

Utsläpp av vinylklorid från en kemikaliefabrik

940706 MARS 1994_16

Fem ton vinylkloridmonomer rann ut i ett ventilationssystem då en operatör av en händelse öppnat en luftventil. Tre ton av vinylkloriden rann ut i botten av ventilationssystemet där ett korrosionshål fanns. Inga andra följder.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
Vinylklorid		5 ton

Skador:

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

Erfarenheter redovisade (Ja/Nej): Ja

Kortfattat anges förebyggande åtgärder.

Report Profile

Identification of Report:

country: FA ident key: 1994_016_01

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

Date of Major Occurrence: Time of Major Occurrence

start: 1994-07-06 start:

finish: finish:

Establishment:

name:

address:

industry: 2001 general chemicals manufacture

Chemical Industry

Seveso II status: not applicable: Yes art. 6 (notification): No

art. 7 (MAPP): No

art. 9 (safety report): No

Date of Report:

short: full:

Authority Reporting:

name:

address:

Authority Contact:

rep_cont_name:

rep_cont_phone:

rep_cont_fax:

Additional Comments:

- a) - not applicable -
- b) - not applicable -
- c) - not applicable -
- d) - not applicable -
- e) - not applicable -

Short Report

country: FA ident key: 1994_016_01

Accident Types:

release: Yes explosion: No

water contamination: No other: No

fire: No

description:

Five tonnes of vinyl chloride monomer (VCM) were inadvertently discharged into a vent system when a shipping operator left a vent valve open after clearing a vapour lock from a VCM off-loading pump. Approximately 3 tonnes of this were relea... see Appendix Short Report / description of accident types

Substance(s) Directly Involved:

toxic: Yes explosive: No

ecotoxic: No other: No

flammable: No

description:

- not applicable -

Immediate Sources of Accident:

storage: No transfer: No

process: Yes other: No

description:

Stack 49, VC3 Plant

Suspected Causes:

plant or equipment: No environmental: Yes

human: Yes other: No

description:

There were root causes which enabled this incident to occur. Firstly, the design of the VCM off-loading system does not prevent the vapour locking of the off-loading pump.... see Appendix Short Report / description of suspected causes

Immediate Effects:

material loss: Yes

human deaths: No

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

other: No

ecological harm: No

national heritage loss: No

description:

- not applicable -

Emergency Measures taken:

on-site systems: Yes **decontamination:** No

external services: No **restoration:** No

sheltering: No **other:** No

evacuation: No

description:

- not applicable -

Immediate Lessons Learned:

prevention: No **other:** No

mitigation: Yes

description:

- not applicable -

A Occurrence Full Report

country: FA **ident key:** 1994_016_01

1 Type of Accident

remarks: Vinyl Chloride (VC) released as a liquid, accumulated in a pool and allowed to evaporate off.

2 Dangerous Substances

remarks: Potential quantity released relates to capacity of road tanker barrel.

3 Source of Accident

illustration: - not applicable -

remarks: Ordnance survey map of site and local area - document 1. Plan of plant area - document. 2. Illustration of vent system - document 3. Valve to vent line opened to clear vapour lock in pump during loading of VC. Mistakenly left open. Liquid VC... see Appendix Full Report A / source of accident - remarks

4 Meteorological Conditions

precipitation none: fog: rain: hail: snow:

Yes No No No No

wind speed (m/s): 2

direction (from): ESE

stability (Pasquill):

ambient temperature (°C):

remarks: For isoplets prepared by ICI, please see doc 4 for estimated concentrations of VC at 1 metre above ground level and doc 5 for concentrations at ground level.

5 Causes of Major Occurrence

main causes

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

5104 operation: corrosion/fatigue

- not applicable -

- not applicable -

- not applicable -

human / organizational 5313 organization: maintenance/repair (none, inadequate, inappropriate)

5401 person: operator error

- not applicable -

- not applicable -

- not applicable -

remarks: Operator wrongly left vent valve open after clearing vapour lock in transfer pump.

