

Sudden fracture of a pipeline immediately upstream of an oil terminal 13 December, 2004 Nanterre – [Hauts de Seine] FRANCE

Soil contamination
Pipeline
Gas oil
Dismantling
Safety management
systems Mapping
Successive operators

THE INSTALLATIONS IN QUESTION

The site:

The operator was the owner of a 20,500 m² stretch of land, on which another company had run a lubricant manufacturing and packaging activity until June 1995 and was subject to the classified facility legislation.

Site clean-up operations under the supervision of the operator were underway since July 2000.

As part of the operations termination procedure, an additional prefectural decree of 11 June issued within the framework of site rehabilitation set out the objectives of the site clean-up operations.

Further to these operations, the dismantling of the building and the facilities was initiated at the end of the 2004.

An oil depot classified top tier SEVESO facility, another lubricant storage unit, as well as a T22 pipeline terminal with its transport pipes were located inside the industrial area close to the site. The "Paris - Le Havre" pipeline cut across this industrial area and ended at the T22 Terminal. Downstream from this T22 terminal, three distinct pipelines transporting gas oil, domestic fuel and petrol were operating.

This segment of the "Paris - Le Havre" pipeline was constructed in the early 1950s to supply the Nanterre petrochemical complex (lubricant and fuel depot).

THE ACCIDENT, ITS BEHAVIOUR, EFFECTS AND CONSEQUENCES

The accident:

As part of the ongoing dismantling of a lubricant depot, a subcontractor disassembled surface pipes, as well as their concrete foundations on **Monday 13 December 2004**. During these operations, the removal of one of the blocks led to severing a segment of underground pipe that neither the site operator nor the subcontractor knew about. In reality, this pipe was one of the three pipes supplying oil products to the Nanterre depot from the T22 terminal of the company operating the pipeline.

The site being dismantled was located just downstream from the terminal of the company operating the pipeline, and at 100 m upstream of the oil depot.

This fracture had no immediate consequence since there were no liquid hydrocarbons being transported at that time. The works contractor considered this pipe to be one of the numerous old decommissioned pipes of the site.

On the morning of December 15 around 11.00 a.m., a gas oil delivery intended for this depot was conveyed through the pipe that had been partially severed 2 days earlier causing an oil spill in the site being dismantled. The construction superintendent of the works company noticed this hydrocarbon spill and promptly informed the oil depot manager. After arriving on site, the oil depot manager ordered an emergency shut down of the transfer. The leak lasted for about 40 minutes.

At 11.55 a.m., the Paris fire department and the police arrived on site to implement the first emergency measures (danger area, pumping, floating boom at the docks, etc.).

Around 2.15 p.m., two specialised companies came to pump the hydrocarbons. At 4.00 p.m. the Paris fire department left the premises.

The consequences:

✓ Nearly 370 m³ of gas oil was spilled on the stretch of land being dismantled. The hydrocarbons seeped into the soil to reach the water table that is 4 meters deep. However, no immediate or medium term pollution was observed in the neighbouring docks of the Seine. Pumping equipment was set up by the various players involved and the operation was coordinated by the fire department right from the afternoon of 15 December on the site being dismantled and in the nearest drainage network. On the evening of 16 December, the pumping equipment helped in recovering 55 m³ of spillage. About three months following the accident 70% of the products had been recovered.



Photo operator

✓ The supply of oil products (gas oil, domestic fuel and petrol) by the pipeline to the SEVESO oil depot was suspended for about a month until the three 9 inch pipes running from the pipeline terminal to the oil depot were made compliant again.

ORIGIN, CAUSES AND CIRCUMSTANCES OF THE ACCIDENT

The three pipes supplying the depot were installed in 1952 during the construction of the oil terminal. Their diameter was 9 inches and the pipes were directly buried in the ground without an underground warning mesh. During site clean-up and dismantling operations, the external company designated by the site owner was in possession of a work order, an excavation order and had previously sent a formal notification of intent to commence works to the concerned bodies (mainly the neighbouring oil depot, the company operating the pipeline, the Nanterre Town Hall, etc.) in compliance with the regulations in force.

Unfortunately, the existence of these transport pipes was not clearly mentioned in the administrative and technical files drafted on the occasion of the works.

