Review of Incident at KPD Aarhus Terminal 17th August 2008

KPNWE / TIEMS Safety Workshop, Luxembourg
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John Briggs KPI Regional SHE Manager

Overview of incident

- On Sunday 17th August at 1720, a leak of 23,000 litres of Gasoline occurred at KPD Aarhus Terminal during the discharge of a vessel.
- The vapours were detected 1 hour after the start of the discharge and the source of the leak was found to be an open drain valve.
- The gasoline ran through the surface water sewer system and into the harbour basin.
- Due to the wind conditions, the contaminated seawater contained in a local area and was removed by the authorities.

Location of terminal - Aarhus

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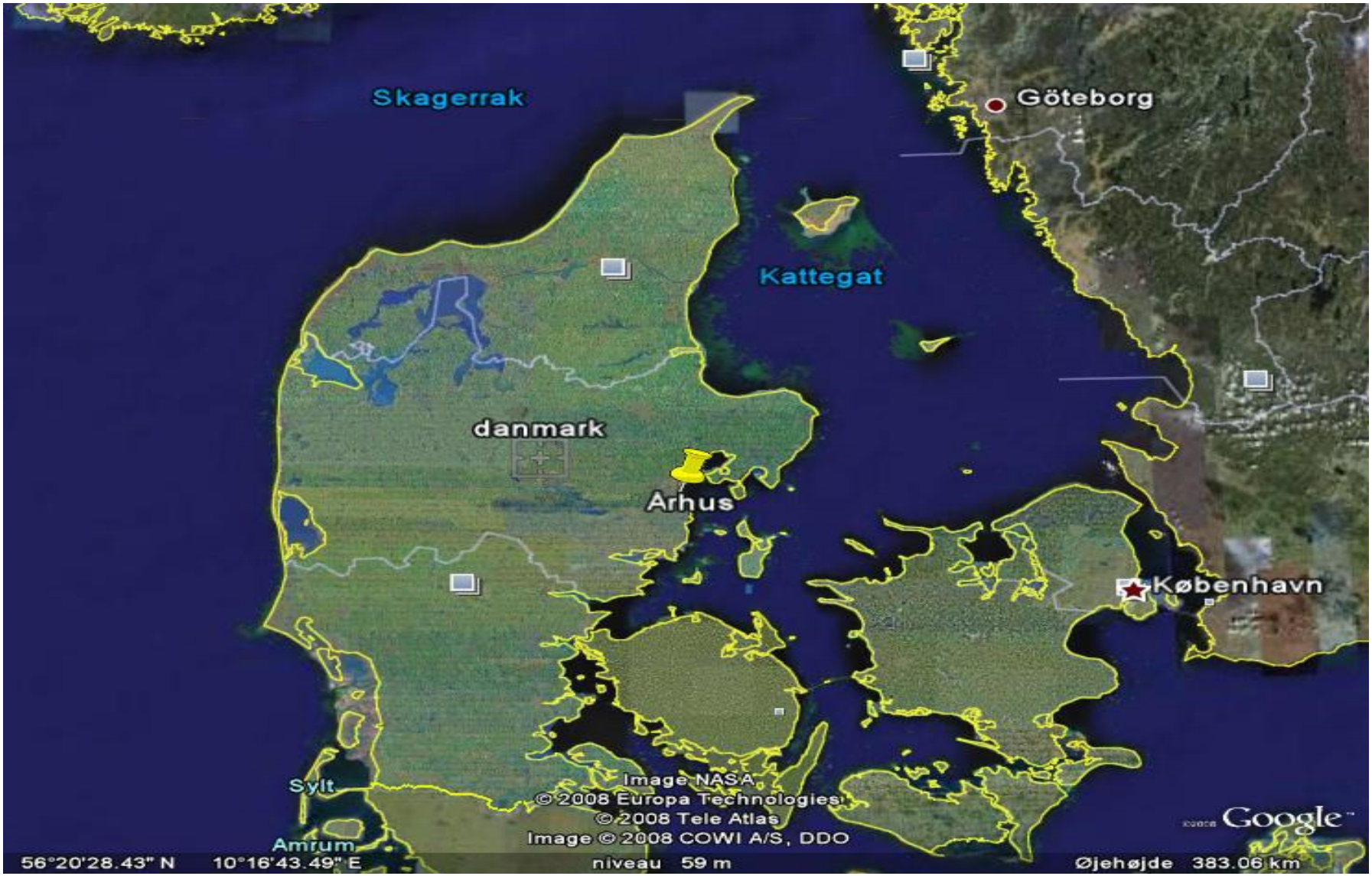

