIALS Quantity: 29 kg / 1720 kg		Deaths: 0 Poisoned: 0 Injured: 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

91-10-20 D-25 GERMANY BAD HARZBURG / NIEDERSACHSEN

Description:

Explosion of zinc and zinc oxide powder. Waiting for accurate translation

Activity: NON-FERROUS METALS

Cost of damage: ?

AGS: Potential interest : ?

Products: ZINC OXIDE / ZINC POWDER

Quantity: Few kg

Deaths: 1

Poisoned: 0

Injured: 0

91-10-29 D-26 GERMANY KRAICHTAL-UNTERÖWISHEIM / BADEN-WÜRTTEMBERG METAL PAINTING

Description:

Due to a flange failure, release of 5,600kg of propane within 2 hour in a metal coating workshop (car body-building). No internal or external damage.

Activity: CAR MANUFACTURE

Cost of damage: ?

AGS: 3/0/0 Potential interest : 4

Products: PROPANE

Quantity: 5600 kg released

Deaths: 0

Poisoned: 0

Injured: 0

91-11-06 D-27 GERMANY WILHELMSBURG / HAMBURG REFRIGERATION UNIT

Description:

Failure during a start-up operation of a low voltage compressor in a refrigeration unit, due to a simultaneous emergency shut-down procedure triggered from the central control room. Instantaneous release of 1.2 t of ammonia. Water was spraid on the equipment. Emergency responders protected with AERI (chemical-proof suit with autonomous breathing apparatus) closed the compressor valves. 6 people injured, external roofs corroded.

Activity: ?

Cost of damage: ?

AGS: Potential interest : 5

Products: AMMONIA

Quantity: 1200 kg released

Deaths: 0

Poisoned: 6

Injured: 0

91-11-26 D-28 GERMANY MINDEN / NORDRHEIN WESTPHALEN

Description:

Improper handling of a valve on cylindre under pressure (25-30 bars) lead to instantaneous release of 60 kg of hydrochloric acid. Despite the use of water curtains, the toxic cloud drifted outside the establishment during 10 mn without consequences.

Activity: CHEMICALS

Cost of damage: ?

AGS: Potential interest : 4

Products: HYDROCHLORIC ACID

Quantity: 60 kg released

Deaths: 0

Poisoned: 4

Injured: 0

91-12-10 D-29 GERMANY GELSENKIRCHEN-SCHOLVEN / NORDRHEIN WESTPHALEN HYDROCRACKING UNIT

Description:

Explosion after leakage from the high pressure cooling circuit of a hydrocracking unit, due to corrosion. Emergency shut-down procedure with electric power cut off and automatic shut-off valves activated. No effects outside the plant. (Waiting for translation)

Activity: PETROCHEMICAL INDUSTRY

Cost of damage: ?

AGS: 4/4/7 Potential interest : 5

Products: HYDROGEN +GASEOUS HYDROCARB. C1-4 / C5 / H2S+NH3

Quantity: 30 t / 150 t / 5.5 t released

Deaths: 0

Poisoned: 0

Injured: 8

92-02-21 D-30 GERMANY EILENBURG / SACHSEN CHEMICAL REACTOR

Description:

Improper manual operation on a reactor equiped with a shaking system. Release of 17 m3 of nitrogen oxides during 1 hour. Slight water pollution (Waiting for translation)

Activity: CHEMICAL INDUSTRY

Cost of damage: DM 7,500

AGS: Potential interest : 5

Products: CELLULOSE NITRATE / NITROGEN OXIDES

Quantity: 1200 kg / 17 m3

Deaths: 0

Poisoned: 0

Injured: 0

92-04-08 D-31 GERMANY LANGELSHEIM / NIEDERSACHSEN REACTOR REPAIR

Description:

Diethylether was used as solvent in a chemical reactor where lithium (in excess) was injected and methylchlond was added for starting the reaction. An injector got choked and needed clean-up. During the cleaning operation, flammable vapors of dimethylether and lithium spread around the reactor and ignited immediatly, leading to a fire. Emergency power cut off activated, and use of powder for extinction. (Waiting for accurate translation)

Activity: CHEMICAL INDUSTRY

Cost of damage: DM 1 million

AGS: Potential interest : 5

Products: LITHIUM

Quantity: 75 kg

Deaths: 0

Poisoned: 0

Injured: 1

OECD DATABASE ON INDUSTRIAL ACCIDENTS

92-04-20 D-32 GERMANY BIELEFELD / NORDRHEIN WESTPHALEN

Description

Mechanical failure of a cleaning system. Land contamination of a 14 ha area (Waiting for translation)

Activity: DOMESTIC WASTE INCINERATION

Products: ? / ?

Deaths : 0

Cost of damage: DM 10,000

Quantity: 2.5 kg / 2.5 kg

Poisoned : 0

AGS : Potential interest : 4

Injured : 0

92-05-02 D-33 GERMANY DORTMUND / NORDRHEIN WESTPHALEN

Description:

Waiting for translation

Activity: FOUNDRY

Products: CARBON MONOXIDE

Deaths : 0

Cost of damage: ?

Quantity: 5 kg

Poisoned : 18

AGS : Potential interest : ?

Injured : 0

92-05-28 D-34 GERMANY BÖHLEN / SACHSEN

Description:

Waiting for translation

Activity: PETROCHEMICAL INDUSTRY

Products: BUTANE + PROPANE

Deaths : 0

Cost of damage: > DM 1 million

Quantity: 1000 kg

Poisoned : 0

AGS : Potential interest : ?

Injured : 2

OECD DATABASE ON INDUSTRIAL ACCIDENTS

92-06-01 D-36 GERMANY MÜLSHAUSEN / THÜRINGEN

Description:

Failure of a hose and of a connecting flange. Release of 600 kg of ammonia. Activation of on and off-site plans. (Waiting for translation)

Activity: FOOD INDUSTRY
Cost of damage: DM 2200 + 4500
AGS: Potential interest : 4

Products: AMMONIA
Quantity: 600 kg

Deaths : 0
Poisoned : 0
Injured : 0

92-06-30 D-36 GERMANY VOGELGESANG / SACHSEN

Description:

Waiting for accurate translation. Extension of fire to 1200 m² of forest. (Waiting for translation)

Activity: EXPLOSIVE MANUFACTURE
Cost of damage:
AGS: Potential interest : 3

Products: POWDER (NDT-3)
Quantity:

Deaths : 0
Poisoned : 0
Injured : 0

92-07-13 D-37 GERMANY DARMSTADT / HESSEN

Description:

Waiting for translation

Activity: F
Cost of damage: ?
AGS: Potential interest :

