

Accident Profile

Title

Release of styrene in a polymer production plant belonging to a petrochemical installation due to a black out

Date/Time of Major Occurrence

Start Date 24-06-2005

End Date 24-06-2005

Accident Type

Major Accident

Reported under

EU Seveso II Directive

Seveso II Status

Upper tier

Industrial Activity

Petrochemical / Oil Refineries

Reasons for Reporting

Substances involved: greater than 5% of quantity in Column 3 of Annex I

Injury to persons: >= 1 fatalities, >= 6 hospitalizing injuries, evacuation, shelter-in-place, utility disruption and damage to real estate

Immediate damage to the environment (according to Annex VI)

Damage to property: on-site >2M €, off-site > 0.5M €;

Cross-border damage: transboundary accidents

Interesting for lessons learned.

Accident Report

Accident description

Styrene was released in the atmosphere in a polymer production plant located in a petrochemical installation due to a black out in the electricity distribution network. This accident is notified because two persons were intoxicated in Germany, one of whom was hospitalised more than three days.

The accident is classified at level 2 of the of the accident gravity scale made official in February 1994 by the committee of competent authorities for the implementation of the Seveso Directive (level two due to the intoxication of 5 persons and level 2 for the economic loss caused by the accident).

Accident involving

☐ Domino effects

☐ Natech events

☒ Transboundary effects

☐ Contractors

Site and installation

Site description

not given

Installation/Unit description

A run away reaction occurred, the rupture disks of 2 reactors of line 1 and also the rupture disks of a third reactor on line 2 burst causing the release of the styrene.

Substances

Substances Involved

Release of 8 t of styrene (C.A.S. No: 100-42-5) into the atmosphere

Substances Classification

06. FLAMMABLE - note 3(a)

Substances detail

Substance	CAS Number	Quantities (t.)	
		Involved	Potential
styrene	100-42-5	8.00000	

Causes

At 19:50 a black out in the electrical network released the onsite emergency plan in the different production workshops. The units were shut down at 20:15. In such circumstances, it is foreseen that the workshops transfer the products under process to the two flare units of the site. The diesel emergency generator sets foreseen to Take relief in case of black out did not power up fast enough to assure the cooling of the reactors of line 1 and 2 during the shut down phase of the workshop.

External

Causative Factor	Type
utilities failure (electricity, gas, water, steam air, etc.)	

Other

Yes

Consequences

A large smoke cloud formed due to the combustion of the discharged products in the flare system and dispersed in the atmosphere during exceptional meteorological conditions with rainstorms. The meteorological conditions were adverse (low wind speed), the styrene cloud affected 3 neighbours of the municipality of Hopital (France) and 2 neighbours of the municipality of Leuterbach (Germanz), including a child hospitalised during 3 days. Between 7 and 9 p.m., sensors close to the petrochemical plant recorded high concentrations of dust, SO₂ (585 µg/m³ over a quarter hour) and orthoxylene (535 µg/m³ over a quarter hour) probably due to styrene (compatible chemical characteristics). The high SO₂ readings may be due to units on the site, as well as to the coke plant supplying the nearby power station. This is because a condensation separator on the coke plant's gas line self-ignited at about 4 p.m. The electricity supply shut-down resulted in production losses of 0.5 to 2 million euros.

Human

Off site	Quantity	Quantity/Effect
Injuries	1	two persons were intoxicated in Germany, one of was hospitalised more than three days

Cost

On site	Quantity	Quantity/Effect
material losses		production losses of 0.5 to 2 million euros

Emergency Response

The onsite emergency plan was activated. The emergency response services took rapidly control of the situation.

Emergency Response	Quantity	Quantity/Effect
On-site systems		emergency plan
Off-site external services		
Sheltering		
Evacuation		
Other		

Remedial Measure	Quantity	Quantity/Effect
Decontamination		
Restoration		
Other		

Lessons Learned

Theme of the Lessons Learned

Causes - Organisational

Lessons Learned

In compliance with the urgent prefectural decree issued 06/07/05

- a report on the failure cause of the emergency generator sets was submitted,
- the start-up sequential of the generator sets was modified
- the risk assessment and the Onsite Emergency Plan were completed

This measures have allowed the operator to start up the polymer plant again.

DRIRE has proposed to issue an additional prefectural decree imposing the operator to review all emergency generator sets present on the petrochemical installation and to perform a study identifying all potential release points of hazardous substances in the installation including the nature of the substances and the quantities potentially released.

Event Profile

Publication Date