Port of Aarhus - Aerial Photo

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KPD Terminal, Aarhus

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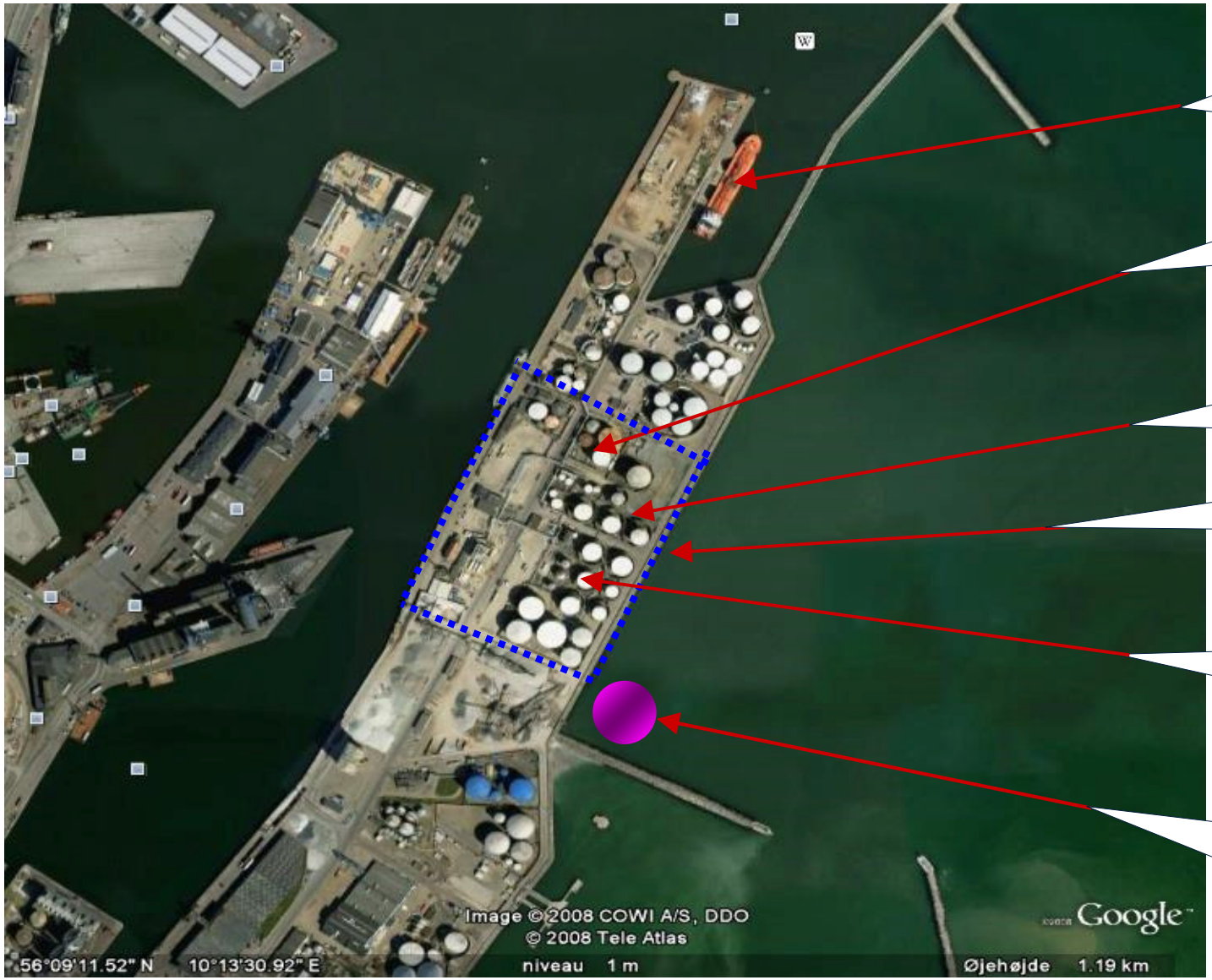


Jetty for discharging vessels

Location of incident – through open valve

Series 100 Terminal

Outflow from rain water sewer system

Series 200 Terminal

Contamination ”trapped” by wind and waves for ”easy” removal

Preparation for dischsrge

- One Supervisor and two Terminal Operators are dedicated to the discharge of a vessel.
- The Supervisor liaises with the vessel Officer, ensures the documentation is correct, and monitors the process from the control room whilst keeping contact with the two operators by radio.
- Operator 1 stays on the jetty at the point of discharge and liaises with the vessel staff.
- The duties of Operator 2 include; preparing the pipeline before discharge, checking the tank and pipeline during the discharge and sampling the product.