Products: PHOSPHORIC ACID / ?
Quantity: 150 kg / #4 kg

Deaths : 0
Poisoned : 0
Injured : 0

92-08-07 D-38 GERMANY DUSSELDORF / NORDRHEIN WESTPHALEN

Description:

Failure of equipment during unloading operation. Evacuation of people. Waiting for translation

Activity: STEEL WORKS
Cost of damage: ?
AGS: Potential interest : 5

Products: HYDROFLUORIC ACID
Quantity: 2.5 t

Deaths : 0
Poisoned : 2
Injured : 0

92-08-18 D-39 GERMANY LUDWIGSBURG / BADEN-WÜRTTEMBERG

Description:

Continuous release within 1/2 hour during an unloading operation. (Waiting for translation)

Activity: PYROLYSIS ?
Cost of damage: ?
AGS: Potential interest : 4

Products: PROPANE
Quantity: 400 kg released

Deaths : 0
Poisoned : 0
Injured : 1

92-09-04 D-40 GERMANY MARKGRÖNINGEN / BADEN-WÜRTTEMBERG

Description:

A fork lift ing truck knock against a pipe located 6 m high, leading to a limited release of butane. The installation is shut down for 2 hours during repair. (Waiting for translation)

Activity: LPG BOTTLE FILLING STATION
Cost of damage: DM 3000 + production loss
AGS: Potential interest :

Products: BUTANE
Quantity: 50 kg released

Deaths : 0
Poisoned : 0
Injured : 0

92-09-06 D-41 GERMANY NEUENBURG / BADEN-WÜRTTEMBERG

Description:

Fire of solid oxydizing products in one of the 4 storage cells of a warehouse. Immediate protection of the others cells by water curtains and spray of cooling water on the building : no extension of fire to other cells. Chlorine concentration measured in the environment. Around 3-4 people suffered from irritating vapors of calcium hypochloride in fire-fighting waters (eyes, throat). Damage to building and external properties (deposit on cars and roofs, corrosion of copper coatings...)

Activity: WAREHOUSING OF CHEMICALS
Cost of damage: ?
AGS: Potential interest : 5

Products: CALCIUM HYPOCHLORIDE
Quantity: 18.2 t

Deaths : 0
Poisoned : 0
Injured : 3-4

OECD DATABASE ON INDUSTRIAL ACCIDENTS

92-09-09	D-42	GERMANY	HERBORN-SCHÖNBADEN / HESSEN	CHROMIC ACID CONTAINER
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Description:

Due to human error, a container (drum) of chromic acid failed down., allowing a part of the content to be released in open sewage systems and a river (?). Liquid was sucked away. Concentration of chromium increased in sediments. Long term measures taken after the accident consist on covering all sewers in the site.

Activity: WOOD PRESERVATIVES and other chemicals **Products:** Chromic acid
Cost of damage: no significant (DM 500) **Quantity:** 12.3 kg
AGS: Potential interest : 2

Deaths : 0
Poisoned : 0
Injured : 2

92-09-24	D-43	GERMANY	KÖNIGSWARTHA / SACHSEN-ANHALT
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Description:

(Waiting for translation)

Activity: FIREWORKS **Products:** Nitrocellulose / Hexogene (cyclotrimethylnitrosamine)
Cost of damage: ? **Quantity:** 342 kg / 8.8 kg
AGS: Potential interest :

Deaths : 0
Poisoned : 0
Injured : 2

92-09-28	D-44	GERMANY	GELSENKIRCHEN / NORDRHEIN WESTPHALEN
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Description :

(Waiting for translation)

Activity: PETROCHEMICAL INDUSTRY **Products:** BENZENE
Cost of damage: ? **Quantity:** 5000 kg
AGS: Potential interest :

Deaths : 2
Poisoned : 0
Injured : 8

92-10-22	D-45	GERMANY	BAYER in LEVERKUSEN / NORDRHEIN WESTPHALEN
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REACTOR START UP

Description:

In a benzotriazole production plant, during procedures for starting up a reactor, a part of the nitrous acid methyl ester produced was released during 1/4 hour through a partly left open valve to the sewage system and the waste water treatment unit. The product vapors flew over a open sewer cover into a laboratory. On-site emergency plan triggered. Water curtains used to stop vapors. 3 employees injured. Long term measures taken after the event consist on reinforcement of existing air-monitoring system (in the laboratory?) with an additional alarm .

Activity: CHEMICAL INDUSTRY **Products:** NITROUS ACID METHYL ESTER
Cost of damage: no **Quantity:** 5000 kg
AGS: Potential interest : 5

Deaths :
Poisoned : 3
Injured : 0

92-10-23	D-46	GERMANY	BUNA / SACHSEN-ANHALT
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Description:

During maintenance operations on a chlorine gas line, the heat generated by welding/cutting work was transmitted to active parts of the pipe. The raise of metal temperature caused a reaction between chlorine and iron and a chlorine release for 1/4 hour. Activation of on and off-site plans : protection area set up, urban traffic stopped, people evacuated from homes. Federal civil protection Authorities informed.

Activity: CHEMICAL INDUSTRY **Products:** CHLORINE
Cost of damage: ? **Quantity:** 5000 kg
AGS: Potential interest : 5

Deaths :
Poisoned : 186
Injured : 0

92-10-30	D-47	GERMANY	GERNTHOFEN / BAVARIA
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TANK EXPLOSION

Description:

During welding operations, air was allowed to enter in a tank. Then the tank (reactor?) was filled with a mixture of methanol and dimethyl terephthalate (DMT). Therefore, an explosive atmosphere air-methanol could develop, leading to the tank explosion and the DMT to escape out and burn. Damages to pipeworks and other buildings (out of the site ?). During fire fighting operations, extinction waters were prevented to reach the sewage system by covering all sliver(?) deliveries.