Corrosion at base of stack temporarily repaired. Wrong part supplied. Very rapid corrosion led to failure again. No system to check adequacy of extending tem... see Appendix Full

Report A / causes of major occurrence

6 Discussion about the Occurrence

- not applicable -

Type of Accident country: FA ident key: 1994_016_01

event:

major occurrence - not applicable -

initiating event - not applicable -

associated event - not applicable -

Source of Accident - Situation country: FA ident key: 1994_016_01

situation

industry

initiating event - not applicable -

associated event - not applicable -

activity/unit

major occurrence 3999 other: other

initiating event - not applicable -

associated event - not applicable -

component

major occurrence 4999 other

initiating event - not applicable -

associated event - not applicable -

situation

industry

initiating event - not applicable -

associated event - not applicable -

activity/unit

major occurrence 3304 transfer: loading/unloading activities (transfer interfaces)

initiating event - not applicable -

associated event - not applicable -

component

major occurrence 4012 other transfer equipment/apparatus/vehicle

initiating event - not applicable -

associated event - not applicable -

B Consequences Full Report

country: FA **ident key:** 1994_016_01

1 Area concerned

affected

extent of effects installation: not applicable

establishment: not applicable

off-site; local: not applicable

off-site; regional: not applicable

off-site; transboundary: not applicable

illustration of effects - not applicable -

remarks No one hurt or affected by fumes.

2 People

establishment popul. emergency personnel off-site population

total at risk

immediate fatalities

subsequent fatalities

hospitalizing injuries

other serious injuries

health monitoring

remarks - not applicable -

3 Ecological Harm

pollution/contamination/damage of:

- **residential area (covered by toxic cloud)** not applicable

- **common wild flora/fauna (death or elimination)** not applicable

- **rare or protected flora/fauna (death or elimination)** not applicable

- **water catchment areas and supplies for consumption or recreation** not applicable

- **land (with known potential for long term ecological harm or not applicable)**

preventing human access or activities)

- marine or fresh water habitat not applicable

- areas of high conservation value or given special protection not applicable

remarks No harm suspected - very low concentrations released outside site boundary.... see Appendix Full

Report B / ecological harm

4 National Heritage Loss

effects on:

- historical sites not applicable - historic monuments not applicable

- historic buildings not applicable - art treasures not applicable

remarks None threatned

5 Material Loss

establishment losses off site losses

costs (direct costs to operator) (social costs)

in ECU ECU

material losses

response, clean up, restoration

remarks No material loss

6 Disruption of Community Life

establishment/plant evacuated disabled/unoccupiable destroyed

- nearby residences/hotels No No No

- nearby factories/offices/small shops No No No

- schools, hospitals, institutions No No No

- other places of public assembly No No No

interruption of utilities etc. no / yes duration

- gas No

- electricity No

- water No

- sewage treatment works No

- telecommunications No

- main roads No

- railways No

- waterways No

- air transport No

significant public concern none local level national level

- off site populations Yes No No

- media interest Yes No No

- political interest Yes No No

remarks - not applicable -

7 Discussion of Consequences

- not applicable -

C Response Full Report

country: FA ident key: 1994_016_01

1 Emergency Measures

taken - on site - not applicable - - not applicable -

- not applicable - - not applicable -

- not applicable - - not applicable -

- **off site** - not applicable - - not applicable -

- not applicable - - not applicable -

- not applicable - - not applicable -

still - on site - not applicable - - not applicable -

required

- not applicable - - not applicable -

- not applicable - - not applicable -

- **off site** - not applicable - - not applicable -

- not applicable - - not applicable -

- not applicable - - not applicable -

continuing contamination or danger

-**on site** not applicable

-**off site** not applicable

remarks - not applicable -

2 Seveso II Duties

pre-accident evaluation

Article item not due yet not done done/submitted evaluated

6 notification No No No No

7 policy (MAPP) No No No No

9 safety report No No No No

9, 10, 11 update No No No No

11 internal plan No No No No

11 external plan No No No No

13 informing public No No No No

9, 12 siting policy No No No No

post-accident evaluation

Seveso II duty was actual were actual compared with actual

contingency consequences consequences, the

addressed? addressed? predicted extent was?

Article item

7 policy (MAPP) not applicable not applicable not applicable

9 current safety report not applicable not applicable not applicable

11 internal plan not applicable not applicable not applicable

11 external plan not applicable not applicable not applicable

13 informing public not applicable not applicable not applicable

9, 12 siting policy not applicable not applicable not applicable

evaluation of safety organisation

organisational element element existed did element relate to actual circumstances of

yes / no no / partly / yes adequate?