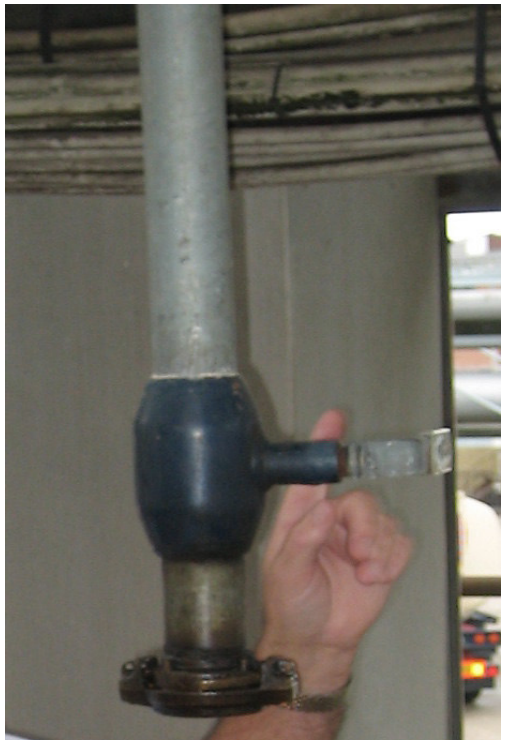
Incident Detail

- One gasolene pipeline from the jetty feeds into two separate terminals (series one terminal and series two terminal), via a pipeline junction.
- It is the responsibility of Operator 2 to prepare the pipeline junction for the discharge. This process includes blanking the line to series one terminal at the junction, emptying approximately 100 litres of product from a drain trap, then opening the pipeline to series two terminal at the junction.

Incident Detail

- Emptying the drain trap is carried out by manually opening a valve, waiting approximately 30 seconds for the trap to empty, then manually closing the drain valve, before carrying out further duties.

- On the day of the incident Operator 2 opened the valve, then proceeded to carry out other duties, leaving the valve in the open position.

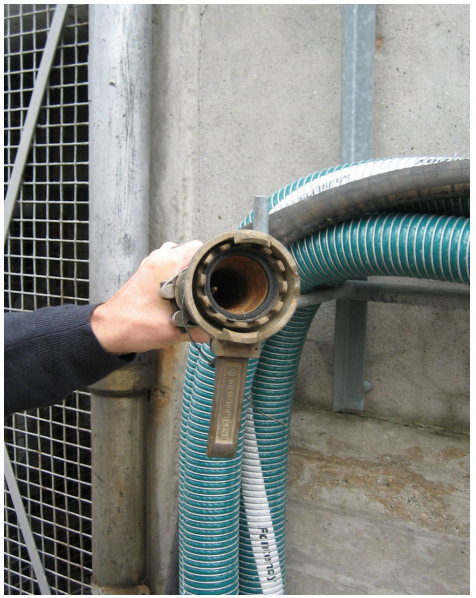


Incident Detail

- Operator 2 informed the Supervisor by radio, that the pipeline had been prepared, and after being satisfied that other checks were complete, the Supervisor authorised the discharge to proceed.
- Operator 2 was standing at the tank inlet when the discharge started, to ensure connection between vessel and receiving tank (the sound of air being pressed through the pipe into the tank by the arriving product).
- Operator 2 returned to the pipeline junction to check for any minor leaks without observing product from the drain valve entering the IBC.
- Operator 2 finding no leaks, then returned to the tank to check for any minor leaks at the inlet.

Incident Detail

- Gasolene flowed down the pipeline into the tank, but a small amount of gasoline also flowed through the open drain valve, down a drain hose, into a 1000 litre drain tank.



- The 1000 litre drain tank overflowed and the gasolene entered the surface water drain system and was discharged into the harbour basin.

Incident Detail

- 23,000 litres of gasolene was spilled into the harbour basin.
- After 1 hour the vapour from the gasoline was detected and the source of the vapour found to be the open drain valve.
- Emergency procedures were put in place until the arrival of local authorities/fire service, who then took charge of the situation. Due to the wind conditions, the contaminated seawater collected in a local area and it was contained by the authorities.

Contributory / Root cause

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Contributory Causes

- Manually operated valves
- Comprehensive high level process instructions in place but no low level operator work Instructions
- No low level operator checklists
- Lack of ongoing operational refresher training
- Engineering of pipeline junction (drain product)
- Terminal operator negligence

Root Causes

- The existing Terminal Risk Assessment was carried out at too high level and did not assess the processes i.e. discharge process, loading process

Recommendations

Recommendations

- Install spring operated drain valves
- Review high level process instructions (introduce low level operator checklists)
- Develop low level operator work instructions
- Introduce ongoing operational refresher training
- Use external expertise to carry out a Terminal Risk Assessment which assesses all the processes
  - Risk assessment will include a review of the engineering of the pipeline junction
- Install local vapour detection equipment
- Communication of incident to all stakeholders

Key Lessons learned

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- Ensure that your risk assessment is focused at the correct level when trying to anticipate the possibility of incidents – assess the processes.
- Use failsafe / automatic valves - do not rely on manually operated valves.
- Below your high-level procedures, ensure that operator work instructions are in place that clearly detail the process steps.
- Carry out continuous refresher training to prevent operators becoming over familiar with the processes

Questions

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Any Questions?

Thank you for your attention!

Kuwait Petroleum International