Activity: CHEMICAL INDUSTRY **Products:** METHANOL / Dimethyl terephthalate
Cost of damage: 2,500 T(?) DM **Quantity:** ?
AGS: Potential interest : 4

Deaths :
Poisoned :
Injured : 3

OECD DATABASE ON INDUSTRIAL ACCIDENTS

92-11-05	D-48	GERMANY	MANNHEIM / BADEN-WURTTENBERG	REFRIGERATION UNIT
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Description:

Mechanical failure of the regulation system of a refrigeration unit . (Waiting for translation)

Activity: BREWERY

Cost of damage: DM 2500

AGS : Potential interest : 4

Products: AMMONIA

Quantity: 5-10 litres

Deaths : 0

Poisoned : 0

Injured : 2

92-12-28	D-49	GERMANY	DORTMUND / NORDRHEIN WESTPHALEN	
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Description:

Explosion and toxic release. 2 operators and one person outside the plant injured. (Waiting for translation)

Activity: STEELWORKS

Cost of damage: DM 3-5 MILLION

AGS : Potential interest : 5

Products: CARBON MONOXIDE

Quantity: 590 kg

Deaths : 0

Poisoned : 0

Injured : 3

93-02-22	D-60	GERMANY	GRIESHEIM / FRANKFURT	RUNAWAY REACTION
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Description:

In order to produce ortho-nitroanisole, methanol and ortho-chlorobenzene are filled in a reactor with agitator activated. In accordance with adequate operating procedures, the operator stops the agitator for checking operations and introduction of sodium hydroxyde in methanolic solution. After waiting for the delay prescribed, a sample is taken. As the mixture does not correspond to specifications, instruction is given to cool the reactor down. In doing so, the operator notes that the agitator is not activated and starts it up. The pressure raises immediately from 9 to 16 bars, and the temperature from 95 to 155 °C. Safety relief valves open and 10 m3 out of the 25 m3 reacting mixture escape to ambient air through a stack. The release causes an air and soil pollution on a 1000 m x several hundred m area with sticking deposit. Relevant emergency response and public information is delayed up to 36 hours due to lack of appropriate data from the company, in particular on the carcinogenicity of the products. A large clean up programme is finally enforced. Hundred companies in Hesse are asked to review all comparable units where batch exothermal reactions are operated, in order to prevent products released through reactor safety relief valves to affect public and the environment.

Activity: CHEMICAL INDUSTRY

Cost of damage: ?

AGS : Potential interest : 4

Products: Orthonitroanisole / methanol / soda / orthochlorobenzene

Quantity: 2 t / 5.5 t / 0.2 t / 0.1 t

Deaths : 0

Poisoned : 0

Injured : 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

90-12-10 DA-1 DENMARK LEMVIG

Description:

As a result of a faulty temperature-control system, a gradual breakdown over 2¼ hours resulted in rupture of the burst disk and deformation of the reactor lid. Fumes escaped into the shop and from there into the control room where they exploded (CVCE 100/150 mbar). 6 workers were knocked unconscious by the blast. This was the first time a new reactor was used with a microprocessor-regulated temperature control system. The explosion occurred at a temperature of 120°C.

Activity: MANUFACTURE OF PESTICIDES

Products: METHYL CHLORIDE/(DIMETHYL) DISULPHIDE

Deaths : 0

Cost of damage: ?

Quantity: 115 KG/250 KG

Poisoned : 0

AGS : 2/3/1 Potential interest : 5

Injured : 6

OECD DATABASE ON INDUSTRIAL ACCIDENTS

98-08-24	E-1	SPAIN	PUERTO DE SANTA MARIA/CADIZ	ALCOHOL FACTORY
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Description:

Fire in an ethyl alcohol production and storage unit following the explosion of a boiler. 8 dead, 4 injured. The fire spread to a nearby pine wood, destroying 25 hectares. Waste dumped into the Gaudalete River killed off a large number of fish (22 tonnes recovered). The administrative buildings and security guard's home were damaged.

Activity: MANUFACTURE OF BEVERAGES

Products: ETHYL ALCOHOL

Deaths : 8

Cost of damage: ?

Quantity: 1 500 M³ DESTROYED

Poisoned : 0

AGS : 3/4/? **Potential interest :** 4

Injured : 4

OECD DATABASE ON INDUSTRIAL ACCIDENTS

88-02-18	F-1	FRANCE	GUEUGNON	GUEUGNON FOUNDRY
Description: Rupture of a hose during the transfer of ammonia from a tank truck. As a result of problems with closing the bottom hydraulic valve, the entire contents of the tank escaped into the plant. 48 people within the plant suffered from slight fume inhalation. 4 employees had to be hospitalized but their condition was not serious. No casualties were recorded outside the plant. Pollution of the Arroux River.				
Activity: METALLURGY Cost of damage: AGS : 3/2/? Potential interest : 4		Products: AMMONIA Quantity: 17 TONNES RELEASED		Deaths : 0 Poisoned : 52 Injured : 0
88-03-03	F-2	FRANCE	ABLON	NOBEL PRB
Description: Explosion involving a dynamite cartridge-filling unit. Toll: 5 dead, 7 injured. Due to the isolation of the plant, no damage or casualties in populated areas. The plant was shut down as a result of the accident.				
Activity: MANUFACTURE OF EXPLOSIVES Cost of damage: ? AGS : 2/3/? Potential interest : 2		Products: DYNAMITE Quantity: 250 KG		Deaths : 5 Poisoned : 0 Injured : 7
88-06-08	F-3	FRANCE	AUZOUER EN TOURAINE	PROTEX CO.
Description: Explosion and fire during the manufacture of a silicone-based waterproofing substance following the untimely release of hydrogen. The operator suffered serious injuries. The fire spread to a large portion of the site. The water used for putting out the fire caused pollution of the Brenne and Loire Rivers. 200 people residing near the site had to be evacuated. 200 000 people in and around Tours were without water for 4 days. Destruction of at least 20 tonnes of fish and all of the microfauna.				
Activity: CHEMICAL INDUSTRY Cost of damage: 105 MILLION F AGS : 3/4/4 Potential interest : 5		Products: CHEMICALS (SOLVENTS/PHENOLS/CYANIDES) Quantity: ROUGHLY 600 TONNES SPILLED		Deaths : 0 Poisoned : 0 Injured : 1
88-06-10	F-4	FRANCE	SOLFERINO	SICA AGRICULTEURS ADOUR
Description: Mis-handling during tank-filling operations resulted in the leakage of ammonia. One fireman was overcome by toxic fumes. A safety area was set up. A fish farm in the town of Escource lost its entire stock (57 tonnes of fish).				
Activity: FERTILIZER STORAGE FACILITY Cost of damage: > 1 MILLION F AGS : 3/5/? Potential interest : 3		Products: AMMONIA Quantity: 6 TONNES SPILLED		Deaths : 0 Poisoned : 1 Injured : 0
88-07-11	F-5	FRANCE	SAINT CYR SUR MER	TANK TRUCK
Description: As a result of faulty brakes, a tank truck carrying 30 000 L of gas overturned and exploded a few hundred metres from an expressway toll station. The driver was killed and the passenger suffered serious burns. The fire spread to the gangue (no details given on the area affected).				
Activity: HIGHWAY TRANSPORTATION Cost of damage: ? AGS : 1/3/? Potential interest : 1		Products: GASOLINE Quantity: 30 M ³		Deaths : 1 Poisoned : 0 Injured : 1
88-10-26	F-6	FRANCE	SHIRMECK	TRW-JEUDY
Description: A faulty pressure-reducing valve on an acetylene cylinder resulted in a leak. The escaping gas burst into flames, and fire engulfed the facility containing 1 920 m ³ of acetylene. Luckily, nearby propane and oxygen storage facilities were spared. Evacuation of 1 000 local residents and plant personnel. Destruction of the facility. Material damage (1.65 million francs) restricted to the storage area. No casualties. 50 rescue workers.				
Activity: MACHINE INDUSTRY Cost of damage: ON THE SITE > 1 65 MILLION FRANCS AGS : 3/3/2 Potential interest : 4		Products: ACETYLENE Quantity: 1920 M ³ DESTROYED		Deaths : 0 Poisoned : 0 Injured : 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

