

FFO leak in a petrol station

October 12, 2001

Gennevilliers – [Hauts-de-Seine] France

Aquatic pollution
Petrol station
Furnace fuel oil
Pump
Equipment failure
Installation defect
Organisation
Danger study
Floating barrier

THE INSTALLATIONS IN QUESTION

The depot is located next to a dock. It consists of 23 tanks, each having a nominal capacity of between 537 m³ and 19,193 m³, for a total nominal capacity of approximately 107,000 m³. The establishment is subject to authorisation and is classed as a "High Threshold" SEVESO installation. The site includes 12 truck loading stations and 3 pump stations.

THE ACCIDENT, ITS BEHAVIOUR AND CONSEQUENCES

The accident:

October 12, 2001, at 5.20 am, an operator of the depot was alerted by a driver and heard an unusual noise in pump station No. 1. There, he discovered a leak of furnace fuel oil FFO (heating oil): the pump station's retaining pit contained approximately 80 cm of FFO.

The operator took the following measures:

- manual closure of the valve in question, stopping the leak,
- closure of the "polluted" rain water release valve into the Seine,
- disconnection of the electrical power supply to pump station No. 1,
- securing of the site by closing all tank valves by activating the emergency stop,
- checking to see if the devices located at the separator outlet correctly closed the pipe which releases into the Seine,
- the depot manager and his assistant were contacted by telephone,
- firefighting system initiated,
- evacuation of all trucks present.



Photo: DRIRE Ile-de-France

The assistant and the depot manager arrived at 5.50 am and 6.05 am, respectively. The following measures were undertaken:

- evaluation of the situation, namely by performing an estimate of the quantity of FFO lost: 239 m³ of FFO were released in the pump station and in the network,
- implementation of pumping means,
- checking of surface water in the dock area,
- control of the Seine: this latter operation was apparently difficult owing to access and visibility-related problems.

7.25 am: the Paris fire brigade was called in the case of possible pollution of the Seine, and neighbouring establishments.

7.35 am, the firemen arrived.

The following operations were conducted throughout the morning:

- information released by the Hauts-de-Seine Prefecture,
- product recovery (185 m³) and elimination of 100 tons of hydrocarbons containing water,
- information gathering and shutdown of downstream water pumping stations along the Seine.

12.00 pm, arrival of the Classified Installations Inspectorate.

12.30 pm, the operator decides not to engage specific measures following the observation of irisations on the Seine.

10/16/01, i.e. 4 days later, the depot (excluding pump station No. 1) is returned to service.

10/19/01, pump station No. 1 is returned to service.

The consequences:

Release into the Seine was limited: an estimated 500 litres of FFO. Irisations, however, were observed on the Seine over a distance of 3 km.

The costs, an overall amount of approximately 200 k€, can be broken down in the following manner:

- Property damage: 112 k€
- Environmental decontamination/clean-up costs: 23 k€
- Operating losses: 61 k€

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 Gennevilliers accident can be characterised by the following 4 indices, based on the information available.

Dangerous materials released			<input type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>
Environmental consequences			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Economic consequences			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input 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 level 1 rating relative to the dangerous substances released (parameter Q1) corresponds to 500 l of FFO, which is classified as petroleum derivatives according to the 'SEVESO 2' Directive 96/82/EC.

Owing to the lack of information on the length of water front or banks requiring decontamination, the rating relative to the economic consequences (parameter Env14) reaches level 1 by default.

And finally, the property damages of 0.112 M€, operating losses of 0.061 M€ or environmental decontamination costs of 0.023 M€ explain the level 1 rating of the 'economic consequences' index (parameters €15 and €18, respectively).