European scale of industrial accidents:

By applying the rating rules of the 18 parameters of the scale made official in February 1994 by the Committee of Competent Authorities of the Member States which oversees the application of the 'SEVESO' directive, the accident can be characterised by the following 4 indices, based on the information available.

Dangerous materials released		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Human and social consequences		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental consequences		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Economic consequences		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The parameters that comprise these indices and the corresponding rating method are available at the following address: <http://www.aria.ecologie.gouv.fr>.

The index concerning the quantity of dangerous materials released is set at level 3 because of the 370 m³ gas oil spill (parameter Q1 - 312 t rejected i.e. 1.25% of 25,000 t of SEVESO top tier).

Level 1 is attributed to environmental consequences due to the 2,500 m² of polluted soil requiring cleaning and excavation of nearly 1,800 tons of polluted soil (parameter Env 13).

The economic consequences rating is set at 4 and includes cost of damaged external material that stands at 550 k Euros for the overhaul of the 3 pipeline segments (parameter € 17); the total cost incurred is 1.5 million euros and that includes site clean-up operation, production losses and material damage.

Lastly, there are no known human and social consequences.

ACTIONS TAKEN

By the classified facilities inspection authority:

- On the one hand, an emergency prefectural order notified on 21 December 2004 required the last operator of the site to:

- ✓ Submit a new hydrocarbon pollution diagnostic study of the site (soil, sub-soil, underground water)
- ✓ Inspect thoroughly the water table on a weekly basis
- ✓ Supervise the site by designating a site guarding company
- ✓ Draw up a detailed inventory of underground pipes before proceeding with any new excavations.

- On the other hand, perform detailed inspections on the safety management systems especially for 2005 on the "pipeline-oil terminal" interface, as well as 2006 on external companies carrying out operations in top tier SEVESO facilities.

By the authority in charge of inspecting pipes:

- ✓ An inspection of the three pipes by a competent body in compliance with the guidelines indicated by a professional body in the oil industry to check the pipes for scratches, sinking, tensile stress or unacceptable buckling except in the severed segment
- ✓ Replacement of the severed pipe segment and X-ray inspection of the tie-in welds
- ✓ The technical analysis of the operating mode of the three pipes with a view to re-commission them and the drawing up of a technical and administrative file to prove the facility's compliance with the safety requirements of 1 October 1959 or 21 April 1989 depending on the case.

By the Nanterre Town Hall:

- ✓ A motion to appoint an expert at the administrative court.

LESSONS LEARNT

The lesson to be learnt from this incident is more of an organisational kind than a technical one.

The inspection must have observed that the hydrocarbon pipes between the terminals of the operating company and the oil depots were likely to run through private or public property without the owners or the concerned authorities being aware of their existence.

An efficient document management system e.g. plans of facilities at risk is an important criteria when dismantling and excavation operations are carried out on an old site by external companies.

The successive changes of operators in a very old site operated since the 1930s, as well as the transfer of the oil depot between the two operators in 1995 resulted in a loss of information among the various parties in question.

There was a serious lack of communication and information among the various parties involved (land owner, pipeline manager, oil depot operator, external company, etc.).

Apart from the administrative and organisational aspect, the Inspection of Classified Facilities as part of the inspection of safety management systems as of 2005 played an active role in furthering the monitoring capacities of the automatic reception of oil products by pipelines inside oil terminals of top tier SEVESO facilities as well as the interface between the transporter and oil depot.

After this inspection campaign, oil depot operators were asked to improve and reinforce their monitoring capacities right from the filling phase of a tank upon reception of product to detect any leak under pressure.

The following proposals were made to improve the facilities and make them compliant:

On the technical level:

- ✓ Installation of hydrocarbon detectors at the manifold of the transporter terminal.
- ✓ Ensuring air tightness of transfer zones (above-ground transport pipes) and reception zones (transporter terminal manifold).
- ✓ Installation of additional technical equipments such as sound/visual remote alarm in the operating premises of the oil terminal that indicates the start of the tank filling phase.

On the organisational level:

- ✓ Reviewing organisational procedures related to monitoring reception by pipeline during and after working hours with a focus on the critical tank filling phase, e.g. :
 - Increasing the frequency of inspection rounds.
 - Continuous monitoring and traceability of tank level readings by technicians or the guarding company.
- ✓ Drawing-up of a formal protocol defining the roles and responsibilities of the transport pipeline and oil terminal operators.