88-10-28	F-7	FRANCE	DAMPNIAT	TEYSSIER CO.
Description: Spill of wood treatment products (40 kg of lindane and sodium pentachlorophenate) in the department of Corrèze following flooding of a storage site for sludge from treatment pits. Pollution of 14 km of the Corrèze River. 15 tonnes of fish were killed.				
Activity: WOOD TREATMENT Cost of damage: AGS : 1/3/1 Potential interest : 4		Products: LINDANE/ SODIUM PENTACHLOROPHENATE Quantity: A TOTAL OF 40 KG SPILLED		Deaths : 0 Poisoned : 0 Injured : 0
88-11-07	F-8	FRANCE	SENESECOURT	METALLIC POWDER
Description: Mishandling resulted in an explosion of zirconium powder. The circumstances and causes not given Toll: 1 dead and 2 seriously injured. No effect on the public and environment outside the site.				
Activity: NON-FERROUS METALS Cost of damage: ? AGS : ?/3/? Potential interest : 2		Products: ZIRCONIUM (POWDER) Quantity: ?		Deaths : 1 Poisoned : 0 Injured : 2
88-12-25	F-9	FRANCE	BERRE L'ETANG	SHELL REFINERY
Description: Rip in a 15 000-m ³ tank containing 13 500 m ³ of atmospheric residues at a temperature of 127°C during filling operations. Probable cause: excess pressure due to sudden vaporization of water directly or indirectly introduced by the boil-over system. The product overflowed the retention pond and spread over an 8-ha area, damaging nearby tanks and displacing a number of pipelines. Installation of a floating boom. The slick remained confined to facility grounds.				
Activity: PETROLEUM REFINERY Cost of damage: ? AGS : ?/2/3 Potential interest : 5		Products: HOT HEAVY HYDROCARBONS (127°C) Quantity: 12 000 T		Deaths : 0 Poisoned : 0 Injured : 0
89-01-04	F-10	FRANCE	VALAURIE	SPRM OIL PIPELINE
Description: A farm machine ripped a 40-cm hole in a pipeline. 15-m-high jet. Initial rate of leakage: 44 m ³ /hour under 21 bars. Formation of a drifting dense fog (50% of L _{IE} at 175 m from the leak). 1-km safety area. 20 people evacuated. Immediate pollution of the groundwater table: 400 mg/L in the vicinity of the leak. 120 m ³ of the supernatant product recovered. Containing and pumping operations until 89-12-25 with 80-fold dilution of the product, which was then dumped into the nearby river. 180 m ³ eliminated.				
Activity: PRODUCT MOVED BY PIPELINE Cost of damage: > 5 MILLION F AGS : 3/3/2 Potential interest : 5		Products: SUPER-GRADE GASOLINE Quantity: 780 M ³ SPILLED		Deaths : 0 Poisoned : 0 Injured : 0
89-02-02	F-11	FRANCE	VILLERS SAINT PAUL	ORKEM
Description: Explosion due to welding by an outside firm on a 1 000-m ³ benzene tank. Toll: 1 dead, 2 injured. The tank was lifted and hurled off the premises. No damage beyond the confines of the facility.				
Activity: CHEMICAL INDUSTRY Cost of damage: ? AGS : 2/3/1 Potential interest : 4		Products: BENZENE Quantity: 13.2 TONNES		Deaths : 0 Poisoned : 0 Injured : 3
89-02-09	F-12	FRANCE	NOYELLES GODAULT	METALEUROP (formerly PENARROYA)
Description: Explosion and fire in an outside magnesium, sulphur and sodium nitrate storage facility. Formation of a nitrogen oxide and sulphur dioxide cloud. Circumstances and causes not specified. Windows rattled or shattered over a 3-km radius. Toll: 3 people suffered slight injuries. 150 firefighters mobilized.				
Activity: NON-FERROUS METALLURGY Cost of damage: ? AGS : 1/2/3 Potential interest : 4		Products: SODIUM NITRATE/SULPHUR/MAGNESIUM Quantity: ?		Deaths : 0 Poisoned : 0 Injured : 3

OECD DATABASE ON INDUSTRIAL ACCIDENTS

89-02-23	F-13	FRANCE	GRAND QUEVILLY	ORKEM
Description: Leak of a synthetic gas (75% H ₂ and 25% N ₂) in a shut-off valve on a level-control device with a capacity of 250 bars in an ammonia synthesis unit. An explosion occurred as an outside firm was trying to correct the problem. 2 killed. Fire in the unit. No consequences beyond the confines of the facility.				
Activity: AMMONIA SYNTHESIS		Products: HYDROGEN		Deaths : 2
Cost of damage: ?		Quantity: ?		Poisoned : 0
AGS : ?/3/? Potential interest : 4				Injured : 0
89-03-28	F-14	FRANCE	CELLES SUR BELLE	FAMILY-OPERATED
ARMS FACTORY Description: Explosion and fire in a family-operated arms factory. Human error the probable cause. Toll: 1 dead, 200 people evacuated. Complete destruction of the factory.				
Activity: CARTRIDGE MANUFACTURE		Products: BLACK POWDER		Deaths : 1
Cost of damage: ?		Quantity: ?		Poisoned : 0
AGS : 1/3/3 Potential interest : 2				Injured : 0
89-04-27	F-15	FRANCE	TAVAUX	SOLVAY
Description: Explosion in an electrostatic dust filter in a coal-fired boiler during start-up. Circumstances and causes unstated. One killed, 8 injured. No consequences beyond the site.				
Activity: CHEMICAL INDUSTRY		Products: COAL (DUST)		Deaths : 1
Cost of damage: ?		Quantity: ?		Poisoned : 0
AGS : 1/3/1 Potential interest : 4				Injured : 8
89-07-16	F-16	FRANCE	NOTRE DAME DE GRAVENCHON	MOBIL OIL
Description: During shutdown procedures, an explosion occurred while the stabilizer column used in catalytic reforming pretreatment operations was being degassed. Toll: 1 dead and 1 person with serious burns				
Activity: OIL REFINERY		Products: HYDROCARBONS		Deaths : 1
Cost of damage: ?		Quantity: ?		Poisoned : 0
AGS : ?/3/? Potential interest : 4				Injured : 1
89-07-16	F-17	FRANCE	NEVERS	NEIMAN COMPANY
Description: Error while unloading a tank truck: chlorine bleach came in contact with sulphuric acid, resulting in the release of chlorine gas. 29 persons on the site suffered from toxic inhalation.				
Activity: MACHINE INDUSTRY		Products: CHLORINE BLEACH/SULPHURIC ACID/CHLORINE		Deaths : 0
Cost of damage: ?		Quantity: ?		Poisoned : 29
AGS : ?/3/? Potential interest : 4				Injured : 0
89-07-21	F-18	FRANCE	LE PONT DE CLAIX	RHONE POULENC
Description: Release of hot phenol while a tank truck was being unloaded. Circumstances and causes have yet to be elucidated. Toll: 1 dead, 1 employee with severe burns. No consequences beyond the confines of the facilities				
Activity: CHEMICAL INDUSTRY		Products: PHENOL		Deaths : 1
Cost of damage: ?		Quantity: ?		Poisoned : 0
AGS : ?/3/? Potential interest : 3				Injured : 1