- **written policy objectives** No

- **specified management** No

structure

- **specified responsibilities** No

- **specified working procedures** No

- **specified procedures for** No

assessment/auditing of

management system

- **specified procedures for** No

review and update of

management policy

- **specified general training** No

procedures

- **specified emergency** No

training procedures

evaluation of ecological impact control

organisational element element existed did element relate to actual circumstances of

yes / no no / partly / yes adequate?

- **ecological status review** No

before incident

- **potential ecological** No

consequences assessment

- **ecological impact review** No

after incident

- **ecological restoration** No

procedures

- **subsequent review of** No

restoration success

remarks - not applicable -

3 Official Action Taken

legal action

- not applicable -

other official action

- not applicable -

4 Lessons Learned**measures to prevent recurrence**

1) Company should ensure that ... see Appendix Full Report C / lesson learned - prevent

measures to mitigate consequences:

Incident handled well, although... see Appendix Full Report C / lesson learned - mitigate

useful references:

- not applicable -

5 Discussion about Response

- not applicable -

Appendices for the FA / 1994_016_01 report

Appendix Short Report / description of accident types:

Five tonnes of vinyl chloride monomer (VCM) were inadvertently discharged into a vent system when a shipping operator left a vent valve open after clearing a vapour lock from a VCM off-loading pump. Approximately 3 tonnes of this were released at the base of the plant vent stack because a mild steel section of vent line had corroded and been temporarily repaired and failed again. The replacement pipe had been ordered but not fitted despite the outstanding working being held in the computerised maintenance system. Design of off-loading and vent system. Material of construction of VC vent line. Management of outstanding maintenance work/temporary repairs. HMIP informed and Enforcement Notice received. HSE informed.

This was an extremely serious loss of containment which could have led to more serious consequences. It occurred because of a number of shortcomings in the plant design, in the procedures used to operate plant and rectify deficiencies, and in the performance of people. The lessons from this incident have been learned by all personnel involved and the actions are being followed up with urgency. Thanks to the alertness and to the actions of the emergency response team the emission of VCM dispersed safely without adverse effect.

Appendix Short Report / description of suspected causes:

There were root causes which enabled this incident to occur. Firstly, the design of the VCM off-loading system does not prevent the vapour locking of the off-loading pump.

VCM import is an infrequent occurrence and technical evaluation work was underway several hours before the incident to identify suitable instrumentation for this duty. Secondly the design of the vent system at the Shipping bay does not prevent the operator error that occurred or indicate that an error has been made. Thirdly the procedure for managing known defects and temporary repairs was not sufficiently rigorous for SHE critical jobs.

Appendix Full Report A / source of accident - remarks:

Ordnance survey map of site and local area - document 1. Plan of plant area - document 2. Illustration of vent system - document 3. Valve to vent line opened to clear vapour lock in pump during loading of VC. Mistakenly left open. Liquid VC vented to stack. Released from a corroded hole at base of stack which had been subject to temporary repair.

Appendix Full Report A / causes of major occurrence:

Operator wrongly left vent valve open after clearing vapour lock in transfer pump. Corrosion at base of stack temporarily repaired. Wrong part supplied. Very rapid corrosion led to failure again. No system to check adequacy of extending temporary repair.

Appendix Full Report B / ecological harm:

No harm suspected - very low concentrations released outside site boundary.

Appendix Full Report C / lesson learned - prevent:

1) Company should ensure that there is a written operating procedure before starting infrequent/unusual operations.

2) Detector to be installed to prevent vapour entering pump.

3) Reduce/avoid liquid down vent line by fitting a restrictor orifice and a knockout drum in the line, with a high level alarm to the control room.

4) System for dealing with temporary repairs to be improved;

- new site wide procedures

- new computer tracking system to track safety related work and temporary repairs.

5) Vent stack drain valve and draining procedures modified so that operator can see whether valve blocked.

Appendix Full Report C / lesson learned - mitigate:

Incident handled well, although ICI are reviewing the number and location of flammable gas detectors required.