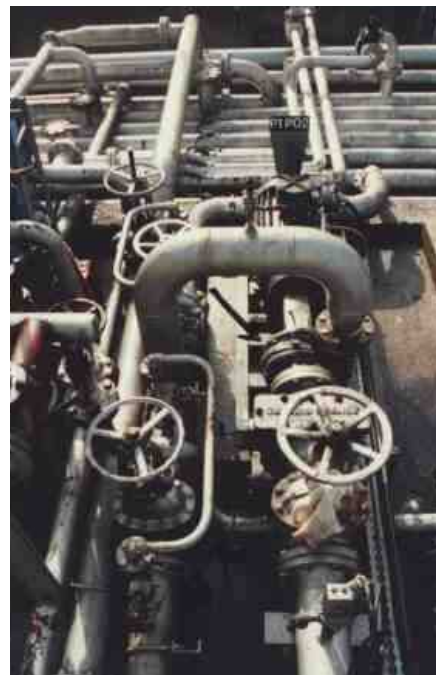


Photo : DRIRE Ile-de-France

ORIGIN, CAUSES AND CIRCUMSTANCES OF THE ACCIDENT

The leak occurred on one of the pumps of pump station No. 1. The pump body ruptured. This rupture was due to the accumulation of excessive stresses linked to:

- incorrect supporting of the lines and line accessories,
- lines incorrectly attached to the pump.

The phenomena was aggravated by the nature of the pump's casing (cast iron).



Photo: DRIRE Ile-de-France

In addition, spillage of product was possible as the resulting of various malfunctions:

- a liquid hydrocarbon detector was present 2 m from the pump in question but it was not operating: at this time, the operator had undertaken work allowing the closure of the tank's bottom valves to be slaved with signals from the detectors. This slaving was supposed to be operational at the end of October,
- the petrol intercepting trap was equipped with a densimetric plug (floaters) which prevented release into the Seine, but as the closure was not immediate, several hundreds of litres of FFO entered the Seine,
- the pump concerned was a back-up pump which was not in operation at the time of the incident, However, the overall management of the site was such that the valves were maintained open on a permanent bases.

ACTION TAKEN

The operator took the following immediate actions following the accident:

- the depot was secured,
- disassembly and verification of all the pumps of pump station No. 1,
- expert evaluation of the pump, (it should be noted that an attack alert occurred the day before),
- closure of the Seine discharge valve.



Photo: DRIRE Ile-de-France

Other measures were taken in a second phase:

- slaving of Seine discharge valve closure to the detection of liquid hydrocarbons located in the last compartment of the intercepting trap,
- monitoring of pump stations 1 and 3 by the personnel during depot business hours pending the refurbishing of the hydrocarbon detection system,
- monitoring of the pump stations during off hours and having the surveillance staff participate in "industrial protection" tasks",
- installation of a "one-fourth turn" valve on the retaining area of pumping station No. 1,
- drainage and cleanup of the petrol intercepting trap and the sewer network,
- forwarding of the corresponding documentary evidence relative to the elimination of the products resulting from the cleanup and drainage of the wastewater network,
- piezometric monitoring of the water table.

LESSONS LEARNED

Other more general measures were also adopted:

- ✓ integration of this type of scenario in the danger study,
- ✓ systematic closure of manual intake and discharge valves of the back-up pumps,
- ✓ expert evaluation of pumps and piping: an action plan based on the elimination of stresses and on the verification that the material used is adequate for the job. The plan also allows for replacement of the pumps that require it.

In addition, the administration requested that the implementation of other modifications also be foreseen. The main modifications are as follows:

- slaving of the Seine discharge valve closure also to the detection of hydrocarbons within the pump station: this would thus lead to the immediate closure of the Seine discharge valve on all detection signal, either liquid or gas.
- the study of the closure of this valve according to a detection noted at the Control Centre:
- verification of the correct positioning of the hydrocarbon detection device located at the outlet of the separator: it must be located sufficiently upline from the shut-off valve to avoid any discharge toward the Seine. In case of detection, the valve's reaction and closing time must be taken into consideration,
- possibility to have a floating barrier operational on a permanent basis: this phase still poses certain problems for the docks,
- a study concerning the installation of a permanent fixed floating barrier at the Seine release point:
- a study concerning the closure of all of the pump stations' mechanical valves when the depot is not open: the solution retained by the operator is to maintain the tank bottom valves closed during "off business" hours,
- rework of the seal of pump station No. 1,
- improvement of the signalling system throughout the depot.