OECD DATABASE ON INDUSTRIAL ACCIDENTS

89-07-28	F-19	FRANCE	ROSTEIG	SPLSE PIPELINE
Description: A loader ripped a hole in a pipeline carrying naphtha (pressure around 10 bar near the incident location). After several minutes, a cloud of naphtha aerosol is generated on an area of several hectares (5 to 10 m high). A diesel car driven by gendarmes lugged down at 250 m from the jet. Engine restart caused ignition an explosion, eared at 20 km. 3 dead, including 2 gendarmes, and 100 people evacuated. Substantial damage in the vicinity (specifically roofs were blown away and windows shattered).				
Activity: PIPELINE Cost of damage: ? AGS: 7/3/2 Potential interest: 4		Products: NAPHTHA Quantity: 50 m3 (1600 m3 at risk between 2 valves)		Deaths: 3 Poisoned: 0 Injured: 0
89-08-08	F-20	FRANCE	LAVAL	SERVICE STATION
Description: Explosion of an underground gasoline tank while it was being degassed and cleaned. Toll: 2 dead and 1 badly burned. Destruction of the tank.				
Activity: SERVICE STATION Cost of damage: ? AGS: 1/3/1 Potential interest: 1		Products: MOTOR FUEL VAPOURS Quantity: ?		Deaths: 2 Poisoned: 0 Injured: 1
89-08-09	F-21	FRANCE	SAINT FONS	RHONE POULENC
Description: Hydrogen explosion during grinding operations involving a 50-m ³ tank that had previously held sulphuric acid. Toll: 1 dead and 2 with serious injuries.				
Activity: CHEMICAL INDUSTRY Cost of damage: ? AGS: 1/3/1 Potential interest: 3		Products: HYDROGEN (GAS) Quantity: < 50 M ³		Deaths: 1 Poisoned: 0 Injured: 2
89-08-14	F-22	FRANCE	BOUSSENS	SIDOBRE SINOVA
Description: 3 30 p.m. Release of H ₂ during dangerous circuit unblocking operations. After a blank flange was removed and a drain valve opened, a leak (or a mistake) in a shut-off valve upstream resulted in the release of H ₂ at 300 bars/300°C. Toll: 4 dead, 3 injured with burns when the gas jet spontaneously burst into flames. The fire was limited in scope and was rapidly brought under control. Following the disaster, there was an overall safety review of the facilities and changes were required in the design and organization of the plant.				
Activity: FATTY ALCOHOLS Cost of damage: ? AGS: 7/3/1 Potential interest: 5		Products: HYDROGEN Quantity: ?		Deaths: 4 Poisoned: 0 Injured: 3
89-08-26	F-23	FRANCE	HAGONDANGE	ASCOMETAL
Description: Untimely start-up of a fire extinguishing system resulting in the release of CO ₂ in a shop. One employee killed and 2 others suffered from toxic inhalation				
Activity: METALLURGY Cost of damage: AGS: 1/3/1 Potential interest: 4		Products: CARBON DIOXIDE Quantity: ?		Deaths: 1 Poisoned: 2 Injured: 0
89-09-25	F-24	FRANCE	CHEMERY	GAZ DE FRANCE
Description: During a technical operation involving a well, there was a serious leak of natural gas under pressure (150 000 m ³ /hour for 50 hours) in an underground storage facility. 300-m safety zone. The technical operation in question had involved the replacement of a water filter. An American specialist succeeded in sealing the leak by injecting mud and steel beads. The cost of the operation was over 3 million French francs. The value of the lost gas was estimated at at least 5 million French francs.				
Activity: Undergroud gas storage Cost of damage: > 5 MFF AGS: 5/3/5 Potential interest: 4		Products: NATURAL GAS (METHANE) Quantity: 7.5 MILLION M ³ /5 350 TONNES		Deaths: 0 Poisoned: 0 Injured: 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

89-10-06 F-25 FRANCE WAZIERS TRAIN DERAILMENT

Description:

Derailment of a train with 4 cars transporting ammonia. Two of the cars derailed and 2 lay on their sides on the track (a total amount of 200 tonnes of NH₃ involved). No leakage observed. Residents within a 500-m radius were instructed to remain indoors (700 people involved).

Activity: RAILWAY TRANSPORTATION

Products: AMMONIA

Deaths : 0

Cost of damage: ?

Quantity: 200 TONNES INVOLVED

Poisoned : 0

AGS : 5/0/4 **Potential interest :** 2

Injured : 0

89-11-30 F-26 FRANCE DONGES HIGHWAY ACCIDENT

Description:

A tank truck transporting 32 tonnes of gasoline and superpremium gasoline overturned. The truck burst into flames 100 metres from a 30 000-tonne oil tanker. The driver was killed. Firefighters from the nearby refinery hosed down the tanker to prevent the fire from spreading. A tug towed the tanker away from the site.

Activity: ROAD TRANSPORT

Products: GASOLINE

Deaths : 1

Cost of damage:

Quantity: 32 TONNES

Poisoned : 0

AGS : 1/3/1 **Potential interest :** 2

Injured : 0

89-12-17 F-27 FRANCE PARIS / SEINE "TRAPIL" OVERFILLING

Description:

Two tanks (capacity 10,000 and 20,000 m³) were being filled simultaneously by Trapil pipe network. Filling started on 16/12 and was supposed to last until 18/12 at 11.00 am, corresponding to a 24,000 m³ delivery. Due to human error, manual valve was left shut off at the beginning of local Trapil subpipe (diameter 225 mm) connected to the largest tank. Then all delivery was driven to the smallest tank which was filled more quickly than planned and overloaded. Tank venting system was unable to evacuate the filling pressure (10 bars) and the roof broke in several spots (splits of 10-20 cm long). As no control or alarm device was available, alert was given by chance at 8.00 by a bus driver outside. Delivery was stopped at 8.15 after 500 m³ of product was released. Violent wind threw a part of liquid outside the retention basin into a ship canal. Local soil contamination and water pollution. 50 responders involved.

Activity: STORAGE / PIPE TRANSPORT

Products: FUEL OIL

Deaths : 0

Cost of damage:

Quantity: 500 m³ / 24000 m³ at risk

Poisoned : 0

AGS : / / **Potential interest :** 4

Injured : 0

90-8-1 F-28 FRANCE MONTEILIMAR / DROME AMMONIA REFRIGERATION

Description:

During holiday, due to lack of local staff, a company maintenance operator from outside the establishment was called for a valve repair. He did not know the circuit and could not find updated flow sheets, which lead him to fail in isolating the part of circuit concerned. While unscrewing the valve, ammonia leaked longer and more violently than planned, and froze his tool (ratchet handled wrench). Uncapable of re-screwing, he spent 15 mn to find and put on by himself a chemical-proof suit with a breathing autonomous apparatus. Leak was stopped after 20 mn. The toxic cloud dispersed through a rear door left open for improving motor aided insufficient ventilation of the building. A pregnant woman leaving close to the establishment was admitted in hospital for slight intoxication.

Activity: WAREHOUSING

Products: AMMONIA

Deaths : 0

Cost of damage:

Quantity: 5l / 1200 l (680 kg) at risk

Poisoned : 1

AGS : / / **Potential interest :** 4

Injured : 0

90-10-11 F-29 FRANCE MONTEILIMAR / DROME AMMONIA REFRIGERATION

Description:

Due to a failure of the regulation system, the refrigeration unit stopped overnight. On morning, the plant manager checked the installation and re-stated the high pressure compressors. Wrong activation of low pressure compressors by the regulation system allows liquefied ammonia to be sucked into the high pressure compressors. One of them burst. After activating the emergency shut down, the plant manager decided to wait for firebrigades in order to isolate failed equipments. A significant quantity of ammonia was released. Concentrations up to 25 ppm were measured in the immediate vicinity of the plant, which obliged to evacuate nearby houses (90 people), some offices and one supermarket. 4 people annoyed. Plant was finally closed in favour of a new better location far from urban developments.

Activity: WAREHOUSING

Products: AMMONIA

Deaths : 0

Cost of damage:

Quantity: ?

Poisoned : 4

AGS : / / **Potential interest :** 4

Injured : 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

90-10-31	F-30	FRANCE	ARAMON / GARD	RUNAWAY REACTION
Description: Chemical reactor loaded with 1800 kg of Demoxepam was waiting for 10 hours before filling and start up of reaction with acetic anhydride used both as solvent and reacting agent. As a few liters of it was accidentally left in the reactor from previous batch, the reaction started progressively and pressure raised up to 4.5 bars. Rupture disc burst allowing a cloud of gases (HCl, NOx, CO, CO2...) and Demoxepam powder to escape and drift outside the establishment. Fortunately no human internal or external effects reported. 38 responders involved. Emergency measures mainly consist of cooling the reactor with water. Cost of intervention 200 kF, commercial losses 600 kF. Improvement of alert and evacuation procedures				
Activity: CHEMICAL INDUSTRY Cost of damage: 0.8 MFF AGS: / / Potential interest: 5		Products: DEMOXEPAM / ACETIC ANHYDRIDE Quantity: 1800 kg / a few liters		Deaths: 0 Poisoned: 0 Injured: 0
90-30-12	F-31	FRANCE	CHAVANNAY / LOIRE	SOIL CONTAMINATION
Description: Derailment of a 22 tank wagon train passing over the village. Nine tank wagons overturned and exploded. Burning petrol communicated fire to 8 houses, 2 garages, 30 private cars, and sewage system over an 1 km x 0.4 km area. Fire extinguished in 6.5 hours. 250-300 m3 of petrol infiltrated in the soil on a 2 ha area. 2 water catchments for agriculture stopped, and fruit and vegetable consumption prohibited on a 12.5 ha area. Polluted area precisely identified by measurement campaigns, and several different methods for soil decontamination tested. Technique chosen (soil depressurization and catalytic incineration of vapours) allowed to eliminate 210-215 m3 of petrol.				
Activity: RAIL TRANSPORTATION Cost of damage: 50 MFF AGS: / / Potential interest: 5		Products: PETROL Quantity: 720 m3 released / 1760 m3 at risk		Deaths: 0 Poisoned: 0 Injured: 0
90-12-13	F-32	FRANCE	TAVAUX / JURA	
Description: Shortly after start up of a stand-by stop-gap pump, a leak occurred on a pipe containing the below-indicated mixture (12 bars, 150-160°C) and ignited immediately. Combustion produced a cloud of hydrochloric acid (15 ppm measured at the limit of the establishment). Emergency measures consist of immediate emergency shut down, evacuation of a school nearby. 1 operator was injured and 10 pupils received medical examination (1 was hospitalized). Leak appeared after change from a diaphragm (diameter 192 mm) to a new one (diameter 132 mm) allowing better flow rate measurement. Flow speed locally increased by a 2.1 ratio. Origin of the leak attributed to internal cavitation causing abrasion of the pipe by mixture containing 4-6 g/l of carbon particles.				
Activity: CHEMICAL INDUSTRY Cost of damage: AGS: / / Potential interest: 5		Products: Dichlorethane/Hydrogen chloride/Vinyl chloride Quantity: ?		Deaths: 0 Poisoned: 0 Injured: 2
91-02-26	F-33	FRANCE	CHAUNY / AISNE	THERMAL DECOMPOSITION
Description: The unit for production of phthalic anhydride (45 000 t/year) consists of 2 reactors. Air-orthoxylene mixture reacts at ambient pressure (< 80 mbars) in presence of vanadium catalyst and gets out of the reactor at 350 °C. The large amount of energy produced is evacuated by circulating a cooling solution of sodium nitrate/nitrite (several thousand m3/h). The whole unit was stopped in order to by-pass one of the reactors for catalyst change. Half an hour after re-starting, flames are observed on the reactor in operation, followed by an explosion causing only material damages. Products were collected before reaching water treatment plant by immediate use of inflatable system pre-installed in the sewage. After technical investigation, the origin was attributed to failure in cooling system causing thermal decomposition of nitrite/nitrate eutectic mixture. This decomposition is progressive and endothermic above 540°C, but was found to be violent above 820 °C in contact with iron. A hot spot could have been generated by the bad circulation of cooling mixture due to the reversed electric connection of the pump after maintenance.				
Activity: CHEMICAL INDUSTRY Cost of damage: AGS: / / Potential interest: 5		Products: SODIUM NITRATE/NITRITE Quantity: ?		Deaths: 0 Poisoned: 0 Injured: 0
91-03-25	F-34	FRANCE	CHALON-SUR-SAONE / SAONE-ET-LOIRE	SHIP REPAIR
Description: An oil barge (dum craft) was supposed to be degassed (free of gas) when arriving in ship repair works. Large explosion occurred at the beginning of external welding operation, eared 10 km away. Welding operator killed, 8 people injured or suffering from psychological shock on the site. Metal pieces thrown at large distances: one fragment weighting 800 kg reached a main road over 100 m away from the barge. Blast shattered cladding panel walls of a metallic frame building at 30 m. Total material damages evaluated to 3 MFF.				
Activity: RIVER TRANSPORT Cost of damage: 3 MFF AGS: / / Potential interest: 4		Products: HYDROCARBON VAPORS Quantity: ?		Deaths: 1 Poisoned: 0 Injured: 8

OECD DATABASE ON INDUSTRIAL ACCIDENTS

91-06-30 F-35 FRANCE BERRE / BOUCHES-DU-RHÔNE

Description:

In the Shell oil refinery, failure of cathodic protection of the "TRANSETHYLENE" ethylene pipe (10", 45 bars) leading to external corrosion of an underground section with old insufficient coating (20 year old). Leak from a 8x1.5 cm hole appeared at 10.25 on the lower part. First explosion ignited by a car engine restarting after being lugged down due to lack of oxygene in the cloud. Driver severely burnt (70 % third degree). Explosion broke and moved the pipe section concerned, with jet fire oriented to a warehouse containing solvents and 1000 t of synthetic rubber, wich caught fire. Explosion also caused another aerian ethylene pipe (6", 90 bars) to fall and broke, generating a second explosion. Activation of mutual assistance agreements with neighbouring companies ; 250 firemen obtained fire extinction at 16.00 Waters collected in the plant retention basin Measures taken to avoid recurrence : hydraulic test and other controls on the wiole pipe length (137 km).

Activity: OIL REFINERY / PIPE
Cost of damage:
AGS : / / Potential interest : 5

Products ETHYLENE/ dimethylcyclooctadiene / ethylacetate / thermoplastic rubber
Quantity: 32 t / 13.8 m3 / 8.8 m3 / 1000 t

Deaths : 0
Poisoned : 0
Injured : 4

91-06-03 F-36 FRANCE TARASCON / BOUCHES-DU-RHONE

Description:

Rupture of a resin sleeve-tube at the exit of a pump on a 3 bar line between the storage of chlorine dioxide and the bleaching unit. Release of 5-6 m3 of aqueous solution (8 g/l) leading to the evaporation a 16 m3 cloud of chlonne dioxide (48 kg). Leakage under control after 3 mn by closing a manual valve. 2 employees slightly intoxicated admitted in hospital for observation. Measurements performed outside establishment ; concentrations observed remained up to 1 ppm thanks to an heavy storm rain. Origin attributed to internal corrosion of resin due to abnormal quick erosion of the anti-corrosion internal coating The sleeve tube is normally changed every year and was operating for almost one year. Accident due to lack of preventive inspection

Activity: PAPER MILL
Cost of damage:
AGS : / 2 / Potential interest :

Products. CHLORINE DIOXIDE
Quantity: 48 kg

Deaths : 0
Poisoned : 2
Injured : 0

91-06-14 F-37 FRANCE SAINT-OUEN / SEINE-SAINT-DENIS

PETROL STORAGE FIRE

Description:

Flash and fire from a leaking drain of an underground pipe connected with a tank containing 9,000 m3 of petrol. Drain leak due to wrong re-screwing of plug after degassing operations. Ignition by hot works nearby (outside tank retention areas) despite continous concentration measurement near the work place. Intervention of up to 472 responders. Wrong understanding of the situation by the plant manager lead to considerable delay in finding the source of products feeding the fire, and put firemen at excessive risk (15 injured, 4 severely burnt). Some 3,000 m3 of water and 42,000 l of foaming agent used to no purpose before discovering that a main valve has been let open. A number of lessons learnt on emergency preparedness and response, and on emergency shut-off procedures. Accident origin related to poor management, and faults in work preparation and check (see information sheet attached to the report)

Activity: OIL PRODUCT STORAGE
Cost of damage:
AGS : 3/4/3 Potential interest : 5

Products PETROL
Quantity. 600 m3 lost / 9000 m3 at risk

Deaths : 0
Poisoned : 0
Injured : 15

91-07-12 F-38 FRANCE ECLARON / HAUTE-MARNE

EXPLOSION OF DISTILLATION COLUMN

Description:

Explosion of a distillation unit for the production of alcohol from fermented sugarbeet juices, after a 3 month continous operation. Building covering the distillation columns fully destroyed ; close buildings severely shattered. Damages to roofs and glass windows in a 300 m radius (12 houses, one small railway station, one industrial establishment affected). Activation of on-site plan. Fire rapidly extinguished by external firebrigades. No people injured due to very low occupation. Origin possibly attributed to a release of alcoholic vapors (max 1/2 h duration according to last inspection) due to a seal failure or a rupture of equipment . Ignition probably linked to the presence of non explosion-proof electrical equipments in the lower part of the colum which was not considered to present a risk of explosion (despite high density of alcoholic vapours). After the event, unit was rebuilt without building, in order to avoid explosion blockage Significant buffer zone introduced to limit close urbanization.

Activity: FOOD INDUSTRY
Cost of damage:
AGS : / / Potential interest : 4

Products: ALCOHOL (92-96°GL)
Quantity unknown

Deaths : 0
Poisoned : 0
Injured : 0

91-10-07 F-39 FRANCE SAINT-HERBLAIN / LOIRE ATLANTIQUE

EXPLOSION OF PETROL AEROSOL

Description

Leak of petrol (gasoline) from a 10,000 m3 tank with generation of an exceptional white drifting aerosol (observed volume 25,000 m3). Explosion ignited from either a lorry engine or a domestic heater. Severe damages to structures up to 100 m, glass windows broken up to 1,000 m away with 50 % brake observed at 700 m and 75 % at 320 m. Fire spread to a second diesel tank (6,560 m2 of retention area involved). Extinction obtained in 72 mn with a foam application rate of 4.3 l/m2 mn. Origin of the leak possibly attributed to seal failure of the "Viking Johnson" coupling between tank and main discharge pipe, due to high concentration of aromatics in unleaded petrol outside seal specifications A number of lessons learnt (described in the information sheet attached to the report).

Activity : OIL PRODUCTS STORAGE
Cost of damage:
AGS : 3/3/3 Potential interest : 5

Products: PETROL / FUEL OIL
Quantity 4525 M3 / 4500 M3

Deaths : 0
Poisoned : 0
Injured : 3

OECD DATABASE ON INDUSTRIAL ACCIDENTS

91-10-16	F-40	FRANCE	CHALON-SUR-SAONE / SAONE-ET-LOIRE	REACTOR OVERFLOW
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Description:

In a 25 year old unit, hexanoyl ethyl-2 chloride is produced in a reactor (1,800 l) from a mixture of hexanoic ethyl-2 acid (1320 kg) and phosphorus trichloride PCI3 (466 kg - 293 l). After heating of the reactor, the latter product is added in the first one. The necessary quantity is obtained by filling a dosage vessel (capacity 500 l) with a large capacity pump (300 l/mn - also used for unloading road tanks). The dosage vessel overflow pipe (diameter 80 mm) is connected to the reactor through a reduction diaphragm (diameter 20 mm) of no purpose. Due to an ill-timed restart up of the pump, PCI3 overflow causes a toxic cloud containing mainly hydrochloric acid from PCI3 hydrolysis (489 l of HCl per kg of PCI3). Hydrolysis increased by wrong emergency response (use of water to clean up internal spill and transfer to outside sewage). Defavourable meteo conditions (stable-fog) allowed large cloud dispersion (up to 1500 m) with 2 employees hospitalized and 17 people intoxicated outside the establishment. Many lessons learnt on opportunities for management and equipment improvements.

Activity: CHEMICAL INDUSTRY

Cost of damage:

AGS : /3/ Potential interest : 5

Products: Hydrochloric acid, Phosphoric acid

Quantity: ? (22 m3 of PCI3 at risk)

Deaths : 0

Poisoned : 19

Injured : 0

OECD DATABASE ON INDUSTRIAL ACCIDENTS

86-01-01 I-1 ITALY ROVERETO/TRENTO

Description:

Rupture of a hose while a tank truck containing styrene was being unloaded. The product was conveyed by the plant's sewer system to the Adige River. The product was carried along more quickly because of the rain. Serious pollution of the Adige River as far as its mouth (high mortality rate among wildlife but no details given). Drinking water intake interrupted for 1 day.

Activity: VARNISH PLANT
Cost of damage: ?
AGS: 3/2/? Potential interest: 3

Products: STYRENE MONOMER
Quantity: 500 KG

Deaths: 0
Poisoned: 0
Injured: 0

86-01-27 1-2 ITALY CHIETI

Description:

While polypropylene was being unpacked by means of flame cutting (uncommon practice on the site), cold temperatures caused a failure of the water cooling operations, and a fire spread to the entire stock (3 hours). Proper help in fighting the blaze was sought after 1½ hours. The fire was accompanied by a plume of smoke that extended over several hundred metres and threatened a nearby gas pipeline. Two other plants were shut down. The blaze was extinguished after one day. No information available on the consequences of the fire nor on the reasons for the delay in giving the alert and taking proper action.

Activity: PLASTICS
Cost of damage: ?
AGS: 1/2/2 Potential interest: 4

Products: POLYPROPYLENE (+ Combustion products)
Quantity: 1 500 TONNES

Deaths: 0
Poisoned: 0
Injured: 0

87-01-26 I-3 ITALY LIVORNO VEGETABLE OIL MILL

Description:

Release of hexane in a vegetable oil extraction shop from an unidentified high point. The cloud was ignited 10 m above the ground in a water treatment system. The force of the resulting explosion hurled debris over the tops of storage silos. 3 dead. 117 people were involved in bringing the situation under control. 24 vehicles and 10 m³ foam required. Extensive damage to the production unit.

Activity: OIL EXTRACTION
Cost of damage: ?
AGS: 4/3/3 Potential interest: 5

Products: HEXANE
Quantity: 113 TONNES INVOLVED

Deaths: 3
Poisoned: 0
Injured: 0

87-05-15 I-4 ITALY GENOA-MULTEDO

Description:

An empty underground tank exploded during degassing operations. Two methanol tanks exploded in turn, damaging a tank containing n-hexane. The contents burst into flame and poured out. It took 10 hours for the blaze to be extinguished and 15 days for the site to be considered safe. Windows shattered over a 150-m radius. Private vehicles damaged. Firefighting operations were hampered by faulty equipment on the site proper, inadequate foam supplies during the initial phase and problems with the water supply system.

Activity: CHEMICAL STORAGE
Cost of damage: ?
AGS: 3/3/2 Potential interest: 5

Products: METHANOL / N-HEXANE
Quantity: 3 160 TONNES / 645 TONNES

Deaths: 4
Poisoned: 0
Injured: 1

88-01-01 I-5 ITALY PRIOLO/SYRACUSE

Description:

Untimely release of ammonia while a ship was being loaded (faulty flare). The cloud drifted for 5 minutes over the city located 500 m from the facilities. Residents panicked. 10 adults and 4 children injured (as a result of the panic reaction or toxic inhalation. The exact causes were not given).

Activity: FERTILIZERS
Cost of damage: ?
AGS: Potential interest: 5

Products: AMMONIA
Quantity: ?

Deaths: 0
Poisoned: 14
Injured: 0

88-01-19 I-9 ITALY PRIOLO/SYRACUSE

Description:

During dismantling operations in an olefin production unit that had been shut down for 10 years, a workman was cutting a pipeline with a torch when inflammable vapours were released. They immediately ignited. The accident was the last in a series of disasters on the site and triggered violent public reaction.

Activity: FORMER PETROCHEMICAL UNIT
Cost of damage: ?
AGS: Potential interest: 3

Products: INFLAMMABLE GASES
Quantity: ?

Deaths: 1
Poisoned: 0
Injured: 0